Developmental Stages of Number Marking in Amharic as a Second Language: *Evidence for Processability Theory*

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Abstract

The aim of this article is to explore the developmental trajectories of Amharic nominal and verbal plural morphemes and to provide empirical support to the typological plausibility of processability theory. Processability theory claims that learners follow the same general developmental routes across typologically different languages (Pienemann, 1998b:2). Up to date, Processability theory has been tested by some languages for its universal applicability. This article is, thus, the only one of its kind from Ethio-Semitic languages that provides additional empirical support to PT. To facilitate interaction and get the necessary data, semi-structured interviews, picture description tasks, and spot the difference tasks were employed. By using distributional analysis and emergence criteria, the data were analyzed and the points of emergence of target structures were determined, respectively. The results show that implicationally ordered developmental routes of number agreement across three developmental stages were found in which s-procedure follows the phrasal procedure, which follows categorical procedure. This result in particular confirms the processability theory's predictions. However, plural number subject agreement markeremerges at category levelin pro-drop context before context that requires agreement between subject and verb. This result contradicts Processability theory's hypothesis, which states that subject agreement markers only begin to emerge at stage four.

Keywords: [Processability theory, Number marking, Morph-syntax, Developmental stage, Amharic as L2]

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1. Introduction

Scholars in the field of second language research have been using different approaches to study second language acquisition (SLA). Initially, SLA research focused on contrastive analysis (CA) from a linguistic perspective, with the idea that the structural difference between a learner's first language (L1) and target language (TL) provides a foundation to predict the level of difficulty a learner will face in his or her second language development. Researchers such as Lado (1957) and Fries (1945) were proponents of this strategy. However, studies such as those by Dulay and Burt (1974) discovered that structural distinctions between learners' L1 and L2 do not necessarily predict learners' difficulties; rather, learners may have trouble in places where the two languages (L1 and L2) are structurally comparable.

In the 1970s, error analysis study was created as a follow-up to CA. Interlanguage was examined using this method by analyzing errors made by a learner at a certain moment in time. However, because the focus was solely on counting and detecting errors, it failed to offer a holistic picture of the language acquisition process (Ellis and Barkhuizen, 2005: 52). As a result, there was a need to demonstrate the evolution of interlanguage through time, and the conclusion that interlanguage evolves in a predictable, regular manner was established (Saric, 2016). Following that, the emphasis was changed away from only describing errors toward investigating second language development from a cognitive standpoint. As a result, the systematic nature of interlanguage began to be researched using various models and theoretical frameworks.

Specific developmental routes in both first and second language development have been observed in language acquisition studies. Some scientists using cognitive approaches to SLA have focused on psycholinguistic processes in the hopes of discovering practical explanations for why language learners acquire some structure earlier than others in a predictable sequence and why such phenomena occur (e.g., McLaugnlin, 1990; Pienemann, 1998b). One of the important principles in cognitive approaches to developmental processes in second language acquisition is language processing. Pienemann (1998b and 2005) established processability theory to investigate learners' ability to process a certain linguistic structure at different stages of second language

development. Despite variations in approaches that researchers follow, the cognitive approach is widely used these days to describe second language development.

The foundation for this study is Pienemann'sprocessability theory (1998b and 2005), which is one of the cognitive theories. It claims that L2 learners follow a universal grammatical path in the process of learning a second language. Processability theory's emergence criteria were used to assess if a certain grammatical structure had emerged in the learner's interlanguage and to identify the developmental phases of L2 acquisition processes of Amharic nominal and verbal number features. The theory proposes that there are well-ordered, cross-linguistically valid stages in second language acquisition, and that these stages may be used to make language-specific predictions that can be tested using empirical data. To the best knowledge of the researcher, no single empirical research has been carried out on the development of number marking of Amharic based onprocessability theory. However, Alemu (2022) conducted on the developmental stages of Amharic gender features based on processability theory. This articleis, therefore, important in that it provides additional empirical evidence to PT in either proving or disproving its predictions.

Accordingly, based on the target language-specific principles, this article first established predictions about Amharic morpho-syntactic developmental stages of number feature, which were subsequently tested by analyzing Amharic Interlanguage produced by Oromo speaking learners. Thus, the article tries to provide empirical evidence for PT by exploring the development of nominal and verbal number features across different developmental stages. Generally, the study explicitly addressed the following research questions:

1. In what sequence does lexical and phrasal nominal plural marker emerge?
2. How does verbal plural subject agreement marker emerge in pro-drop, con-verb/lə+imperfective form and S-V contexts?
3. How does the developmental hierarchy of plural number fit within the PT framework?

2.The Theoretical Framework

1.1 Processability Theory

Processability theory (*hence forth*, PT) is a universal theory that is able to predictdevelopmental trajectories for any second language (Pienemann, 1998b:6). According to PT, the order of the procedural skills is the same for every language. However, the interlanguage of each language learner tends to be personal given that a certain amount of variation is allowed. Every language learner unfolds his own trajectory while still following the general developmental scheme. Therefore, the acquisition of a language consists of fixed stages that are also open to individual learner variation. The aim of PT is to "determine the sequence in which procedural skills develop in the learner" (Pienemann, 1998b:7).

PT tackles the issue of second language acquisition from a processing standpoint. However, it is not the first theory about second language acquisition that is based on the idea of processing. For example, the "Clashen's Strategies Approach" (Pienemann, 1998b:45) is based on the concept of processing; however, it was not developed further in order to apply to language in general. Crucial in the theory is the notion of the architecture of the human language processor. The language processor contains all the computational routines that have an influence on linguistic knowledge. PT focuses on these computational routines and predicts in which order the language learner acquires them. The computational routines correspond to the procedural skills that the language learner has to possess in order to process the target language. Basically, PT has received empirical support from many languages such as, Arabic (Oulhaj, 2015), China (Wang, 2011), English (Yamaguchi, 2010), Italian (Di Biase, 2007) etc. Despite its support, it has also received oppositions from scholars such as Dao (2007), Charters, Dao and Jansen (2011) andAlhawary (2003).

The main hypothesis of PT 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" (Pienemann, 1998b:9). This theory is based on lexical-functional grammar (LFG) (Kaplan and Bresnan, 1981; Bresnan, 2001) and L1 speech production models (Levelt, 1989). The most commonly utilized theoretical framework in L2 speech

production research is Levelt's (1989) model of language processing (Kormos, 2014:7). Based on Levelt's (1989) approach, language production in PT is primarily characterized by four features. These include incrementality, automaticity, linearity, and use of memory store in language processing (Peinemann, 2005:5-6).

Lexical-FunctionalGrammar, on the other hand, serves as the means of analyzing morphological and syntactic structures in any language that are supplied into the hierarchy of processing procedures. The processability hierarchy involves two important procedures based on LFG. These are exchange of grammatical information between constituents required for L2 processing and acquisition based on feature unification and the mapping process of the information involved in connecting constituents, semantic roles, and grammatical functions.

2.1.1. Processability Hierarchy (PH)

Pienemann (1998b: 7) has proposed the processability hierarchy (PH, *henceforth*), a hierarchy of acquisition of processing procedures in L2 development. The hierarchical sequence follows the same order as the activation of language production processes. Acquisition of these processing procedures at the lower levels in the hierarchy is a prerequisite for the higher levels. In other words, L2 learners must sequentially complete each stage.

Because PT regards L2 acquisition as progressive acquisition of these hierarchical processing procedures, the terms 'grammatical memory store' and 'exchange of grammatical information' are key in characterizing the concepts of acquisition hierarchy in the PH (Pienemann,1998b: 7). The following table exemplifies the three levels of information exchange procedures in morphology. At the category stage, grammatical information is not exchanged. An exchange of grammatical information takes place within the noun phrase at the phrasal stage, stage three. Similarly, at the sentence stage, an exchange of grammatical information occurs within the sentence (Pienemann and Kessler, 2011).

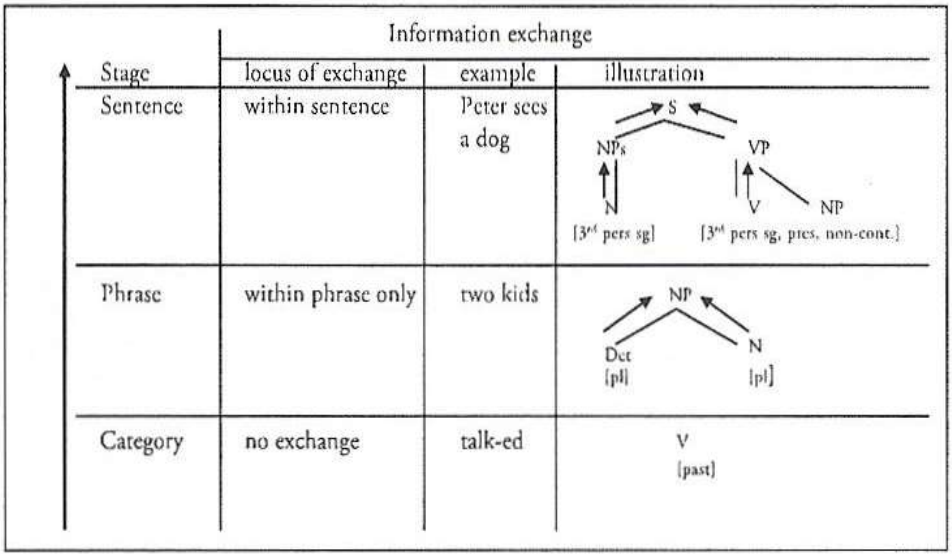

Table 2: Three levels of information exchange procedures in morphology (Pienemann and Kessler, 2011)

Table 2 shows the five hypothesized developmental stages of processing procedures based on the principles of processability. These are word/lemma at Stage 1, categorical procedure at Stage 2, phrasal procedure at Stage 3, S-procedure at Stage 4, and S'-procedure at Stage 5 (Pienemann, 1998b:8). The following section briefly summarizes these hypothesized (general, non-language specific) structural outcomes of morpho-syntactic structures at each stage.

	Stages of development				
Procedures	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
Subordinate clause procedure	-	-	-	-	+
S-procedure	-	-	-	+(Inter-phrasal information exchange)	
Phrasal procedure	-	-	+ (phrasal information exchange)		
Category procedure	-	+ (Lexical morphemes)			
Word or lemma access	+	+	+	+	+

Table 2: Hypothetical hierarchy of processing procedures (Pienemann, 1998b: 8)

These predicted stages of acquisition follow two Lexical-Functional Grammar principles, namely, feature unification and feature mapping. The former principle is used to determine hierarchy of processing procedures for the acquisition of morphological structure while the latter is used for syntax.

The most important prediction of PT is a five-stage implicational sequence, each with its own grammatical encoding mechanisms (Peinemann, 1998b:7). Below are the five phases.

1. Lemma access: learners produce lemmas and formulaic expressions
2. Category procedure: learners mark inflectional morphemes on different classes of words
3. Phrase procedure: learners share grammatical information among constituents within a phrase
4. Sentence procedure: Learners match grammatical features between phrases
5. Subordinate clause procedure: learners exchange grammatical information between subordinate clause and main clause

3.Plural Marking in Amharic

Singular nominals in Amharic remain unmarked, e.g., *bet* 'house', *ləʤ* 'child'. On the other hand, plural nominals are marked and they generally take the suffix '-oʧʧ' (e.g., *betoʧʧ'* 'houses', *ləʤoʧʧ'children'*) (Kramer, 2012: 226; Leslau, 1995:169-170). The regular plural can also be *-woʧʧ*if the last sound of the noun is a vowel, as in *bäre* 'ox', resulting in *bärewoʧʧ* 'oxen'. However, some irregular plurals are formed by different strategies (Leslau 1995:171-172). Some use the suffixes–*an* and–at, e.g., *mämməhər-an* 'teachers', *həśan-at* 'babies'. Some of them are formed through different voweling (e.g., *känafər* 'lips'; *aganənt*'demons'. Still, there are double plurals that contains both regular and irregular plural suffixes (e.g., *mämməhər-an-oʧʧ 'teachers'; mäs'ah-ə-ft-otʃtʃ* 'books'). Every noun with an irregular plural can be marked as double plural, and every nominal with an irregular plural can be marked with the regular suffix *-otʃtʃ* (e.g., *mämhər-an/mämhər-otʃtʃ*'teachers'; *mäs'ahəft/mäs'əhaf-otʃtʃ*'books'(Kramer, 2012:227). Kramer (2012:228) concluded that regular and irregular plural morphology do not compete for insertion in Amharic, i.e., they do not occupy the same syntactic head (Num). The 'regular' plural suffix realizes Num [+PL], and irregular plural morphology realizes n [+PL], a morpheme that

nominalizes category-neutral roots. In addition, irregular plurals are not formal and high-register allomorphs. Despite some irregularities, the plural number of most nouns is realized as regular allomorphs (Kramer, 2012:227). Thus, due to the limited usage of irregular plural markings even by native speakers and the absence of evidence from the collected corpus data, this study presented the development of regular nominal plurals.

There are also plural number agreement markings on demonstrative adjectives and verbs. The plural demonstrative adjective must agree in number with its head (e.g., *ənnäzzihbetoʧʧ* 'these houses'). Moreover, plural verbs must agree in number with their subject (e.g.,*säwoʧʧumätt'-u*'the people came') (Seyoum, 2017: 99). However, plural verb affixes vary depending on aspect or mood. In the perfective aspect, the suffix '*-u*' is used to indicate a plural number, while in the imperfective /jussive the plural form used is '*yə…-u*'. In addition, in the gerundive mood, the suffix used to mark plural is '*-w*'. All of these aspectual verbal plural markers were considered in this study.

4.Predicted Stages of Nominal and Verbal Plural Agreement

The developmental sequence of L2 morpho-syntax focuses on feature unification across different constituents. Grammatical information refers to features such as person, number, or gender and their values such as third person, singular, or masculine encoded in the lexicon. To reach agreement, these features and values must be harmonized or traded between distinct components of sentences. The fact that the exchange of grammatical information appears at diverse levels of processing leads to the following processability hierarchy of L2 morpho-syntactic structural development (Pienemann, 1998b: 7-8).

Stage 1: Lemma access

At the first stage, L2 lexical items are stored without any grammatical information, and no processing procedure is involved. L2 learners are only able to produce morphologically invariant forms (chunks or non-analysed structures) such as single words like 'here' or formulaic expressions like 'many thanks', 'how are you' etc. Thus, this section is left unanalyzed as the focus of this article is the marking of nominal and verbal plural morphemes, which are expected to be processed after stage two.

Stage 2: Categorical procedure (lexical category)

L2 learners are able to recognize the categories of lexical items such as nouns and verbs in the second category procedure stage, but they are unable to transmit grammatical information within a phrase or sentence. For instance, at this stage, learners are expected to supply the plural (*-oʧʧ/-woʧʧ*) markers on nouns. Plural -oʧʧ/-woʧʧ on nouns requires identification of the noun category of lexical items. From the perspective of semantics, L2 learners need to determine whether the referent is one entity or more (*ləʤ'child'*vs. *ləʤoʧʧ'children'*) and then differentiate whether the referent is countable or not (*ləʤ 'child'*or*wəha 'water'*). Next, L2 learners need to learn that this '-oʧʧ/-woʧʧ' ending marker is associated with generic countable entities such as *'ənnäsuləʤoʧʧnaʧʧäw'they are children',* but not with generic uncountable entities (Pienemann, 1998a:114). Moreover, verbal plural markers (*-u, yə-…-u, -w*) in pro-drop contexts are also expected to emerge at this stage. The verbal plural markers require an analysis of the verb category. In pro-drop contexts, learners are not expected to exchange grammatical features as the pronominal or nominal subject is not present in the sentence. Di Biase (2007: 12) in his study on the acquisition of Italian as a second language claimed that second language learners of pro-drop languages produce a high rate of null subjects at an early stage of language learning, and they only produce structures with subject-verb agreement at a later stage. Therefore, nominal plural (*-oʧʧ/-woʧʧ)* and verbal plural (*-u, yə-…-u, -w*) markers without feature matching with other constituents are expected to emerge at this stage.

Stage 3: Phrasal procedure

Stage 3 introduces the phrasal procedure, which includes the capacity to combine attributes as well as the ability to establish 'positions' in terms of phrases rather than simply words (Pienemann, 2005: 27). Features like plurality, for example, might be matched across other components within the same constituent at this point in terms of morphology, e.g. noun phrase or verb phrase agreement. Consider the phrase, 'ten bananas'.Because the plural feature exists in thehead noun (the plural referent 'bananas') and its modifier (the numerical quantifier 'ten'), this information must be integrated across two lexical elements in this NP. In Amharic, the head noun agrees in number and gender with its modifiers. This agreement takes place at the noun phrase level with two structures. The first is with demonstrative adjectives. A plural demonstrative adjective agrees only in number with its nominal head *(e.g.,'ənnäzzihləʤoʧʧ'these children')*as gender distinction is absent in plural contexts. The other context in which plural agreement takes place within an

NP is with attributive adjectives. However, plurality is optional as singular attributive adjectives can also be used with plural head nouns unless they are definite. Because of this, this context was not considered in this article. Moreover, agreements between con-verbs (-w) or *lə* + imperfective forms (yə-…-u) and main verbs at verb phrase level are also expected to emerge at this stage, as in [1aand b] below.

(1) a. *säw-oʧʧ-u* *mätt-ä-u* *hed-u*
people-PL-DEF come: CNV[3]-3-3PL go:PF-3PL
'The peoples have come and gone.'

b. *ləʤ-oʧʧ-u* *ləbs* *lə-yə-at'b-u* *hed-u*
child-PL-DEF cloth PROS-3PL-wash: IMPF-3PL go:PF-3PL
'The children have gone to wash clothes.'

Stage 4: Inter-phrasal procedure (S-procedure)

At this stage, inter-phrasal information can be exchanged, which involves the exchange of information across constituent boundaries, e.g., subject-verb agreement in Amharic. Subject-predicative adjective agreement, which is attested in some languages, is also an inter-phrasal procedure. In Amharic, a subject always agrees in number and gender with its verb. However, while counting contexts of subject-verb agreement, only those contexts with obvious nominal or pronominal subjects were considered since subject agreement markers in pro-drop contexts were expected to emerge at stage

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Note the following abbreviations:

ACC-Accusative	DR-Diriba	IMPF-Imperfective	PL-Plural	YN-Yenenesh
AB-Aberash	F-Feminine	INF-Infinitive	POSS-Possessive	
AN-Anwar	FR-Frehiwot	M-Masculine	PRG-Progressive	
AS-Aster	FSG-Feminine sing.	ML-Melkamu	PROS-Prospective	
AY-Aynalem	GEN-Genitive	MSG-Masculine sing.	SH-Shito	
AUX-Auxiliary	GN-Genet	NR-Nuredin	SG-Singular	
[3]CNV-Con-verb	HB-Habtamu	PASS-Passive	TRS-Transitiviser	
DEF-Definiteness	HM-Hailemariam	PF-Perfective	VN-Verbal noun	

two of language development. Thus, since the focus of this article is on plural number agreement, the perfective (*-u*), imperfective (*yə-...-u*) and con-verb (*-w*) plural agreement markers were analyzed as in [2a, b, & c] below.

(2) a. *lədʒ-oʃʃ-u* *wädä* *təməhərtbet* *hed-u*
boy-PL-DEF to school go:PF-3PL
'The children have gone to school.' (Perfective)

b. *säw-oʃʃ-u* *lə-yə-mot-u* *nä-u*
People-PL-DEF PROS-3PL-IMPF:die-3PL AUX-3MSG
'The people are about to die.' (Imperfective)

c. *lədʒ-oʃʃ-u* *kom-ä-u* *-all*
child-PL-DEF stand:CNV-3-3PL AUX
'The children are standing.'
(Con-verb)

5. Methods of the Study

5.1.Population of the Study

The population of this study was learners of Amharic as a second language who speak the Bale dialect of Oromo as their first language. In this region, learning Amharic as a second language starts in grade five. They had little or no exposure to the target language before they started learning Amharic in grade five. These learners were in grades six, seven, and eight. They took two hours of Amharic instruction per week. Accordingly, learners who were in grades six, seven, and eight took 80, 160, and 240 hours of instruction during data collection time.

5.2.Sample and Sampling Techniques

Thirteen learners who were in grades six, seven, and eight and aged between 12 and 18 participated in the study. The samples were selected purposely by taking into account some criteria. These include the amount of instruction, prior language experience outside school, attitudes towards the language, willingness to participate in the study, and motivation to learn the language.

Furthermore, in a cross-sectional study, in order to identify the developmental order of target structures implicationally, we need to select respondents whose proficiency levels differ. It is recommended to use standardized proficiency tests in the respective language in order to find respondents with different proficiency levels. However, there is no standardized proficiency

test for Amharic that has been prepared so far based on empirical study. In such cases, researchers differentiate learners' proficiency levels based on the amount of instruction they received, because the amount of instruction increases the speed of acquisition, which increases with proficiency (Pienemann, 1998b:216). Accordingly, in this study, the proficiency levels of the students were determined based on the number of class hours spent learning Amharic at Tife Elementary School. This is because learners in grade eight were thought to have more exposure than those in grades seven and six, and grade seven learners were thought to have more disclosure to the target language than grade six learners did.

5.3.Instruments and Procedures of Data Collection

Processability theory encourages communicative oral tasks to be used as a source of data in second language studies. This is because, oral data are more unplanned and spontaneous, and it is dependent on implicit linguistic knowledge (Pallotti, 2010:162). Accordingly, spot the difference tasks, picture description tasks, and semi-structured interviews were employed to facilitate interaction and collect the relevant data. The purpose of these tasks is to elicit different morpho-syntactic structures like nominal number, gender, case, and definite markers. Moreover, verbal person, number, and gender markers were also expected to be produced. Therefore, for the purpose of this article, nominal and verbal number feature markings were targeted.

Pienemann (1998b) claims that the basic architecture of language development does not vary because of differences in communicative tasks. However, communicative tasks should take some basic characteristics into account (Skehan, 1998:95). These include:

a. Meaning has priority
b. There is a communication issue to be resolved
c. There is a connection to analogous real-world activity
d. The assessment of the task is in terms of outcome.

Therefore, taking into account all these characteristics (a-d), the tasks were designed and relevant data were collected. Before the data was collected, the consent of the parents of the respondents was secured as they were under the age of eighteen.

A day before data collection, respondents were informed as clearly as possible about the purpose of the data collection in order to avoid any

sentimentality of fear. This helps the researcher to familiarize himself with the respondents. The next day, each respondent was invited to take part in the data collection session that took over 40 days. In order to achieve consistency, the researcher himself carried out the task of data collection with all respondents.

5.4.Methods and Procedures of Data Analysis

5.4.1. Emergence Criteria

In second language research, acquisition criteria have to be operationally defined to provide replicable and falsifiable claims about how different linguistic structures appear in an interlanguage (Pallotti, 2007:361). Accordingly, in the past, the accuracy criterion, which has been criticized by many scholars, has long been employed by many second language researchers like Dulay and Burt (1974), Krashen (1977), and others. Due to the failure of accuracy criteria, Pienemann (1998b) advocated the emergence criterion as a valid indicator of language development. It is "the point in time at which certain skills have, in principle, been attained or at which certain operations can, in principle, be carried out" (Pienemann, 1998b:138). In other words, the first productive and systematic use of a structure is taken as the starting point of acquisition. Occurrences are said to be productive if they exhibit morphological and lexical variation in at least four contexts. For instance, the nominal plural (*-otʃʃ*) in Amharic should be supplied in at least two lexically different words, as in, *setoʧʧ* 'females or women' and *käbtoʧʧ* 'cattles' and these lexemes should be found without the plural marker or in their singular form, as in *set* 'female/woman' and *käbt* 'cattle' respectively. On the other hand, systematicity refers to the amount of evidence. In order to undertake analysis of a particular target morpheme, at least four obligatory contexts have to be present. This type of analysis allows you to avoid formulaic expressions and unanalyzed entries (Pienemann, 1998b:144). In the process of applying the emergence criterion, distributional analysis and implicational scaling are carried out.

5.4.2. Distributional Analysis

Distributional analysis is the quantitative analysis of rule applications in the learner's interlanguage data. This analysis falls into four categories. These include absence of evidence, contexts of insufficient evidence, non-application of rule X in the presence of contexts, and rule application in the presence of contexts for rule X (Pienemann, 1998b:146). However, the first

two pieces of evidence were not important to arrive at a valid conclusion since there are not expected amount of evidence. Thus, the last two categories are encouraged to provide valid evidence and arrive at a reliable conclusion (Di Biase, 2007:24; Pienemann, 1998b:146). Thus, the last two categories were considered while conducting the distributional analysis. Furthermore, the supplience and non-supplience of target morphemes in target-like contexts were decided based on contextual clues (discourse context, pictorial context, and sentential context) (Jia, 2003: 1301).

Once the distributional analysis was carried out, by applying the emergence criterion to these results, the emergence and non-emergence of target morphemes were determined. Then, implicational scaling was applied to reveal the rank order of development.

5.4.3. Implicational Scaling

Implicational scaling is a scale that shows the cumulative learning process from knowing to mastery level. The assumption is that if someone acquires rule 2, then he is expected to also acquire rule 1, since rule 1 is a prerequisite for rule 2. In doing so, errors that affect the reliability of the implicational scaling may occur. For example, if a learner acquires rule 3 without acquiring rule 2, such errors affect the predictive power of the scale (Hatch and Lazaraton, 1991:207). Thus, a means of calculating such errors was devised. The coefficient of scalability of the data has to be calculated by creating an implicational scaling that contains a plus (+) sign to show acquisition and a minus (-) sign to show no-acquisition (Pienemann, 1998b:133-135). In order to calculate scalability, three statistical procedures have to be followed. These calculations include the coefficient of reproducibility, the minimum marginal reproducibility, and the percent improvement in reproducibility (Hatch and Lazaraton (1991:210–212)).

The coefficient of reproducibility (CR) reveals the probability of reproducing the predicted structure accurately. One minus the number of errors divided by the number of students multiplied by the number of items gives us the value of CR. This value must be higher than 0.90 (90%) (Hatch and Lazaraton, 1991: 210).

Minimum marginal reproducibility (MMR)indicates the rate of reproducibility of the predicted structure without considering the number of errors. Its value is calculated by dividing the number of emerged rules (maximum marginal) with the number of students minus the number of items. Its value should be less than the value of CR *(Hatch and Lazaraton, 1991:211).*

The percentage improvement in reproducibility (PIR)*indicates the percentage improvement between CR and MMR***.** Thus, deducting the value of CR from MMR gives the value of PIR. After calculating the three procedures above, namely, CR, MMR, and PIR, we can finally get the result of the coefficient of scalability by dividing the value of PIR by one minus the value of MMR. The value of the coefficient of scalability should be greater than 0.6 (60%) in order to claim the developmental pattern shown implicationally as reliable.

6. Analysis and Presentation of Results

This section provided sample analyses of the emergence or non-emergence of nominal and verbal plural marking in different linguistic contexts. In tables, the cells provide values in type count. That means the values indicate lexically varied contexts.

6.1 Nominal Plural in Different Linguistic Environments

This section presents the development of the nominal plural marker (-oʧʧ/-woʧʧ) across two linguistic contexts (lexical and phrasal). In Amharic, only the plural number is morphologically marked. Therefore, the distributions of lexical and phrasal plural number markings were presented one after another in the following sections.

6.1.1 Lexical Plural without Context

This section presents the results of the analysis of the marking of the plural morpheme on nouns to indicate plurality, that is, on nouns without contexts.

In this article, the plurality formed by *-oʧʧ/-woʧʧ*was considered. This is because, apart from *-oʧʧ or -woʧʧ,* there are no contexts in the corpus data where respondents used to form plurality with the other irregular plural formation strategies.

Following PT, this morpheme is expected to emerge at stage two. Accordingly, occurrences of plural markerswithout contexts or without grammatical information exchange with other constituents within a phrase or a sentence, as in [3], were counted as suppliance in obligatory contexts.

(3) *mäśəhaf-oʧʧ* *lä-ləʤ-u* *säťť-ähu-t*
book-PL to-child-DEF give:PF-1SG-3MSG$_O$
'I have given books to the child'

On the other hand, the occurrences of non-suppliance were counted when the morphemedid not occur on nouns in the obvious plural contexts. Instances such as in [4] below were counted as non-suppliance since the noun was not marked plural in the obvious obligatory contexts of plurality. The respondent produced the word *käbt* 'cattle' to describe a picture containing more than one cattle. Thus, by using pictorial contexts, we can decide on the omission of the target structure.

(4) *käbt* *nä-u*
cattle-SG AUX-3MSG
'It is a cattle.'

Moreover, contexts of over-supplience were also counted because such contexts can affect the credibility of evidence that is taken for granted as positive if its number is huge. As a result, supplying the plural marker in singular contexts, as in [5a], or using it in other contexts where plurality is unnecessary, as in [5b], is considered over-supply. The utterance in [5a] was produced to describe a picture showing one duck swimming in a pool; thus, the subject of the verb *dakkəyye-woʧʧ*' 'ducklings' should have been in its singular form, *dakkəyye* 'duck'. Moreover, the plural marker *(-oʧʧ*) was incorrectly marked on the masculine demonstrative pronoun in example [5b]. In Amharic, the demonstrative pronoun *ənnäzzih* 'these' is used in the plural context instead of suffixing *'-oʧʧ*'. Hence, such kinds of occurrences are also counted as over-suppliences.

(5) a. **dakkəyye-woʧʧ* *əyya-hed-äʧʧ* *nä-w*
duck-PL PRG-go: IMPF-3FSG AUX-3MSG
'Ducklings is going.'

b. **yəhe-ñño ʧʧ* *saw* *k'ućć* *bəl-o* *-all*
this man sit become: CNV-3MSG AUX
'The man sat down.'

The following table presents the results of the distributional analysis of lexical plural*(-oʧʧ/-woʧʧ).* In the table, the values were given based on type count.

Features	Respondents												
	AN	HB	ML	NR	AS	AY	DR	FR	GN	HM	SH	YN	AB
Nominal Plural	+15	+8	+10	+13	+6	+10	+1	+9	+6	+2	+2	+9	+10

Table 3: Results of distributional analysis of lexical plural

Despite differences in the number of obligatory contexts in which they supplied the target structure, all respondents produced the lexical plural marker (*-oʧʧ/-woʧʧ*), as shown in Table 3. These differences may be attributed to different factors like the use of avoidance strategies and frequent use of pro-drop structures. To determine the emergence or non-emergence of the lexical plural, the results of the distributional analysis shown in Table were compared to the emergence criteria. Accordingly, with the exception of DR and SH, all of them productively marked the lexical plural marker.

ML is one of the respondents who produced the lexical plural marker in ten lexically different contexts. As usual, the emergence criteria of morphological and lexical variation were applied to this result. Hence, as indicated in examples [6aand b], the plural marker [-oʧʧ] was properly supplied on different lexical elements (*käbt-oʧʧ-u-n*'the cattles' and *säw-oʧʧ-ə-n* 'peoples'*).*

(6) a. *käbt-oʧʧ-u-n* *fälləgg-e* *a-mät'* *–all-ähu*
cattle-PL-DEF-ACC find: CNV-1SG TRS-bring AUX-1SG
'I will find the cattle and bring them.'

b. *säw-oʧʧ-n* *lä-madan…*
people-PL-ACC INF-save
'…to save people….'

In addition, the existence of formal or morphological variations of the lexemes on which he supplied the plural marker was analyzed. As a result, the nouns *käbt* 'cattle' and *säw*'person' were found in their base forms as in [7aand b] respectively.

(7) a. *wädä* *käbt* *hedʒdʒ-e…*
to cattle go:CNV-1SG
'Going to cattle…'

b. *yətʃiʃi* *k'äććən* *säw* *nä-tʃiʃ*
this:F thin person AUX-3FSG
'This is a thin person.'

Hence, it can be said that the specific target morpheme emerged as the respondent was able to produce it with both morphological (*käbt/ käbt-otʃiʃ;säw/säw-otʃiʃ*) and lexical (*käbt-otʃiʃ/ säw-otʃiʃ*) variations.

GN is the other respondent who produced plural markers productively. As indicated in Table she supplied the morpheme in six lexically varied contexts. Consider the following examples below.

(8) a. **t'ək'ur* *lədʒ-otʃiʃ-u* *läslassa* *yə-t'ät't'-* *all*
3MSG-drink:
black child-PL-DEF softdrink IMPF AUX
'The black children drink softdrink.'

b. **təlləkʼ* *säw-otʃiʃ* *yə-kʼom-* *all*
big man-PL 3MSG-stand: IMPF AUX
'Big men stands.'

In the examples, although the sentences are ungrammatical, the respondent was able to mark the plural morpheme (*-otʃiʃ*) on the nouns *lədʒ* 'child' in [8a] and*säw* 'man' in [8b]. Thus, lexical variation has been achieved. As for morphological/formal variation, the base forms of the lexical items *lədʒ* 'child' in [9a] *and säw* 'man' in [9b] were produced in other contexts.

(9) a. *lədʒ-u* *kʼom-o* *all*
boy-DEF stand:PF-3MSG AUX
'The boy has stood.'

b. *əzzi* *hulätt* *säw* *all-ä*
here two person AUX-3MSG
'There are two persons here.'

The other respondent YN produced the structure in nine lexically varied contexts as shown in Table Consider the following examples in [10aand b] below.

(10) a. * *säw-otʃʃ-u* *əzziga* *ək'a* *tä-yəz-o* *-all*
man-PL-DEF here item PASS-hold-3MSG AUX
'The men are holding an item here.'

b. **yəhe* *färäs-otʃʃ-u* *hulätt* *nä-w*
this.SG horse-PL-DEF two AUX-3MSG
'This horses is two.'

The suppliance of the plural marker-*otʃʃ* in the nouns *säw* 'man'and*färäs* 'horse' above implies that she has produced the target structure with lexical variation. Furthermore, the corpus investigation indicated that there were formal differences, as seen in [11aand b] below. These are sufficient evidences to decide the productivity of the instances produced by the respondent.

(11) a. *əzziga* *hulätt* *säw* *nä-w*
here two people AUX-3MSG
'Here is two people.'

b. *färäs-u* *əyyä-bälla-Ø* *nä-w*
horse-DEF PRG-eat:IMPF-3MSG AUX-3MSG
'The horse is eating.'

Thus, the respondent was able to supply the target grammatical structure (-*otʃʃ*) with both morphological (*färäsotʃʃ/ färäs; säwotʃʃ/ säw)* and lexical (*färäsotʃʃ/ säwotʃʃ*) variations in contexts where there was no grammatical information exchange among constituents in a sentence.

However, two respondents (DR and SH) failed to process this structure. DR, for example, supplied two tokens of the plural morpheme (*-otʃʃ*) in the same lexical element (*käbt-otʃʃ*) without lexical variation. This implies that none of the emergence criteria was met, though there were sufficient opportunities. Below are some negative evidences or undersupplied contexts of the target grammatical structure.

(12) a. **yəhe* *färäs-u* *hulätt* *nä-w*
this horse-DEF two AUX-3MSG
'This horse is two.'

b. **ʤəb-u* *sost* *nä-w*
hyena-DEF three AUX-3MSG
'The hyena is three.'

c. **wəʃʃa hulätt nä-at*
dog two AUX-3FSG
'The dog is two.'

These utterances in [12a], [12b], and [12c] were produced to describe three separate pictures that show two horses, three hyenas, and two dogs in the picture description tasks, respectively. Thus, the nouns *färäs* 'horse', *ʤəb*'hyena' and *wəʃʃa*'dog' should have been marked plural.

Generally, with the exception of DR and SH, all respondents can mark the target plural inflectional morpheme on nouns to form a lexical category of lemmas productively and systematically.

6.1.2 Number Agreement within Noun Phrase

This section presents the results of the analysis of number agreement within a noun phrase. It examines the emergence or non-emergence of a number feature with a value plural in contexts where there is grammatical feature matching between modifiers and head nouns. In the target language, plural number agreement in a noun phrase is obligatory only in context where the head noun is modified by a demonstrative adjective. With an attributive adjective, the plural head noun can be modified either by a singular or plural modifier, as in *təlläḱsäwotʧ* 'big peoples', or *təlalläḱsäwotʧ* 'big people', unless it is definite. For this reason, only the number agreement between demonstrative adjective and head noun (Dadj-N)was considered.

6.1.2.1 Demonstrative Adjective-head noun Agreement

This section presents the results of distributional analysis of number agreement in the demonstrative adjective-noun complex. Demonstratives in Amharic differentiate singular and plural numbers and gender in the singular. These demonstratives are *yə-h 'this (*MSG)'/*ya*'that *(*MSG)', *yə-ʧi 'this (*FSG)'/*ya-ʧi 'that (*FSG)' and *ənnä-zzih 'these* (PL)'/*ənnä-zziya 'those (*PL)' (Anbessa *and* Hudson, 2007: 49). However, in this article, we focus on the development of plural number assignment.

The occurrence in [13], for example, shows number feature matching between the modifier *ənnäzzih* (PL) 'these' and the head noun *wəʃʃ-otʧ* (PL) 'dogs' with a value plural. Such instances were counted as positive evidence of rule application.

(13)	*ənnä-zzih*	*wəʃʃ-oʧʧ*	*k'om-ä-u*	*-all*
	PL-these	dog-PL	stand: CNV-3-3PL	AUX
	'These dogs stood.'			

Contrarily, occurrences in [14] were counted as negative evidence. The respondent was describing three horses running together in the picture description task. Thus, the head noun should have been marked as plural. However, the plural marker (*-oʧʧ)* was not marked on the head noun (**färäs*-SG 'horse') in a context that must be supplied in order to agree with its modifier *(ənnä-zzih* (PL) 'these') in number.

(14)	**ənnä-zzih*	*färäs…*
	PL-these	horse-SG
	'These horse…'	

The following are the results of the distributional analysis of number agreement between demonstrative adjective and head noun based on type count.

Features	Respondents												
	AN	HB	ML	NR	AS	AY	DR	FR	GN	HM	SH	YN	AB
Nominal Plural	+5	+4	+2	+3	+1	+3	-8	-6	+1	+1	-6	+3	+3

Table 4: Results of distributional analysis of number agreement (Dadj-N)

+ represents values in different lexical elements - represents omission in different obligatory contexts

Respondents created number agreements between demonstrative adjectives and head nouns at the noun phrase level with differing degrees of occurrence, as shown in Table 4. The values in the table indicate the use of plural morphemes in lexically different contexts. Accordingly, it was found that seven respondents properly produced the grammatical morpheme (*-oʧʧ*) in noun phrase contexts and met the emergence criteria of both lexical and morphological variations. Contrarily, six respondents (AS, DR, FR, GN, HM, SH) did not produce the structure in lexically varied contexts in the presence of sufficient obligatory contexts. The following are a few examples of analysis.

AN provided the plural morpheme (*-oʧʧ*) in five lexically diverse linguistic contexts. The morpheme was used in noun phrase settings where the pronominal modifier and the head noun needed to exchange grammatical

information of number feature. As a result, in order to determine the emergence of this morpheme, the respondent must provide morphological and lexical variation of the target morpheme. Consider the following examples in [15aand b].

(15) a.	*ənnä-zzih*	*säw-otɟɟ*	*bäsəlk*	*əyyä-tänägaggär-u*	*nä-w*	
	PL-these	person-PL	by-phone	PRG-talk: IMPF-3PL	AUX-3MSG	
	'These persons are talking on the phone.'					
b.	*ənnä-zzih*	*set-otɟɟ*	*yähonä*	*borsa*	*yəz-ä-u*	*all-u*
	PL-these	woman-PL	some	bag	hold:CNV-3-3PL	AUX-3PL
	'These women are holding some bag.'					

In the above examples, the respondent properly supplied the phrasal plural – *otɟɟ* on the head nouns *säwotɟɟ* (PL) 'men' and *setotɟɟ* (PL) 'women' to mark plurality, which agrees with the pronominal modifier (*ənnäzzih*-PL) in number. These instances are sufficient to meet one of the emergence criterions (lexical variation). However, in order to determine its emergence, the lexemes must be applied in another context with morphological variation. Thus, the examination of the corpus revealed that both nouns *säw* 'man' and *set* 'woman' were used in their base forms, as in [16aand b] below.

(16) a.	*əzziga*	*yähonä*	*säw*	*leba*	*ayt-o-(*t)*	*-all*
	here	some	person	thief	see:CNV-3MSG$_S$-3MSG$_O$	AUX
	'Here, some person saw a thief.'					
b.	**əzzih*	*yähon-ä*	*set*		*all-ätɟɟ*	
	here	some:M	woman		AUX-3FSG	
	'Here, there is some woman.'					

Plurality in noun phrase contexts also emerged in the data from ML. He produced the minimum sufficient contexts (+2) to meet lexical variation. As shown in [17aand b], the plural morpheme (*-otɟɟ*) was attached to the nouns *set* 'woman' and *säw* 'person'.

(17) a.	*ənnä-zzih*	*k'äyayy-otɟɟ-u*	*säw-otɟɟ*	*täk'ämmt'-ä-u*	*-all*
	PL-these	red-PL-DEF	person-PL	sit:CNV-3-3PL	AUX
	'These light skinned persons sat.'				

b.	*ənnä-zzih*	*set-oʧʧ*	*yä-abärraʃ*	*g^{w}addäññ-oʧʧ*	*nä-aʧʧä w* AUX-3PL
	PL-these	women-PL	POSS-Aberash	friend-PL	

'These women are Aberash's friends.

In order to decide the emergence of the morpheme, contexts where the base forms of the nouns to which the morpheme attached in [17aand b] above has to be found in his corpus data. Accordingly, the nouns *säw* 'man' and *set* 'woman' were found, as in [18aand b], so the occurrences were proved to be productive.

(18) a. *təlləkʾ* *säw* *täkʾämmtʾ-o* *-all*
big man sit:CNV-3MSG AUX
'A big man sat down.'

b. *yəʧʧi* *set* *yä-abärraʃ* *ləʤ* *nä-ʧʧ*
this woman POSS-Aberash daughter AUX-3FSG
'This woman is Aberash's daughter.'

6.2 Verbal Inflectional Morphemes

Third person verbal number markers in three linguistic contexts (pro-drop, con-verb-main verb agreement, and subject verb agreement) are provided in the following section. In pro-drop situations, the verbal number agreement marker linked to verbs does not exchange grammatical information due to the absence of nominal or pronominal subjects with which they agree. As a result, it was predicted that verbal number agreement in pro-drop contexts emerges earlier than in subject-main verb agreement contexts as far as PT is concerned. By and large, the analyses of the development of third person number agreement markers across the three structures are provided.

6.2.1 Plural Number Agreement Markers in Pro-Drop Contexts

This sub-section provides the results of third-person plural number agreement markers in pro-drop contexts. In this language, pro-drop contexts may exchange grammatical features of number between the object agreement marker and the nominal object. Such instances are very rare, as object agreement is optional in the target language. However, when encountered, such contexts were not counted since feature matching is unexpected at this stage.

Thus, instances like [19] were counted as positive evidence of rule application. In the example, the third person plural marker [-u] was supplied in a pro-drop context where there is no feature matching.

(19) *əyyä-addammäťť-u* *nä-w*
PRG-hear:PF-3PL AUX-3MSG
'They are listening.'

Whereas, in [20], the respondent supplied the third person singular masculine marker where its plural counterpart was required as far as the pictorial context was concerned. Thus, such an instance was counted as an omission of the third person plural marker.

(20) *bunna* *əyyä-ťäťťa-Ø* *nä-w*
coffee PRG-drink: IMPF-3MSG AUX-3MSG
'He is drinking coffee.'

Feature	Respondents												
	AN	HB	ML	NR	AS	AY	DR	FR	GN	HM	SH	YN	AB
3PL	+4	+5	+3	+2	+2	+6	+1	+5	+3	+6	+1	+6	+3

Table 5: Results of third person plural agreement markers in pro-drop contexts

As shown above, many of the contexts were produced with lexical variations that meet the emergence criteria with both morphological and lexical variations in pro-drop contexts. However, three respondents (AS, DR, and SH) could not fulfill the emergence criteria for third person plural agreement markers [yə-...-u/ -u] although there were sufficient obligatory linguistic environments. Some analyses of emergence were presented.

AY supplied in six lexically varied contexts for third person plural verbal agreement markers. As indicated in [21aand b], the verbs *əyyawärru'talking' and əyyäsak'u*'laughing' were marked with the third person plural marker [-u] showing lexical variations in pro-drop contexts.

(21) a. *əyyä-awärr-u* *nä-w*
PRG-talk:IMPF-3PL AUX-3MSG
'They are talking'

b. *əyyä-sak'-u* *nä-w*
PRG-laugh:IMPF-3PL AUX-3MSG
'They are laughing.'

In order to determine its emergence, the lexemes must be applied in another context with morphological variations. Thus, the examination of the corpus revealed that both verbs appear with variation (*əyyawärraʧʧ, əyyäsak'äʧʧ)*, as in [22aand b].

(22) a. *ləʤ-ət-u-a* *bä-səlk* *əyyä-awärr-äʧʧ* *nä-w*
girl-F-DEF-F by-phone PRG-talk:IMPF-3-3FSG AUX-3MSG
'The girl is talking by phone.'

b. *ləʤ-ət-u-a* *əyyä-sak'-äʧʧ* *nä-w*
girl-F-DEF-F PRG-laugh:IMPF-3FSG AUX-3MSG
'The girl is laughing.'

6.2.2 Verb Phrase Morphology

Third person plural number agreements between con-verb/*lə*+imperfect form and reference verb are presented. At verb phrase level, the main verb agrees in number with con-verbs or *lə*+imperfect verb forms when the subjects of the two verb forms are the same. In the target language, verbal nouns (VN) can be replaced by *lə*+imperfective form in a verb phrase, as in [23a]. Unlike verbal nouns, the imperfective forms must agree with their reference verbs. Third person plural con-verb form is expressed by [-w], which is realized as [-u], as in [23b], *ćärrəs-ä-u* 'finishing', whereas [lə+yə-…-u] is used for third person plural imperfective form, as in [23a], *ləyəbälu* 'about to eat'.

(23) a. *məsa* *lä-mäblat* *or* *lə-yə-bäl-u* *hed-u*
lunch to-eat-VN PROS-3PL-eat:IMPF-3PL go-PF:3PL
'They have gone to eat launch.'

b. *ćärrəs-ä-u* *tämälläs-u*
finish:CNV-3-3PL return:PF-3PL
'After they had finished, they returned.'

Instances like [23aand b] were taken as positive occurrences throughout the data. In [24] again, the plural con-verb (*gagräw*–PL 'baking') agrees in number with its reference verb (*tämallässu* 'returned.').

(24) *əndʤära* *gagr-ä-u* *tämalläss-u*
injera bake:CNV-3-3PL return:PF-3PL
'They returned after baking Injera.'

Contrarily, verb phrases that contain these verb forms, which do not agree in number, as in [25] below, were counted as omissions of the third person plural

number. In the example, the main verb *gäbbu*–PL 'they went' disagrees in number with the con-verb *ʃäťo*-3MSG 'sell'.

(25) **bäre-u-n* *ʃäť-o* *wädä* *bet* *gäbb-u*
ox-DEF-ACC sell:CNV-3MSG to home go:PF-3PL
'They went home after they had sold the ox.

In the following table, the distributional analyses of verb phrase agreement are provided. The numbers in each cell indicates values based on type count.

Structure	Feature	Respondents						
		AN	HB	ML	NR	AS	AY	DR
Con-verb/lə+Imperfective-main verb agreement	3PL	+3	/	(+2)	(+1)	-4	/	/
	Feature	Respondents						
		FR	GN	HM	SH	YN	AB	
	3PL	(+1)	/	+1	/	(+1)	+3	

Table 6: Results of distributional analysis of third person plural agreement within a verb phrase

/ represents no evidence () represents insufficient evidence + represents supplience in obligatory contexts - represents non-supplience in obligatory contexts

As shown in Table 6, only four respondents provided a sufficient number of contexts for analysis. Of these respondents, AS and HM could not process the plural number agreement between reference verb and con-verb. Sample analyses of third person number agreement at verb phrase level are provided as follows.

Third person plural number emerged in the data from two respondents at verb phrase level, and AN is one of them. He produced plural agreement in three lexically different contexts. Consider the following examples.

(26)

a. *andlay* *t-asr-ä-u* *əyyä-hed-u* *nä-w*
together PASS-imprison:CNV-3-3PL PRG-go:IMPF-3PL AUX-3MSG
'They are going together being imprisoned.'

b. *hulätt* *färäs* *hon-ä-u* *əyyä-roťť-u* *nä-w*

		become:CNV-3-	PRG-run:IMPF-	AUX-3MSG
two	horse	3PL	3PL	

'Two horses are running.'

In the occurrences above [26aand b], the main verbs *əyyähedu*'they…going' and *əyyäroťťu*'they…running' agree in number with their respective con-verb forms *tasräw*'being imprison' and *honäw*'becoming' respectively.

The occurrences in [27aand b] below prove the above contexts for their morphological variations. In the examples, the verbs *əyyäroťäʧʧ* 'she…running' and *hedä* 'he has gone' were produced by the respondent in other contexts in his corpus data, showing formal variations.

(27) a. *ləʤ-oʧʧ* *yəz-a* *əyyä-roť-äʧʧ* *nä-w*
child-PL hold:CNV-3FSG PRG-run:IMPF:3FSG AUX-3MSG
'She is running holding children.'

b. *täʧʧagr-o* *wädäzza* *hed-ä*
cross:CNV-3MSG there go:PF-3MSG
'He has gone there crossing something.'

6.2.3 Subject Verb Agreement

This section presents the results of the analysis of subject verb agreement. Such a structure requires agreement between the nominal/pronominal subject and the main verb in person, number, and gender.

According to PT's developmental hierarchy, subject verb agreement emerges at stage four of the processability hierarchy. In pro-drop languages like Amharic, the main verb carries the subject feature without necessarily unifying it with an overt subject. In such situations, subject verb agreement disappears since there is no overt nominal or pronominal subject. Scholars like Di Biase (2007) hypothesized that in pro-drop languages, agreement markers in pro-drop contexts and in subject-verb agreement contexts should be treated differently because in the Italian language, he found that such agreements in pro-drop contexts emerged earlier than in subject verb agreement contexts.

Thus, only those verbal markers with overt nominal and pronominal subjects were considered while counting occurrences of the subject verb agreement

phenomenon. The third person plural number marker is expressed by the forms [-u] and [yə-…-u] in perfective and imperfective aspects, respectively.

Instances of the third person plural marker [–u] on verbs in clear plural contexts, as in [28], were counted as positive instances of number agreement since the verb (*əyyähedu* 'they… going') agrees with its head noun (*ʤəbotʃʃ* 'hyenas') in number.

(28) *ʤəb-otʃʃ-u* *əyyä-hed-u* *nä-w*
hyena-3PL-DEF PRG-go:IMPF-3PL AUX-3MSG
'The hyenas are going.'

In contrast, instances like [29] were counted as negative evidence of omission of third person plural number agreement markers. The third person singular main verb *əyyäroťä*'he…running' disagrees with its plural nominal subject *färäs-otʃʃ* 'horses'.

(29) * *bəzu* *färäs-otʃʃ* *əyyä-roť-ä* *nä-w*
many horse-PL PRG-run:IMPF-3MSG AUX-3MSG
'Many horses is running.'

The results of the distributional analyses of third-person number agreement markers are presented in Table 7. In the table, the value with the "+" sign shows rule application in TL contexts, the "-" sign represents non-rule application in TL contexts, and "(...)" represents insufficient contexts of rule application.

Structure	Feature	Respondents						
		AN	HB	ML	NR	AS	AY	DR
	3PL	+4	+1	+6	+2	-11	+1	(0)
	Feature	Respondents						
		FR	GN	HM	SH	YN	AB	
Subject-verb Agreement	3PL	+1	+1	+3	-7	+2	+5	

Table 7: Results of distributional analysis of third person plural number agreement markers

Third person plural markers [-u and yə…u] were productively produced by five respondents (AN, ML, HM, YN, and AB)with both morphological and lexical variations. DR produced no evidences for the analysis; thus, he was excluded from the analysis.

AB produced the plural morpheme in five lexically varied contexts as indicated in Table 7. As shown in [30aand b], the morpheme was supplied on the verbs *əyyähedu* 'they…going' and *əyyäťäťťu*'they…drinking' in contexts where there is grammatical feature matching of number with a value plural with the head nouns *ʤəboʧʧ* 'hyenas' and *wändoʧʧ*'males' respectively.

(30) a. *hulätt* *ʤəb-oʧʧ* *əyyä-hed-u* *nä-w*
two hyena-PL PRG-go:IMPF-3PL AUX-3MSG
'Two hyenas are going.'

b. *hulätt* *ťəḱur* *wänd-oʧʧ* *koka* *əyyä-ťäťť-u* *nä-w*
two black male-PL coca-cola PRG-drink:IMPF-3PL AUX-3MSG
'Two black males are drinking coca-cola.

The lexemes to which the plural agreement marker attached were produced in their base forms *(əyyähedä* and *əyyäťäťťa*) in other contexts, as in [31aand b].

(31) a. *asa* *əyyä-hed-ä* *nä-w*
fish PRG-go:IMPF-3MSG AUX-3MSG
'A fish is going.'

b. *käzza* *wəha* *əyyä-ťäťť-Ø* *nä-w*
then water PRG-drink:IMPF-3MSG AUX-3MSG
'Then, he is drinking water.'

7. Discussion of Results

7.1 Developmental Stages of Nominal Plural in Different Linguistic Environments

The hypothesis that lexical plural develops before phrasal plural was tested by looking at the marking of plural morphemes in two linguistic settings: lexical and phrasal (agreement between demonstrative adjective and head noun) contexts.

PT Stages	Structures	Feature	Respondents												
			DR	SH	GN	FR	AS	HM	AY	HB	NR	YN	AN	AB	ML
3	Phrasal	PL	-	-	-	-	-	-	+	+	+	+	+	+	+
2	Lexical	PL	-	-	+	+	+	+	+	+	+	+	+	+	+

1	Lemma	+	+	+	+	+	+	+	+	+	+	+	+	+

Table 8: Developments of nominal plural (-oʧʧ/-woʧʧ) in lexical and phrasal contexts

As shown in Table 8, all respondents produced lemmas that are predicted to emerge at stage one. As the singular number feature in Amharic is morphologically unmarked, all respondents were found to be producing a sufficient number of singular nouns. For example, DR and SH who failed to produce a plural number in context where there are no feature matching productively, produced a sufficient number of singular nominals. This implies that the singular emerges before the plural number feature.

The development of the nominal plural suffix in contexts where there are no grammatical information exchanges among constituents in a sentence was predicted to emerge earlier than in contexts that require plural agreement with demonstrative adjectives within a noun phrase. Accordingly, the finding of this study confirms this prediction in that the lexical plural emerged before the phrasal. Six respondents (DR, SH, GN, FR, AS, and HR) who marked a nominal number feature with a value plural on lexemes with no feature matching with other constituents in a sentence were unable to mark it in contexts that require plural number agreement between demonstrative adjective and head noun within a noun phrase. This result substantiates many previous findings in the literature. For example, Pienemann (1998b) investigated the developmental trajectories of the English nominal plural marker (-s) in contexts with and without quantifiers among German learners of English as a second language. He found out that nominal plurals with quantifiers emerged later than nominal plurals without quantifiers. However, Dao (2007) as cited in Charters, Dao and Jansen (2011) provided counter evidence against Pienemann's finding. The research was carried out on Vietnamese learners of English as a second language, and the focus of the study was to find out the developmental order of plural-*s* with and without quantifiers. Accordingly, they found that learners were able to process plurality in contexts with a quantifier earlier than in contexts without a quantifier. They argued that this happened since the concept of plurality exists with numerals that facilitate processing. Because of the conceptual clarity, learners were able to easily attach the plural marker to the head in

contexts where the heads were modified by quantifiers (Charters, Dao and Jansen 2011). In the Amharic language, although demonstrative pronouns have inflectional morphemes that show number (ənnä-zzih 'these') and gender (yə-h 'this-MSG'; yə-ʧʧi 'this-FSG') features, they are learned as independent words having the concept of gender and number features within the lexical elements like English quantifiers since their roots are bound morphemes. However, conceptual transparency did not work in the case of Oromo learners of Amharic as a second language, and the result was found to be consistent with PT's prediction.

7.2 Verbal Plural Agreement Marker across three Grammatical Structures

This section discusses the developmental routes of verbal featurein three linguistic contexts. More specifically, the development of plural subject agreement marker in pro-drop, agreement between con-verb/le+imperfective and head noun, and subject-verb agreement contexts were portrayed.

PT Stages	Structures	Feature	Respondents												
			DR	SH	AS	FR	AY	NR	HB	HM	GN	YN	AN	AB	ML
4	S-V agreement	3PL	/	-	-	-	-	-	-	+	-	+	+	+	+
3	CNV/IMPF-MV Agree	3PL	/	/	-	/	/	(/)	/	-	/	(/)	+	+	(/)
2	Pro-drop	3PL	-	-	-	+	+	+	+	+	+	+	+	+	+

Table 9: Developments of verbal plural agreement across three linguistic contexts

As can be understood from Table 9, plural subject agreement in pro-drop context emerged before contexts that require subject verb agreement. Many respondents (GN, FR, AY, NR, and HB) who supplied third-person plural markers in contexts where there is no feature matching with the nominal or pronominal subjects could not properly supply them in contexts where grammatical information exchange of plural number between subject and verb is required. This confirms previous findings in the literature. Di Biase (2007) suggested that counting instances of subject verb agreement in the pro-drop language should be different from other non-pro-drop languages. In pro-drop languages, the development of number-gender agreement markers

with nominal or pronominal subjects might be different from their development in pro-drop contexts. This claim emanated after he found that in the Italian language, which is one of the pro-drop languages, number-gender agreement markers in pro-drop contexts were found to emerge before subject verb agreement. Thus, this finding provides additional empirical support for the claim made by Di Biase (2007). Regarding the agreement between con-verb/lə+imperfective with its head at verb phrase level, the implicational scale did not provide us evidence that this number agreement with a value plural at verb phrase level emerges before the subject verb agreement that requires number feature matching across phrase boundary. We could not get evidence from respondents who productively supplied the plural agreement marker at verb phrase level but failed to process it at S-procedure. This is one area of investigation for future research.

It was noticed that learners at a very early stage of acquisition repeatedly over-supply imperfective forms as compared to perfective forms. They supply the imperfective form where either the progressive or the completive aspect is needed. For example, GN and AS pervasively employed such instances throughout their production data. They produced, for instance, words like *təsäťalläɟɟ*'she gives', *yəhedal* 'he goes/walks', *yək'ämmäťällu*'they will sit'etc while describing a picture of a woman feeding her child, a man walking towards a rabbit, and children sitting on a floor, respectively. This may partly be attributed to cross-linguistic influence or L1 transfer because unlike in Amharic, in Oromo, imperfective aspect is used to express on-going and extended actions (Eba, 2020:190). In Amharic, the non-canonical progressive aspect whose pattern is like perfective is used to express on-going action (Yimam, 2006:197).

7.3 Overall Morphological Developments

Table 10 shows the overall development of nominal and verbal plural in different linguistic contexts.

	Structures	Feature	Respondents

PT Stages			DR	SH	AS	FR	GN	HM	HB	AY	NR	YN	AN	AB	ML
4	S-V agreement	PL	/	-	-	-	-	+	-	-	-	+	+	+	+
3	CNV/IMPF-MV Agree	PL	/	/	-	/	/	-	/	/	(/)	(/)	+	+	(/)
2	Noun phrase (Dadj-N)	PL	-	-	-	-	-	-	+	+	+	+	+	+	+
4	Pro-drop	PL	-	-	-	+	+	+	+	+	+	+	+	+	+
3	Lexical	PL	-	-	+	+	+	+	+	+	+	+	+	+	+
2	Lemma		+	+	+	+	+	+	+	+	+	+	+	+	+

Table10: Overall developments of nominal and verbal plural in different linguistic contexts

The scale's statistical reliability was determined using the calculations provided in the methodology. As a result, one 'error' does not fit the implicational model as a whole. Accordingly, the scale's reproducibility coefficient was 0.98. It is statistically valid to have a coefficient of reproducibility of over 0.90. (Hatch &Lazaraton, 1991:210). The scale has a minimum marginal reproducibility of 0.57, which is smaller than the reproducibility coefficient (0.98), and a percent improvement reproducibility of 0.41. As a result, the coefficient of scalability becomes 0.95, which is statistically needed to be greater than 0.60. As a result, the implicational scale in the preceding Table has a very high statistical value of scalability, indicating a significant implicational relation among the developmental stages of morpho-syntactic rules.

8. Conclusion

This study aimed at exploring the developmental trajectories of Amharic morpho-syntactic structures based on processability theory and testing the compatibility of these developmental routes with PT's predictions. Based on PT's principles of stage-like development, predictions about the development of Amharic morph-syntactic structures were first made, and these predictions were tested based on the data collected from Oromo-speaking learners of Amharic as a second language. Accordingly, the stage-like development of nominal and verbal plural across different structures was identified, and the results regarding the general developmental architecture of target structures were found to be suited to PT's predictions. Evidence for the presence of

discrete and independent stages in which transitions from stage 2 to 3, and 3 to 4 were found. However, due to a lack of sufficient evidence produced by some learners, we could not identify a separate stage for verb phrase agreement (con-verb/lə+imperfect form). This requires further research. At stage two, the nominal plural without agreement, and the verbal plural in pro-drop contexts emerged. At this stage, the nominal plural emerged before the verbal plural. At stage three, plural number agreement within a noun phrase emerged, which signals the emergence of a phrasal after the lexical nominal plural.

The finding, which is against PT's prediction, which emanated from this article,was that the plural subject agreement markers in pro-drop contexts emerged before contexts that need subject-verb agreement. This result in fact corroborates studies conducted on other pro-drop languages like Italian (Di Biase, 2007). PT claims that subject agreement markers generally emerge or processableat stage four without taking into account its nature in pro-drop languages. Overall, the implicational scaling proved the hierarchical nature of language development with 0.95 scalability.

This empirical study has implications for curriculum design, theoretical advancement, and teachers' professional development. The findings would be an input to designing an effective Amharic language curriculum, which organizes different morpho-syntactic structures based on the developmental processes or trajectories explored via this empirical study. Moreover, the finding that subject agreement markers in a pro-drop context emerge at stage two would advance processability theory in considering the nature of this feature in pro-drop languages. More importantly, teachers would benefit from reading this study in that they would provide effective instructions that take into account the processing ability of every individual learner.

This study provided some evidence in support of PT's prediction. Future research should address the gaps identified in this article. More advanced research, which includes more task types (to test the steadiness hypothesis) and different grammatical structures, should be carried out to have a comprehensive understanding of the nature of second language development based on PT cross-linguistically.

Declaration of Conflict of Interest

The author of this article declares that there is no conflict of interest.

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