

Persian and Arabic Language Students' L3 Acquisition of English Plural Marking: Language of Instruction Matters for Cross-Linguistic Influence

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Fatemeh Khezri¹
Ali Akbar Jabbari*²
Ali Mohammad Fazilatfar³
Fatemeh Jamshidi⁴

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Abstract

This study aims at comparing the effects of order of acquisition (L1 vs. L2) and language of contact instruction on third language acquisition (L3), exploring whether the context of acquisition affects learners' knowledge of the L3. To this end, four groups of L3 English learners were selected: The first and the second groups had Persian as their first language (L1) and Arabic as their second language (L2). The participants of the first group were students of Persian Language and Literature, while the participants of the second group were students of Arabic Language and Literature. The third and fourth groups had Arabic as their first language and Persian as their second language. The participants of the third group were students of Persian Language and Literature, while the participants of the fourth group were students of Arabic Language and Literature. The knowledge of English plural marking was elicited via a grammaticality judgment correction task and a picture description task, aimed at examining how these groups learn number agreement between the noun and its adjective modifier in English as their L3. Results revealed that Persian and Arabic A groups (those with Persian as their language of instruction) outperformed the other groups in both tasks, suggesting that they transferred plural marking facilitatively from Persian.

Keywords: transfer, multilingualism, third language acquisition, language of contact instruction, cross-linguistic influence

*Corresponding Author

1 Instructor, Department of English Language and Literature, Faculty of Language and Literature, Yazd University, Yazd, Iran. khezri.1368@gmail.com.

2 Associate Professor, Department of English Language and Literature, Faculty of Language and Literature, Yazd University, Yazd, Iran. jabbari@yazd.ac.ir.

3 Professor, Department of English Language and Literature, Faculty of Language and Literature, Yazd University, Yazd, Iran. afazilatfar@yahoo.com.

4 Instructor, Department of Arabic Language and Literature, Faculty of Language and Literature, Yazd University, Yazd, Iran. f.jamshidi1364@gmail.com.

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Introduction

The effect of formerly learned languages (L1, L2, L3, ...) on the acquisition of subsequent ones (L_n) has been among the most hotly debated issues in the studies of language acquisition. Second language acquisition is undoubtedly a well-explored territory. On the contrary, the specific research on third language (L3) acquisition is a new research field, especially within formal linguistic approaches, and is expanding rapidly due to its relevance to our multilingual world. The acquisition of the first (L1), second (L2) and third language is different in the initial stage and developmental sequence, because the components available to the learners in each process are different. In the last decades, there have been many studies investigating the acquisition of a third language. However, they often focused on how the L3 relates to the first language and/or the second language, and they have obtained different results.

Studies conducted in L3 acquisition have varied in the variables proposed to explain transfer from previous languages. Some have attributed privileged roles for the L1 (e.g., the L1 Factor, Hermas, 2010, 2014a, 2014b) or the L2 (e.g., the L2 Status Factor, Bardel & Falk, 2007; Falk & Bardel, 2011). Others consider both the L1 and the L2 as possible sources of transfer (e.g., the CEM, Flynn, et al., 2004; the TPM, Cabrelli Amaro et al., 2015; Giancaspro et al., 2015; Rothman, 2010, 2011, 2015).

While several recent studies have provided support for the TPM (see Puig-Mayenco et al., 2020), most of the language combinations in these studies are unambiguously typologically similar. In an effort to provide data from pairings where the typological distance between the L3 and the background languages is less straightforward, this study investigates the effect of Persian and Arabic on English L3 Acquisition.

A further understudied aspect in this study is whether the language that the individuals have selected and learned as their major and received most of their university instruction in plays a role in the transfer patterns observed at the early stages of third language acquisition. This study takes up that challenge.

Theoretical Framework

Four logical possibilities are introduced by Rothman (2015) for how morpho-syntactic transfer may manifest. The first is called the 'no transfer position.' It suggests that the primary state of language learning for any adult language learner is the same, irrespective of previous linguistic knowledge. The second and third are the "L1 factor" and "L2 status factor", which assume a deterministic role for the L1 and L2 of the learners, respectively. The fourth position considers either or both the L1 and/or the L2 as the transfer source of grammatical features and functional categories. This approach has traditionally been taken up by two different models, named Cumulative Enhancement Model (Flynn et al., 2004) and Typological Primacy Model (Rothman, 2015). The four competing hypotheses based on which the L3 acquisition of English noun-phrase number agreement by Persian-Arabic bilinguals is investigated are explained below.

1. *L1 Factor Hypothesis*

The second position introduced by Rothman has sometimes been

dubbed the 'L1 factor' or 'L1 status factor' (e.g., Håkansson et al., 2002; Hermas, 2010, 2014a, 2014b; Na Ranong & Leung, 2009). This hypothesis, first discussed by Håkansson et al. (2002), highlights the role of L1 in the early stages third language acquisition.

2. L2 Status Factor

The third logical position introduced by Rothman (2015) for morpho-syntactic transfer is the 'L2 Status Factor' (Bardel & Falk, 2007; Falk & Bardel, 2011). It borrows the name from the study on the L3 lexicon by Williams and Hammarberg (1998) and Hammarberg (2001). The L2 status factor model suggests that the cognitive and contextual nature of the L2 grammar makes it have a more prominent role than the L1 at the early stages of L3 morpho-syntactic development. Cognitively, both the L2 and the L3 are non-native languages. Contextually, both are acquired in different settings and at different ages from the first language, often as post-pubescent or adult learners in formal instruction settings. These authors assert that, due to age of acquisition and maturational constraints, the L1 grammar is stored in a memory system different from the one subserving the L2 and L3/*L_n* (procedural versus declarative memory, respectively). Therefore, the L2 and the L3 are more similar to one another in terms of cognition. This naturally entails that the L2 has a higher chance to influence the development of the L3 grammar, and thus an overall more substantial effect on L3 acquisition.

3. Cumulative Enhancement Model

The fourth position introduced by Rothman (2015) considers either or both the L1 and/or the L2 as the transfer source of grammatical features and functional categories. This approach has traditionally been taken up by two different models. They both agree that all formerly learned linguistic properties are accessible for transfer. They are the Cumulative Enhancement Model (CEM) of Flynn et al. (2004) and the Typological Primacy Model (TPM) of Rothman (2010, 2011, 2015). The CEM maintains that transfer from the earlier acquired languages can be facilitative or neutral. Crucially, the CEM predicts that if transfer is potentially negative from one of the transfer sources, it simply does not happen.

4. Typological Primacy Model

Rothman (2011) proposed the Typological Primacy Model, in which the choice of the previously obtained grammar as a transfer source in the acquisition of L3 is limited by the structural similarity (real or perceived) between the three grammars considered by the internal parser. Rothman claims that the comparison for establishing proximity has a specific order. It goes over similarities in the lexicon, then phonetics/phonology/phonotactics, then functional morphology, and, finally, syntactic structure. However, these levels are not mutually exclusive: they can all influence the parser's (unconscious) perception of similarities. In contrast to CEM, this model proposes that initial transfer is wholesale, not property by property.

Research Background

Below we present some related studies that examined the L3 transfer models explained in the previous section, along with some recent proposals considering roles for the dominant language in the learners environment in L3

acquisition.

While some scattered studies point to a prominent role of the L1 (e.g., Håkansson et al., 2002; Hermas, 2010, 2014a, 2014b; Na Ranong & Leung, 2009), García-Mayo (2012, p. 137) explains that although the absolute transfer of L1 in the early stages of L3 is a logical working hypothesis, there is no research in the recent literature to clearly defend this position. Similarly, De Angelis (2007) emphasizes the role of L1 transfer, although she does not attribute a privileged role to it, considering instead that the non-native language may play a more critical part in L3 acquisition.

The first and most cited study supporting the L2 status factor model is Bardel and Falk (2007). It presented new data on the acquisition of L3 Swedish and Dutch sentence negation, which supported transfer from the L2. The participants in this study had different L1s and L2s and acquired Swedish and Dutch as their L3. The study investigated the placement of negation at the early stages of L3 Swedish and Dutch. The learners' L3s were taught via Direct Method, and they produced semi-spontaneous speech in interaction with their teacher. The data supported the stronger role of the L2 status factor than the typology factor in L3 acquisition: learners seemed to transfer negation placement from their L2, irrespective of the typological relationship between the L3 and their L1 or L2.

Berkes and Flynn (2011) investigated the acquisition of relative clauses by two groups of L3 English learners of L1 Hungarian-L2 German and L2 English learners of L1 German. All three languages are head initial while German is underlyingly SOV, as seen in its obligatory verb-final word order in embedded clauses. Using an elicited imitation task, they investigated the acquisition of lexically headed and specified, lexically headed and unspecified, and free relative clauses. The results of the study revealed that the English L2 group outperformed in the production of the free relatives and lexically headed clauses while the English L3 group did not. The authors concluded that there was facilitation in L3 acquisition over what would have been non-facilitation from L2 German to L3 English. So their results can be considered as counter-evidence to both the L2 status factor model and TPM and good evidence for CEM.

The foundational evidence for the TPM comes from a study by Rothman and Cabrelli Amaro (2010). This study also built on the notion of Bardel and Falk's (2007) 'L2status factor' for syntactic transfer and explored the role of (psycho-)typology by examining the status of the Null Subject Parameter (NSP) in four different (L2 and L3) groups of Italian and French (see below for details), at the early levels of acquisition. Their participants were four groups of native English speakers. Two of them were acquiring French and Italian, respectively, as an L2. The other two were already highly proficient L2 speakers of Spanish and were acquiring Italian and French, respectively, as their L3. Comparing the languages under scrutiny in this study, Spanish is positively valued for the NSP, while English is negatively valued for this parameter. Crucially while Italian behaves like Spanish (and most other Romance languages) in that it has null subjects, French is not like English.

Despite the seeming support for the L2SF in this study, Rothman and Cabrelli Amaro discussed that psychotypology or even actual typology might be

at play. This means that both the L1 and the L2 are in principle accessible for transfer, in support of the CEM, but only one is transferred as the initial L3 interlanguage hypothesis, yielding both target like and non-target like performance (depending on where the target L3 grammar and the transferred L1 or L2 grammar coincide or diverge)

Another recently advanced position is that, in the early stages of third language learning, transfer comes from the speakers' dominant language, irrespective of whether it is an L1 or L2 (Fallah et al., 2016). Fallah et al. connect this claim to the Activation Threshold Hypothesis (Paradis, 2004, 2007). This hypothesis asserts that the choice of a specific background linguistic system in the multilingual mind depends on its activation threshold. In other words, frequent language use decreases the activation threshold and makes the more activated language more available for future use (Fallah & Jabbari, 2016).

However, not all studies have found dominance to play a significant role. Lloyd-Smith et al. (2016) found that syntactic transfer was not related to overall dominance or heritage language proficiency in a group of early Italian-German bilinguals. The structure under scrutiny were embedded wh-questions. Lloyd-Smith et al. used a proficiency index and vocabulary test to measure proficiency of the learners in German and Italian and investigated to what degree these measures predicted performance in the L3. Participants were all German-dominant heritage speakers of Italian, with different Italian proficiency levels. Using an acceptability judgment task, Lloyd-Smith et al. found that in L3 English the heritage speakers incorrectly accepted stimuli that followed to a similar degree the linear word order of both German and Italian. The results of this study questioned the role of typological proximity at later levels of L3 acquisition. Furthermore, the results showed that cross-linguistic influence from Italian happened for all speakers irrespective of proficiency/dominance.

Despite its relevance to the above claim, very few empirical studies in L3 acquisition have examined the role of the language of contact instruction, defined here as the language that individuals have selected and learned as their major of study and received most of their university instruction in. Language of contact instruction is markedly different from the concept of "language of communication" or "dominant language" proposed by Fallah et al. (2016), who describe it as a language that can be acquired naturally without formal instruction, usually as a result of living in a specific place, and used as a language for daily communication in the family, social environment, and school. It is also different from what Puig-Mayenco et al. (2020) have referred to as the "language of instruction." They considered the language of instruction as the language in which English as the third language is taught (at least for beginner learners) and investigated its effect as an extralinguistic factor on the third language development of the learners.

The present study aims to examine morphological aspects of the early L3 interlanguage grammar in order to assess whether (a) the L1 has a more prominent role in L3 acquisition, (b) the L2 somehow blocks access to the L1, (c) transfer comes from both the L1 and the L2, or (d) transfer seems to come only from one of the two languages, but this does not seem dependent on the

order of acquisition. Therefore, the first goal of this study is to test which, if any, of the models discussed above (L1 Factor, L2 Status Factor, CEM, and TPM) predict transfer patterns in the case of noun phrase attributive adjective agreement in L3 English by Persian-Arabic bilinguals with different orders of acquisition. The second goal of this study is to examine whether the language of contact instruction plays a superseding role in syntactic cross-linguistic influence (CLI)/transfer at the initial stages of L3 acquisition.

Syntax of Noun Phrase Attributive Adjective Agreement in Persian, Arabic, and English

A noun phrase contains a group of words headed by a noun. Each noun phrase contains modifiers that may follow or precede the head noun. Agreement occurs between nouns and their modifiers in some situations. It commonly happens in languages such as French, Spanish, and Arabic, in which articles, determiners, and adjectives agree in number (and, sometimes, gender) with the nouns they modify. In languages in which grammatical gender plays an important role, such as French and Arabic, a noun and its modifiers often agree in gender. In languages that have a case system, such as German and Arabic, there is often agreement by case between a noun and its modifiers.

The focus of this study is on singular or plural agreement between the nouns and their adjective modifiers in noun phrases in Arabic, English, and Persian. This phenomenon is described, compared, and contrasted in these languages in the rest of this section.

In Persian, nouns can be marked as singular or plural in terms of grammatical number. The singular form refers to one person or thing, while the plural form refers to more than one of that noun.

Persian nouns are pluralized in one of these three ways: Using the plural suffix "ha:", using the plural suffix "a:n", or using the original irregular form in Arabic borrowings (in the written register only, see below).

The most common way of marking number in Persian is through the suffix "ha:":

(1) Mi:z→Mi:zha:

Table→Tables

(2) Si:b→Si:bha:

Apple → apples

(3) Danesha:mu:z→Danesha:mu:zha:

Student → Students

Once productive across all nouns, the plural suffix " a:n" is now restricted to animate nouns and, in particular, human nouns:

(4) Danesha:mu:z→Danesha:mu:za:n

Student → Students

Arabic loan words are marked for plural either with the regular Persian suffix "ha:" (in spoken Persian) or with an irregular, idiosyncratic form (in written Persian):

(5) Keta;b→Keta:bha:

Book → Books

(6) Keta:b→Kotob

Book → Books

Number agreement between nouns and their adjective modifiers in noun phrases does not happen in Persian in any of the cases mentioned above:

- (7) Mi:zhayebozorg
Table.pl.Ez big
big tables
- (8) Si:bha:ye Khoshmæze
Apple.pl.Ez delicious
Delicious apples
- (9) Da:neshamu:zane Ku:sha
Student.pl.Ez studious
Studious students

The plural in Arabic is of two kinds: regular and irregular or "broken". The regular plural is, in turn, divided into the regular masculine plural and the regular feminine plural. The regular plural is thus called because the singular form remains unchanged; the omission of "s" (marking feminine gender) is not considered as breaking the form (Sterling, 1904). Therefore, nouns are singular, dual, or plural in Arabic. Each of these types may be masculine or feminine. The feminine is formed by adding " *feminine /t/*" (ة) to the end of the masculine form:

- (10) Telmizon → telmizætton
Student-M student-F

The dual form is formed by adding "a:ne" to the singular for the nominative and "æine" for the genitive form:

- (11) Telmizon → Telmiza:ne
Student-sing.M Student-dual.M.Nom
Telmizon → Telmizæine
Student-sing.M Student-dual.M.gen.
- (12) Telmizætton → Telmizata:ne
Student-sing.F Student-dual.F.Nom.
Telmizætton → Telmizætæine
Student-sing.F Student-dual.F.gen.

The plural masculine form is formed by adding "u:næ"(in the nominative case) to the end of its singular form and "i:næ" (in the genitive case) to the end of its singular form.

- (13) Telmizon → Telmizu:næ
Student-sing.M Student-pl.M.Nom.
Telmizon → Telmizi:næ
Student-sing.M Student-pl.M.gen.

The plural feminine form is formed by adding " a:ton" to the end of the singular masculine form in the nominative case and "a:ten" to the end of the singular masculine form in the genitive case.

- (14) Telmizaton → Telmiza:ton
Student-sing.F Student-pl.F.Nom
Telmizaton → Telmiza:ten

Student-sing.F Student-plural.F.genitive

These processes all apply exclusively to indefinite nouns. When nouns are definite in Arabic, the prefix "al" is added to both the noun and its adjective modifier in all cases, and "tanween" (ـَ , ـِ , ـُ) is omitted. *Tanween* is a /n/ sound

added to the end of a word in certain situations in Arabic sentences, and its function is similar to "a" and "an" in English, indicating an indefinite article.

Adjectives in Arabic agree with the nouns they modify in gender, number, case, and definiteness.

English also inflects nouns for number. The plural morpheme "s" (or "es" in some cases) is suffixed to the end of the count noun in regular cases:

(15) Student → students

(16) Watch → watches

In irregular cases, the noun is not suffixed, but instead, its root undergoes some change. One of them is a change in the vocalic sound of the root, although some plural forms are entirely different from the corresponding singular.

(17) Man → Men

(18) Person → people

In this language, adjectives are not inflected for number.

(19) good student → good students

In general terms, noun phrase attributive adjective number agreement is similar in English and Arabic, and in turn, dissimilar in Persian. According to Husseinali (2016), "the attributive adjectives follow their head nouns in Arabic and agree with them in gender, number, and case when the head noun is human. However, in English, the attributive adjectives precede their head nouns, but they agree with them in number (like Arabic) whether the noun is human or not." (p. 90). On the other hand, Persian is a strictly head-initial language in which attributive adjectives follow the nouns in a noun phrase, but they do not agree in number. (See Table 1 for a comparison of attributive adjective agreement in Persian, Arabic, and English).

Table 1

Noun Phrase Attributive Adjective Agreement in Persian, Arabic, and English

	Singular	Dual	Plural
Persian	daneshamu:zekhu:b student good		daneshamu:zanekhu:b students good
Arabic	telmizunjahidun student-M. good-M. telmizætun jahidætun Student-F. good-F.	Telmiza:nejahida:ne student-dual.M good-dual-M. telmizæta:ne jahidæta:ne student-dual.F. good-dual.F.	Tæla:mizunja:hidu:n student-pl.M good-pl.M. telmiza:tun ja:hida:tun student-pl.F. good-pl.F.
English	a good student		good students

These language pairings allowed us to test the following hypotheses (see Table 2):

1. The L1 properties are the deterministic sources of transfer in the early stages of L3 acquisition according to the L1 Factor hypothesis. If the L1 fully determines the acquisition of L3 English, both Persian A and B groups are predicted to transfer their L1 Persian, bringing about a facilitative effect. On the other hand, the Arabic A and B groups are predicted to transfer L1 Arabic, resulting in a detrimental effect. Therefore, Persian groups will not pluralize the adjectives in noun

- phrases in L3 English, while the Arabic groups will.
2. The L2 properties are the deterministic sources of transfer in the primary stages of L3 acquisition according to the L2 Status factor model. If the L2 fully determines the acquisition of L3 English, both Persian A and B groups are anticipated to transfer their L2 into their L3 detrimentally, while the Arabic groups are predicted to transfer L2 Persian, bringing about a facilitative effect. Therefore, Persian A and B groups will pluralize the adjectives in noun phrases in L3 English, while the Arabic A and B groups will not.
 3. Both L1 and L2 properties will be transferred into L3 regardless of the order of acquisition, resulting in facilitative effects for all four groups. Therefore, all participants will transfer Persian into their L3 English. This model predicts no differences across the four groups' performance on the tasks predicting that all of them will not pluralize the attributive adjectives in English noun phrases.
 4. According to TPM, L1 or L2, which is more similar to L3 in typology, is the main transfer source. To determine such underlying similarity, the linguistic parser processes a hierarchical continuum of four linguistic cues subconsciously, including the lexicon, phonological cues, functional morphology, and syntactic structure. While lexical and phonological cues are likely to be uninformative to select between Arabic and Persian here, there might be more similarities in functional morphology overall between Persian and English than between Arabic and English. The attributive adjectives do not agree with head nouns in noun phrases in both languages. Therefore, the TPM anticipates that Persian would be the deterministic transfer source (the predictions of TPM and CEM are confounded in this study) at the early stages of L3 English acquisition, resulting in facilitative effects for all four groups. Thus all four groups will not pluralize the attributive adjectives in English noun phrases.
 5. The dominant language of contact instruction serves as the deterministic transfer source in the initial stages of L3 acquisition. So Persian A and Arabic A groups, with Persian as the language of contact instruction, will not have any difficulty in comprehending or producing plural marking in English but, both Persian B and Arabic B groups, with Arabic as the language of contact instruction, will tend to pluralize the adjectives in accordance with the nouns in noun phrases.

Table 2

Predictions for the Transfer of Number Agreement in NPs

	Persian A	Persian B	Arabic A	Arabic B
L1 Factor	Persian(F)*	Persian (F)	Arabic (D)	Arabic(D)
L2 status Factor	Arabic (D)*	Arabic (D)	Persian (F)	Persian (F)
CEM	Persian (F)	Persian (F)	Persian (F)	Persian(F)
TPM	Persian (F)	Persian (F)	Persian (F)	Persian (F)
Language of contact instruction	Persian (F)	Arabic (D)	Persian (F)	Arabic (D)

F= facilitative effect D= detrimental effect

Method

Participants

The participants consist of four groups:

The first and the second groups had Persian as their first language (L1) and Arabic as their second language (L2). The participants of the first group were students of Persian language and literature, while the participants of the second group were students of Arabic and literature. The third and fourth groups had Arabic as their first language and Persian as their second language. The third group were students of Persian language and literature, while the fourth group were students of Arabic language and literature. (see Table 3 for a description of the participants.)

The participants of this study included male and female students studying Persian language and literature and Arabic language and literature at Yazd University and Shahid Chamran University of Ahvaz. Ahvaz is one of the cities in south Iran, the people of which have Arabic as their first language, but Persian as the official language. So the Ahvazi children get familiar with Persian as a second language when they enter school at the age of 7, but they start learning English when they enter secondary school at the age of 12, just like the children all over Iran. Of course, some people prefer their children to learn English before school, but this factor was controlled in this study to ascertain that all the participants started learning their L3 English at the same age.

The students selected from Yazd University had Persian as their first language and Arabic as their second language, which they were exposed to at the age of 7 in language learning institutes as their second language. They also started learning English at the age of 12, when they entered secondary school.

Sixty-four participants were selected from the students who took the Oxford Quick Placement Test (OQPT). The selected students' proficiency scores ranged from 18 to 29, so they were considered as elementary learners of English according to the interpretation guide provided with the OQPT (Geranpayeh, 2003). The age range of the subjects varied from 20 to 30.

Table 3

Description of the Participants

Group	First language	Second Language	Third language	Language of contact instruction
Persian A	Persian	Arabic	English	Persian
Persian B	Persian	Arabic	English	Arabic
Arabic A	Arabic	Persian	English	Persian
Arabic B	Arabic	Persian	English	Arabic

Tasks

The tasks used in this study are a Language and Social Background Questionnaire (LSBQ), the Oxford Quick Placement test (OQPT), a timed Grammaticality judgment/ correction task (TGJ/CT), and a Picture description task (PDT).

The Language and Social Background Questionnaire (Anderson et al., 2018) is a questionnaire containing 22 items which includes information about the participants' proficiency as well as their environmental context. It provided

us with the participants' personal information about the participants, as well as information about their exposure to Persian, English, and Arabic. This questionnaire was also used to elicit information about the participants' age, gender, place of birth, their language backgrounds, the age and the context of language acquisition, the length of time they had been learning English, when they first began learning English, the type of instruction they had received, and their approximate proficiency levels in the respective languages according to their own self-evaluation.

According to Geranpayeh (2003), the Oxford Quick Placement test is a flexible test of English language proficiency developed by Oxford University Press and Cambridge ESOL (English for Speakers of Other Languages) to provide teachers with a reliable and time-saving method of finding a student's level of English. We used the OQPT to ascertain that the participants were at low proficiency levels in L3 English. The simultaneous administration of the OQPT and the LSBQ ensured that our participants were both at low proficiency and had had relatively low exposure to English.

The paper and pen version of this test was used for the purpose of this study. All items in this test use a multiple-choice format to test students' reading and structure, including grammar and vocabulary. This test takes about 30 minutes to administer. The answers are recorded directly on the answer sheet, and the answer sheets are quickly marked using the answer key provided. The test consists of two parts. Part 1 was taken by all candidates. This part contains 40 items, including items of vocabulary, grammar, and cloze passages. Part 2 is for higher proficiency students only. Participants who obtain scores of 30 and above can take the second part.

The Timed Grammaticality Judgment/Correction Task (Appendix A) comprising 28 items was administered to assess the participants' comprehension of the plural features in English. The GJ/CT is a set of grammatical and ungrammatical sentences for which the learners are supposed to judge their grammaticality and correct the ungrammatical ones. There is a time limit to complete the task in order to ensure that it taps into the implicit knowledge of the learners with the least possible intrusion of metalinguistic knowledge. The test contained sentences including the target structures (plural NPs) as well as several distracters (14 items). Distracters tested structures other than the target ones to divert the participants' attention from the structures in focus. They consisted of grammatical and ungrammatical items (7 for each). The items focusing on the target structures (14 items) also consisted of both grammatical and ungrammatical types (7 for each):

- (1) The good students were doing their homework at home. ✓
- (2) The strongs workers were working in the building. ✗

The Picture Description Task was used to check the participants' production of plural marking in noun phrases. It comprised two pictures containing plural items to be described. Below each picture, some sentences were provided (12 in total), each containing a blank. The participants had to fill in the blanks with plural nouns using the picture above the items (see Appendix B). There were also 12 distractor sentences in this task. The participants were provided with possibly unknown words.

Procedure

As the first step in the data collection procedure, the number of the participants was estimated by running some power analyses to ascertain achieving decent statistical power and effect sizes using the R statistical package. Considering the large effect size ($f = 0.432$) and the alpha level of $p < .05$, the number of participants equals 15.6 for the power level of 0.8.

To tap into the participants' L1, L2, and L3 use, they were asked to complete the Language and Social Background Questionnaire. Meanwhile, They took an English proficiency test to ascertain that they were at the initial level of English proficiency. After one week, they took the timed grammaticality judgment/ correction test (TGJ/CT).

The next week, participants were provided with some pictures to describe in the PDT. They completed the description of the printed pictures in English in a specified space below each picture.

The participants' L2 knowledge of the structures under study was tested (after the L3 testing) to ascertain that they have differentiated L1 and L2 background knowledge available for the structure of interest.

Correct answers in both GJ/CT and PDT were coded as 1, and the incorrect ones as 0 in SPSS. By correct answers, we mean those in which an incorrect sentence was marked as such, followed by the right form, as well as those correct sentences which were appropriately marked as such by the participants. In the PDT, NPs which were grammatically correct were considered as correct answers and coded as 1.

Results

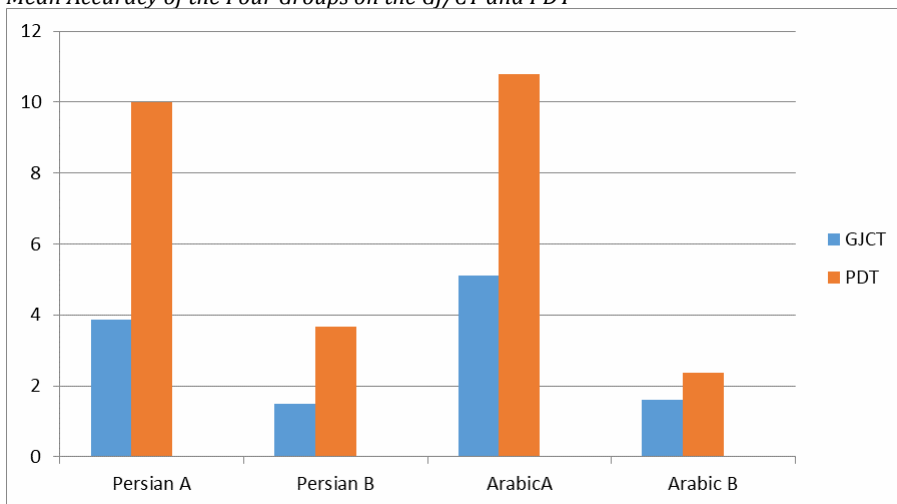
Descriptive statistics of the two tasks are presented in table 4. Regarding the GJ/CT, the Arabic A group got the highest mean ($M = 5.1$) in terms of their performance on the 14 items checking plural marking amongst the four groups, followed by the Persian A group ($M = 3.87$), while the lowest mean is 1.5, obtained by the Persian B group. Regarding the PDT, the Arabic and Persian A groups obtained approximately the same means, 10.8 and 10, respectively, and the lowest mean is obtained by the Arabic B group ($M = 2.37$). These results also showed that the overall performance of the participants in the picture description task was better than their performance in the grammaticality judgment task

Table 4

Mean Accuracy of Four Groups on the GJ/CT and the PDT

Groups	N	GJCT		PDT	
		Mean	SD	Mean	SD
Persian A	16	3.87	4.42	10	2.64
Persian B	16	1.5	2.82	3.68	2.12
Arabic A	16	5.1	7.1	10.8	1.85
Arabic B	16	1.6	4.3	2.37	2.91

Figure 1
Mean Accuracy of the Four Groups on the GJ/CT and PDT



In order to compare the participants' scores in both tasks, Kruskal-Wallis tests which are the non-parametric alternative of One-way ANOVA were run because the data violated the assumption of normality.

A Kruskal-Wallis test showed a statistically significant difference among the four groups' scores on the PDT, $\chi^2(3, N = 64) = 42.8, p = 10^{-9} \times 2$, but not the GJ/CT, $\chi^2(3, N = 64) = 4.9, p = .17$ in GJ/CT.

On the other hand, The results of the Mann-Whitney U tests conducted on the data obtained from the PDT indicated a significant difference in the performance of Persian A and Persian B groups ($z = -4.37, p = 10^{-6} \times 12$), Persian A and Arabic B groups ($z = -4.43, p = 10^{-6} \times 9$), Persian B and Arabic A ($z = -4.71, p = 10^{-6} \times 2$) and Arabic A and Arabic B groups ($z = -4.73, p = 10^{-6} \times 2$) but neither Persian and Arabic A groups ($z = -.616, p = .53$) nor Persian and Arabic B groups ($z = -1.7, p = .08$) performed significantly differently.

Table 5
Results of the Mann-Whitney U Tests Conducted on the Data Obtained from the PDT

	Persian A		Persian B		Arabic A		Arabic B	
	<i>z</i>	<i>p</i>	<i>z</i>	<i>p</i>	<i>z</i>	<i>p</i>	<i>z</i>	<i>p</i>
Persian A								
Persian B	-4.37	0.000012*						
Arabic A	-6.16	.53	-4.71	0.000002*				
Arabic B	-4.43	0.000009*	-1.7	.08	-4.73	0.000002*		

Discussion

According to the results reported in the previous section, the Persian and Arabic A groups, whose language of contact instruction is Persian, outperformed the other groups in the PDT. While there were some numerical trends favouring these groups over the Arabic-instructed groups in the GJCT, differences between them were not statistically significant. This may have to do with the overall poor performance of all groups in this task (5 out of 14 being

the highest group mean), which might obscure potential differences between them. The production data in this study shows that those learners with Persian as their language of contact instruction constructed attributive adjective-noun number agreement correctly in English, observing the morphological rule that the attributive adjective carries no plural marking, even within plural NPs. This suggests that Persian may have been a source of facilitative transfer, especially in contrast with the performance of the B groups (with Arabic as a language of contact instruction), who seemed to transfer number marking on the adjective from Arabic. Producing phrases such as *goods students*, *males classmates*, *opens books*, and *actives boys* to fill in the blanks in PDT.

Another fact clearly shown by the results of the study is that the participants' performance in the PDT was generally better than their performance in the GJ/CT. This seems to indicate that the participants' production of noun-attributive adjective agreement is better than their comprehension of it.

Returning to our hypotheses, the L1 factor hypothesis (Håkansson et al., 2002; Hermas, 2014a) claims that the L1 fully determines the acquisition of the L3. For this study, this means that Persian A and B groups are predicted to transfer the target property from their L1 Persian, facilitatively. In contrast, the Arabic A and B groups are predicted to transfer L1 Arabic, bringing about a detrimental effect. The results of this study, however, contradict this hypothesis, with Persian A and B and Arabic A and B groups performing differently from each other, respectively—and the A group outperforming the B group in both cases.

The second hypothesis we reviewed above, the L2 Status Factor, would expect the Persian A and B groups to pluralize the adjectives in English noun phrases to agree with the head nouns, in line with (L2) Arabic, and the Arabic A and B groups to keep the adjective singular, in line with Persian. For the same reason as with the L1 hypothesis, the L2 Status Factor is not supported here: groups with the same L2 perform differently from each other.

The next hypothesis, the Cumulative Enhancement Model (Flynn et al., 2004), predicts no differences across the four groups' performance on the tasks because it maintains that previously acquired languages can be transferred facilitatively to the subsequent language acquisition or remain neutral. According to the CEM, all participants in this study are predicted to transfer Persian, regardless of the order of acquisition, resulting in facilitative effects for all four groups. As we have seen before, groups differed in their performance in the PDT, contrary to this prediction. While they did not differ in the GJCT, their performance was remarkably low, which would not be expected under the CEM's prediction that Persian NP number agreement is transferred here.

According to TPM (Rothman, 2010, 2011, 2013, 2015), L1 or L2, which is typologically/structurally more similar to the L3, is the main source of transfer. To determine such underlying similarity, the linguistic parser processes a hierarchical continuum of four linguistic cues subconsciously, including the lexicon, phonological cues, functional morphology, and syntactic structure. While lexical and phonological cues are likely to be uninformative to select between Arabic and Persian here, there might be more similarities in functional morphology overall between Persian and English than between

Arabic and English. If this is the case, the TPM would expect Persian to be the source of transfer for all four groups. In any case, a natural prediction for the model would be that all groups behave the same. This was not the case, at least in the PDT, although it did hold for the GJCT. To the extent that the specific prediction of a transfer source is indeed Persian, the poor results of the GJCT would also contradict this.

The results of the present study are compatible with the predictions of the last hypothesis discussed in our introductory section, which posits that the dominant language of contact instruction serves as the deterministic source of transfer in the early stages of L3 acquisition. This is most clearly supported by the results of the PDT, where the Persian and Arabic A groups clearly outperformed the B groups, arguably showing facilitative transfer from their dominant language of contact instruction, Persian. The similarly low performance of all groups in the GJCT does not add further support to these results, although the lack of significant differences might reflect methodological shortcomings rather than a true absence of differences. For example, it might be that the lexical knowledge of our learners was too low, complicating the parsing of the test sentences for them and thus limiting our insight into their grammatical competence.

Conclusion

This study investigated the acquisition of number agreement between the attributive adjective and the head noun in (L3) English noun phrases by four groups of students of Persian language and literature and Arabic language and literature with different combinations of Persian and Arabic as L1 or L2. The data collected using a GJ/CT and a PDT were analyzed to test which, if any, of the L3 transfer models (L1 Factor, L2 Status Factor, CEM, and TPM) correctly predicted transfer patterns in these groups. Simultaneously, our goal was to test these hypotheses against one in which the language of contact instruction plays a superseding role in syntactic transfer at the early stages of L3 acquisition. Since the Persian and Arabic A groups with Persian as their language of instruction outperformed the other groups in both production and comprehension of the noun phrase attributive adjective agreement rule, the results of the present study suggest that the dominant language of contact instruction plays a more significant role than assumed to date, serving as the deterministic transfer source in the early stages of L3 acquisition.

The results also suggest that the context of learning affects the acquisition of the third language. This means that if the learners associate instructed learning with a specific language (Persian or Arabic in the case of this study), it might show that this language is more prominently activated in any other instructed context, including the L3 classroom. In the case of the present study, students of Arabic language and literature and Persian language and literature associated the academic context of English learning with Persian as their language of contact instruction and seemed to transfer the agreement rule from this language facilitatively.

The findings of the present study can be useful for material developers in the ELT domain and also for those who design and present language learning tasks to enhance the learners' comprehension and production of English as a

third language.

Since the participants of this study were elementary L3 learners of English, the findings may not be generalized to learners at other levels of English (who will have had more experience with the language and potentially overcome initial difficulties). The role of gender, the proficiency level of language of contact instruction, and the dominant language of communication is not taken into consideration either. Considering these factors in their research, future researchers may use various tasks, especially oral ones, to see the effect of language of contact instruction on the learners' acquisition of the L3.

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Appendix A

Grammaticality Judgment Correction Task

Grammatical plural:

1. The hungry kids were looking at the dish.
2. He was looking at the stressed students.
3. I visited the kind doctors in the clinic.
4. His mother talked with the patient nurses in their room.
5. The good students were doing their homework at home.
6. I didn't know the five drivers.
7. Brave girls are watching a violent movie.

Ungrammatical plural

1. My beautifuls sisters are at school.
2. His nices boys were playing in the backyard.
3. Mr. Smith wanted to discuss the issue with his hard workings employees.
4. The clevers kids usually answer the questions.
5. The strongs workers were working in the building.
6. Honests men were in the court.
7. The calms babies are in their beds.

Grammatical distracters

1. The girl came home after running.
2. She was making dinner.
3. The baby was crying.
4. They were listening to the music.
5. She made lunch yesterday.
6. They're busy all day long.
7. She said that her last trip was really scenic.

Ungrammatical distracters

1. The windows is broken.
2. I've been in England for 1989.
3. Neil Armstrong were an astronaut.
4. John were a police man in 2015.
5. She opening the door.
6. He's smoking yesterday.
7. The coffee are hot.

Appendix B Picture Description Task



جذاب = Attractive

با مزه = Cute

مذکر = Male

نگران = Nervous

رسمی = Formal

قفسه = Shelf

Plural:

1. The _____ are in the library.
2. The _____ are studying.
3. The sad girl is looking at her _____ .
4. The _____ are looking at their books.
5. There are three _____ on the desk.
6. There are three _____ on the desk.
7. She is satisfied with her _____ .
8. The teacher is wearing _____ .

Distracters:

9. The library is _____
10. There are many books on the _____ .
11. Another _____ is sitting next to the shelves.
12. A(an) _____ is their teacher.
13. The studious boy is looking at the book.
14. The _____ is helping his classmate.



فعال = Active

بازیگوش = Naughty

هیجان زده = Excited

خجالتی = Shy

آفتابی = Sunny

Plural:

1. They are all ____ .
2. The ____ are playing.
3. The tall girl is looking at her ____ .
4. The man enjoys watching the ____ playing.

Distracters:

5. All the children are ____ a good ____ .
6. This picture ____ a playground in spring.
7. The weather is ____ and nice.
8. The trees are ____ and beautiful.
9. The handsome man loves to ____ children playing.
10. The little girl ____ swinging and shouting.