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Research Paper

# Processability Theory: Stage-like Development of 'Copula inversion' and 'Negation' in Iranian EFL Learners' Writing Performance

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**Abstract**
Processability Theory (PT) is regarded as one of the prominent theory of second language acquisition (SLA) developed to illuminate the developmental sequences in SLA as well as some other linguistic phenomena (Pienemann, 1998a; 2011). Since 1990s, Processability has been at the center of attention in second language acquisition research. Within the framework of Processability theory and through analyzing the written performance of Iranian EFL learners, the present research focused on the acquisition of "Copula inversion" and "Negation" across five proficiency levels, from elementary to advanced and compared it with the stage-like development model of morpho-syntactic structures proposed by Pienemann (1998a, 2011). The study followed a descriptive method of research and the data was collected from 350 participants in five different proficiency levels from elementary, pre-intermediate, intermediate, upper-intermediate and advanced. The participants were asked to provide samples of their written performance on different tasks such as introduction task, habitual action task, story retelling task, audio-video-retelling task, picture description task, composition, communication task. The data in this research was analyzed both qualitatively, in order to identify and classify the type and order of the morpho-syntactic structures; and quantitatively, by calculating means. The results of Kruskal-Wallis test revealed that "Negation" emerged at the elementary level of the language learners' performance and "copula inversion" emerged at the intermediate level. Just the same, the competence of the learner grows stronger in concern with these variables through the higher proficiency levels. These findings imply that PT is valid for Iranian EFL learners, as well.

**Keywords:** *Copula inversion, Negation, Processability Theory, Stage-like development*

مطالعه پیشرفت مرحله ای ساختارهای نحوی-واژی با تاکید بر" منفی سازی فعل " و" جابه جایی فعل ربطی و فاعل" در عملکرد نوشتاری زبان آموزان ایرانی از دیدگاه نظریه پردازش پذیری

نظریۀ پردازش‌پذیری نظریه‌ای مرتبط با فراگیری زبان دوم است که در جهت تبیین پیشرفت مرحله ای در زمینه فراگیری زبان دوم و دیگر پدیده‌ها شکل گرفت (پینمن، 1988الف). از دهۀ 1990، پردازش‌پذیری یکی از اصلی‌ترین دغدغه‌های پژوهش در حوزۀ فراگیری زبان دوم بوده است. در چارچوب این نظریه، پژوهش حاضرفراگیری مرحله‌ای دو ساختار «جا به جایی فعل ربطی و فاعل» و «منفی سازی فعل» را ازطریق تحلیل نوشتارهای زبان‌آموزان ایرانی در پنج سطح مبتدی تا پیشرفته بررسی نموده و آنها را با مدل پیشرفت مرحله‌ای ساختارهای نحویِ - واژی پینمن (1988الف) مورد مقایسه قرار داده است. داده‌های مورد نیاز این پژوهش که با بهره‌گیری از روش تحقیق توصیفی انجام شده، از طریق۳۵۰ زبان‌آموز در پنج سطح مبتدی، پیش‌متوسط، متوسط، فوق متوسط و پیشرفته گردآوری و مورد تحلیل قرار گرفته است. داده‌ها به لحاظ کیفی به منظور شناسایی و طبقه‌بندی نوع و ترتیب ساختارها و نیز به لحاظ کمّی با محاسبۀ میانگین مورد تحلیل قرار گرفتند. نتیجۀ آزمون کروسکال-والیس نشان داد که دو ساختار (( منفی سازی فعل )) و «جا به جایی فعل ربطی و فاعل» به ترتیب در مرحله مقدماتی و متوسط یادگیری زبان انگلیسی ظاهر می‌شوند . در روندی بسیار مشابه، با ارتقاء سطح فراگیران، توانش زبانی آنها در رابطه با این دو ساختار نیز افزایش می یابد. یافته‌های تحقیق نشان داد که نظریۀ پردازش‌پذیری تا حد بسیار زیادی در مورد زبان آموزان ایرانی معتبر است.

**واژگان کلیدی**: جا به جایی فعل ربطی و فاعل، منفی سازی فعل، نظریه پردازش پذیری، پیشرفت مرحله ای

## Introduction

Processability Theory (PT) is regarded as theory of second language acquisition (SLA) which was developed to explain the developmental sequences in SLA as well as some other linguistic phenomena and the Processability hierarchy is the core component of this theory (Pienemann, 1998a; 2011). A fundamental assumption is that the hierarchy can be applicable to all languages.

PT addresses the problem of SLA from a processing point of view. It claims that some processing operations are used to predict the developmental order of second language grammar acquisition regardless of the language under study. PT aims to offer a cross-linguistically applicable and psycholinguistically plausible explanation for the stages and sequences the learners get through in learning to produce morpho-syntactic structures of the target L2. The logic underlying Processability theory is that: "at any stage of development, the learner can produce and comprehend only those L2 linguistic forms which the current state of the language processor can handle". Therefore, the notion of the architecture of the human language processor is crucial in the theory.

Up to the present time, a number of different studies concerning second language acquisition have examined the validity of Processability theory in a number of languages. They include: Swedish (Glahn et al. 2001); (Hakansson, 2001; Hakansson, 2013); Arabic (Husseinali, 2006; Mansouri, 2000; Mansouri, 2005); Italian (Bettoni, Di Biase & Nuzzo, 2009); French (Ågren, 2009); Chinese (Zhang, 2004, Zhang, 2005); Japanese (Di Biase & Kawaguchi, 2002). Moreover, there are some studies done in this field in EFL and ESL contexts (e.g. Khansir and Zaab, 2015; Mohammadkhani, Eslamdoost & Gholamreza'i, 2011; Taki and Hamzehian, (2016). The results of these studies showed that morpho-syntactic structures were acquired following the fixed sequence predicted by PT. However, it seems that the study of this typical order in the development of second language is in need of more investigation at least in EFL contexts.

Accordingly, the main purpose of the present study was to cross-sectionally validate the processability theory, in general, and, to test the written performance of Iranian EFL learners' use for identifying the stage-like development of morpho-syntactic structures, in particular by comparing it with Pienemann's model to identify whether there is any consistency or not. To this end, the present research focused on the acquisition of "Copula inversion" and "Negation" across five proficiency levels from elementary to advanced. The question that guided this research was whether there was any significant difference among the means of the frequency of "Copula inversion" and "Negation" in the interlanguage of Iranian EFL learners across five proficiency levels.

## Literature Review

Researchers interested in appreciating how people acquire a second language (L2), especially the acquisition of morpho-syntactic structures, have been discussing two research issues for decades: the logical problem and the developmental problem (Hawkins, 2001). The logical problem is to account for what makes it possible for the L2 speakers to develop the mental representations of grammar in the first place. As it is often observed, the L2 syntactic knowledge that speakers have developed appears to go beyond the properties of input that they have been exposed to, i.e., how do speakers come to know more than presented in the input? The developmental problem is to describe how the knowledge of morpho-syntax develops over time, i.e., why some properties are acquired earlier than others, and why some properties remain difficult even for the advanced second language speakers (Hawkins, 2001). The existence of L2 acquisition orders was originally suggested by Dulay and Burt (1973, 1974) and Bailey, Madden,

and Krashen (1974), inspired by the research done by Brown (1973). Brown (1973) examined L1 development, with a focus on the emergence of 14 English morphemes.

Researchers further investigated the acquisition of English morphemes with learners from different L1 backgrounds (Dulay & Burt, 1974). The researchers compared the oral performance of 60 Spanish and 55 Chinese children learning English as a L2 using the Bilingual Syntax Measure. The results suggested the following common acquisition order of the morphemes for both of the groups of L1 learners: 1) –ing (progressive), 2) plural and copula, 3) auxiliary and articles, 4) irregular past, and 5) regular past, third person singular and –'s (possessive).

Teachability Hypothesis was proposed by Pienemann (1984, 1988b) based on his application of the multidimensional model to German as a second language. According to the teachability hypothesis, instruction does not change a L2 learner's acquisition sequence of grammatical structures because none of the developmental stages which was hypothesized by the multidimensional model can be skipped by the L2 learners.

Later, Pienemann and Johnston (1985, 1987a, 1987b) suggested a new predictive framework relying on a set of universal speech processing constraints in order to explain the implicational order of second language acquisition. This theoretical framework initiated a shift in research from the multidimensional to Processability Theory (PT) (Pienemann, 1998b).

Pienemann (1998c) stated that the three central features of PT are language-specific, incremental and linear. According to Processability Theory, there are specific procedural skills obligatory for the processing and the production of utterances in second language. In the first stage, learners develop lexicon that is the basic element to all language processing in later stages. In the second stage, the learners use the bound morphemes to produce free morphemes. In the third stage, disconnected phrases bring together by intra-phrasal components such as conjunctions.

Pienemann (1998a) claims that English morphology and syntax develop in six stages: subordinate clause procedure; sentence procedure; verb phrase procedure; noun phrase procedure; category procedure; word/lemma.

These elements form a hierarchy so that the element of a lower stage is a prerequisite for the other elements in the higher stages and it is impossible for the stages to be skipped.

Furthermore, In Iran, Mohammadkhani, Eslamdoost & Gholamreza'i (2011) tried to find a relationship between second language instruction and learners' productive use of 3rd person singular -s. Researchers collected written data from 151 participants in three different proficiency groups in two phases. The findings showed that elementary learners were less developed in their Interlanguage and are in lower levels of development based on Processability theory (1998a, 2003).

Moreover, Khansir and Zaab (2015) studied the impact of Processability theory on the speaking skill of Iranian EFL learners. The result of this research showed that both tasks were effective instruments to help EFL learners produce the target structures in the order predicted by Processability theory.

In another study, Taki and Hamzehian (2016) investigated the validity of Processability theory among Iranian EFL learners' oral performance. The results indicated that Iranian EFL learners produced language structures in the predicted procedural stages as proposed by Processability theory.

As it is evident, there are very few studies testing PT on EFL learners and in other countries, PT has been supported by a number of studies which have mainly targeted learners' oral performance and very few cases on writing performance with the fewer number of participants. Accordingly, the present study tries to address this gap by focusing on the acquisition of "Copula inversion" and "Negation" across five proficiency levels, from elementary

to advance on EFL learners' writing performance and comparing it with Pienemann's stage-like development model of morpho-syntactic structures.

## Method

Within the framework of Processability theory and through analyzing the written performance of Iranian EFL learners, the present research focused on the acquisition of "copula inversion" and "negation" across five proficiency levels, from elementary to advanced and compared it with the stage-like development model of morpho-syntactic structures proposed by Pienemann (1998a).

Following a descriptive method of research and a post-hoc design, the purpose was to find out whether the order of emergence of "copula inversion" and "negation" in the Iranian EFL learners' writing performance was compatible with the order presented in Pienemann's model or not." Copula inversion" is the inversion of copula and subject, for example: "Is she at home?", and "negation" is the negation of verbs, for example: "I don't live here."  Or "I'm not a teacher.". According to Pienemann's PT model," copula inversion" occurs at the fourth stage and "negation" occurs at the beginning of the third stage of second language development.

## Participants

The participants of the present study were selected through the non-random availability sampling from different branches of Safir institute in Tehran from elementary to advanced levels since the random sampling from a large number of participants was not affordable by the researcher. The participants' proficiency level ranged from elementary to advanced (62 male and female elementary students, 45 male and female pre-intermediate students, 43 male and female intermediate students, 100 male and female upper intermediate students and 100 male and female advanced students). They were all adult EFL learners and the native speakers of the Persian language whose age ranged from 18 to 55 years old, learning English through Touch Stone series from elementary to advanced. Each level was divided into 6 terms and totally the learners belonged to 42 terms. The institutional placement tests were utilized to determine the learners' proficiency levels.

## Materials

The materials utilized in this research were 350 writings provided by the EFL learners from five levels of elementary, pre- intermediate, intermediate, upper-intermediate and advanced studying English language in different branches of Safir institutes in Tehran.  The writings were elicited through different writing tasks, such as introduction task, habitual action task, story retelling task, audio-video-retelling task, picture description task, composition, communication task. The construct validity of the procedure for eliciting the writing performance was approved by two TEFL professors. For the purpose of content validity, the researchers made sure that the topics chosen for the writing tasks were general enough and matched the topics covered through the courses.

The Adult English language course is designed for those aged 15 and over, and consists of two sections: beginner and intermediate (24 terms), and specialized and advanced courses (18 terms). *Touchstone* series are taught in Adult English and Middle English courses, and in specialized courses, *Viewpoint* and *CPE-Masterclass* series are covered. In addition, *Oxford Word Skills* books are used as side books at all levels. The "negation" and "copula inversion" were taught and practiced at the elementary levels (Safir Adult English Language Courses, 2019).

**Procedure**

A structured procedure was adopted to measure the validity of Processability theory through the written performance of EFL learners. First, the data were collected through different tasks including introduction task, habitual action task, story retelling task, audio-video-retelling task, picture description task, composition, communication task. Next, the researchers focused on training the raters for the assessment of the participants' writings at different levels on the basis of the model presented by Pienemann (1988, 2005) related to the type and frequency of morpho-syntactic structures at different stages. Then, they were given a chance to rate a few scripts independently, and the iner-rater reliability of 0.83 as well as the intra-rater reliability was 0.96 was achieved. In the next step, the writings were rated by the raters (score 1 for correct morpho-syntactic structure and 0 score for absent or incorrect structure) and the data analysis was accomplished as the last step.

**Results and Discussion**

The present study investigated the stage-like development of morpho-syntactic structures in the EFL learners' writing performance at different levels from elementary to advanced levels. The data in this research was analyzed both qualitatively (in order to identify and classify the type and order of the morphosyntactic structures), and quantitatively (by means of SPSS and analysis through cross tabulation, normality test and Kruskal-Wallis). In this part, the results of the data analysis are provided.

**Result for "Copula Inversion"**

The first morpho-syntactic variable which was studied in this research was the Processability of "copula inversion" across the five mentioned levels from elementary to advanced.

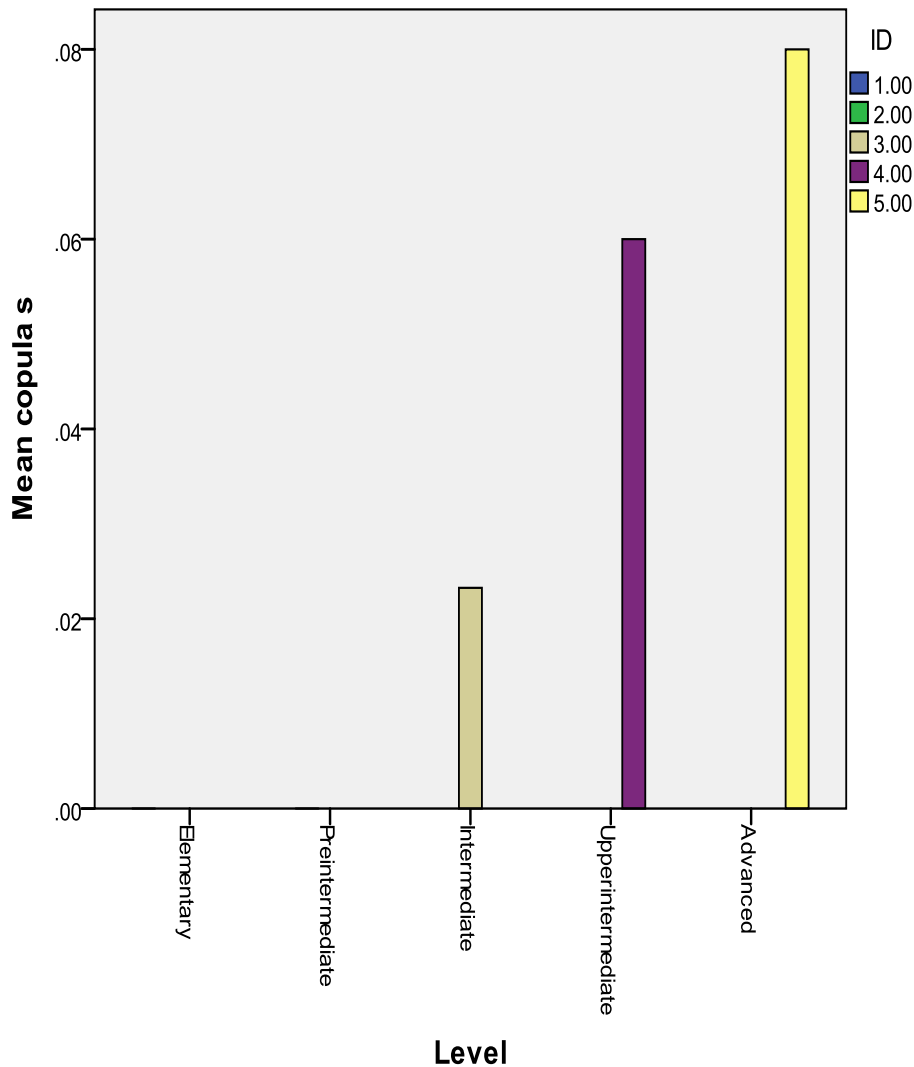**Table 1**
*Level * Crosstabulation for Copula Inversion*

| | | .00 | 1.00 | Total |
|---|---|---|---|---|
| Level | Elementary | 62 | 0 | 62 |
| | Preintermediate | 45 | 0 | 45 |
| | Intermediate | 42 | 1 | 43 |
| | Upperintermediate | 94 | 6 | 100 |
| | Advanced | 92 | 8 | 100 |
| Total | | 335 | 15 | 350 |

In table 1, the lowest and highest score and also the frequency for the scores in regard with language learners' performance for the true usage of "**copula inversion**" have been illustrated. The next step for this variable is to show the graphic representation of the distribution of copula inversion across five levels from elementary to advanced.

In order to find out if there is any significant difference among the distributions of "**copula inversion**" across the levels, a comparison of the means distribution for each level was necessary. To choose the appropriate statistical test, the normality was checked.

**Figure 1**

*Frequency for the scores in regard with language learners' performance for true usage of "copula inversion"*



**Table 2**

*Tests of Normality for Copula Inversion*

| Level | Kolmogorov-Smirnov[a] | | | Shapiro-Wilk | | |
|---|---|---|---|---|---|---|
| | Statistic | df | Sig. | Statistic | df | Sig. |
| Intermediate | .537 | 43 | .000 | .140 | 43 | .000 |
| Upperintermediate | .539 | 100 | .000 | .252 | 100 | .000 |
| Advanced | .535 | 100 | .000 | .301 | 100 | .000 |

a. Lilliefors Significance Correction
b. copula s is constant when Level = Elementary. It has been omitted.
c. copula s is constant when Level = Preintermediate. It has been omitted.

Table 2. shows that the data is not distributed normally (sig. <05). Therefore, Kruskal-Wallis Test was chosen to compare the means of distribution of "**copula inversion**" at each level.

**Table 3**
*Ranks for Copula Inversion*

|  | Level | N | Mean Rank |
|---|---|---|---|
| copula s | Elementary | 62 | 168.00 |
|  | Preintermediate | 45 | 168.00 |
|  | Intermediate | 43 | 172.07 |
|  | Upperintermediate | 100 | 178.50 |
|  | Advanced | 100 | 182.00 |
|  | Total | 350 |  |

**Table 4**
*Kruskal Wallis Test for Copula Inversion*

| Chi-Square | 9.247 |
|---|---|
| df | 4 |
| Asymp. Sig. | .055 |

a. Grouping Variable: Level

According to table 4, there was no statistically significant difference among the distribution of "**copula inversion**" across language learners' level of proficiency (sig> 05).

**Result for "Negation"**
The next variable studied in this article was "negation" usage across the levels.

**Table 5**
*Level * Crosstabulation for Negation*

| Level |  | .00 | 1.00 | 2.00 | 3.00 | 4.00 | 5.00 | 6.00 | 7.00 | 10.00 | 11.00 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  | Elementary | 35 | 14 | 10 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 62 |
|  | Preintermediate | 23 | 5 | 11 | 3 | 1 | 1 | 0 | 0 | 1 | 0 | 45 |
|  | Intermediate | 16 | 3 | 11 | 7 | 2 | 3 | 1 | 0 | 0 | 0 | 43 |
|  | Upperintermediate | 35 | 12 | 29 | 11 | 7 | 5 | 0 | 1 | 0 | 0 | 100 |
|  | Advanced | 22 | 19 | 24 | 14 | 12 | 6 | 3 | 0 | 0 | 0 | 100 |
| Total |  | 131 | 53 | 85 | 37 | 22 | 15 | 4 | 1 | 1 | 1 | 350 |

In table 5, the lowest and highest score and also the frequency for the scores in regard with language learners' performance for the true usage of "negation" have been illustrated. The

next step for this variable is to show the graphic representation of the distribution of negation across five levels from elementary to advanced.

**Figure 2**

*Frequency for the scores in regard with language learners' performance for true usage of "Negation"*
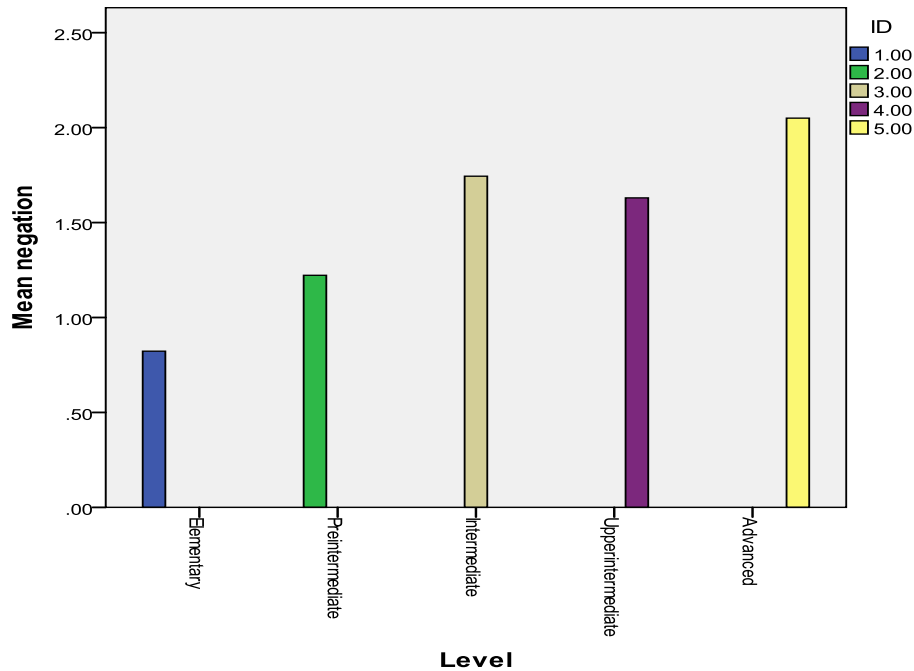


In order to find out if there is any significant difference among the distributions of "**negation**" across the levels, a comparison of the means distribution for each level was necessary. To choose the appropriate statistical test, the normality was checked.

**Table 6**

*Tests of Normality for Negation*

|          | Level | Kolmogorov-Smirnov[a] | | | Shapiro-Wilk | | |
|----------|-------|-----------|-----|------|-----------|-----|------|
|          |       | Statistic | df | Sig. | Statistic | df | Sig. |
| negation | Elementary | .301 | 62 | .000 | .508 | 62 | .000 |
|          | Preintermediate | .257 | 45 | .000 | .668 | 45 | .000 |
|          | Intermediate | .219 | 43 | .000 | .865 | 43 | .000 |
|          | Upperintermediate | .199 | 100 | .000 | .867 | 100 | .000 |
|          | Advanced | .162 | 100 | .000 | .915 | 100 | .000 |

a. Lilliefors Significance Correction

Table 6. shows that the data is not distributed normally (sig. <05). Therefore, Kruskal-Wallis Test was chosen to compare the means of distribution of "**negation**" at each level.

**Table 7**
*Ranks for Negation*

|  | Level | N | Mean Rank |
|---|---|---|---|
| negation | Elementary | 62 | 124.48 |
|  | Preintermediate | 45 | 148.26 |
|  | Intermediate | 43 | 186.78 |
|  | Upperintermediate | 100 | 182.08 |
|  | Advanced | 100 | 207.97 |
|  | Total | 350 |  |

**Table 8**
*Kruskal Wallis Test for Negation*

| Chi-Square | 32.616 |
|---|---|
| df | 4 |
| Asymp. Sig. | .000 |

According to table 4.8, there was statistically significant difference among the distribution of "**negation**" across language learners' level of proficiency (sig <05).

First, the findings of this study showed no significant difference in the distribution of "**copula inversion**" across different levels. The results showed that the use of "**copula inversion**" was observed in the writing performance of language learners at the intermediate level with lowest frequency and mostly in the upper intermediate and advanced levels. Meanwhile, the higher the level of proficiency, the more the use of "**copula inversion**" was. The findings indicate that "**copula inversion**" is a morpho- syntactic feature which emerges in the higher stages of Interlanguage of the language learners' performance and the competence of the learner grows stronger in concern with this structure through the higher proficiency levels. The findings of this study are in line with Pienemann (1998a) who concluded that this structure emerges in the fourth stage of second language development after the processing of word/lemma, category, noun phrase and verb phrase or lexical and phrasal information.

The other finding of this study was that there was significant difference in the distribution of "negation" across different levels. First, the results showed that the use of "negation" was observed in the writing performance of language learners at all the levels. Meanwhile, the higher the level of proficiency, the more the use of "negation" was. The findings imply that "negation" is a morpho- syntactic feature which emerges very early in the Interlanguage of the language learners' performance. Furthermore, the competence of the learner grows stronger in concern with this variable through the higher proficiency levels. The findings of this study are somehow in line with Pienemann (1998a) who concluded that this structure emerges at the beginning of the third stage that is, the first structure in the third stage of second language development after the processing of word/lemma and category. Just the same, it can be suggested that this structure emerges as a formula first, and only later it is processed through the language learners' interlanguage and it is mastered as the learner language develops further.

So, based on the results, it is concluded that the Iranian EFL learners pass through definite stages in the processing of second language development. Their development is progressed hierarchically. These stages are acquired cumulatively in an order predicted by Processability theory. There is no counterevidence for the above assumptions behind the theory. Findings of this study are generally consistent with the predictions made by Processability theory. Generally, the Processability theory showed to be valid for Iranian EFL learners.

**Conclusions**

According to the results of this study, the existing models aimed at the illustration of stage-like development of morpho-syntactic structures in the development of second language are in general appropriate for the prediction of learner's language. Meanwhile, there are some fine-tuning and modification needed for the models, which should be done through local considerations in concern with the language learners, including their first language, their cultural background and the context of their learning the second language. This claim is because of some minor differences between the results of this study and the suggested models.

This study can have implications for language teachers and learners and also material developers. The teachers can benefit from this study so that they can provide appropriate input to their learners. They can evaluate the syllabuses in terms of their adaptation with the natural order in language development as suggested by the relevant models. Furthermore, they can have a better view towards the assessment of the language learners' progress.

There are also some implications perceivable for the language learners. The process of language learning can be discouraging for the learners at different stages. If the learners are somehow provided with a general illustration of the due time of emergence of morpho-syntactic structures in their approximate system, they can formulate more logical expectations for themselves and self-assess their course of development.

The findings of this study may also benefit the material developers, since they can develop the standard materials based on the natural order of language development, because knowing about the path of second language development provides important insights into what learners are ready to acquire in the foreign/second language at any given point in time. Therefore, this can support second language learning both in natural and instructional settings.

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