

## Second Language Learner's Access to Parameters of Universal Grammar: A Syntactic Perspective

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### ABSTRACT

In Universal Grammar, syntax is explained through X-bar theory. X-bar theory is the component of Universal Grammar which specifies the hierarchical structure of the heads of phrases, their specifiers and complements. Investigating the availability of this component in adults learning a second language can provide a better insight into the process of second language learning. This study attempted to find out if the X-bar theory is accessible to Malay speaking adults learning English as a second language and to investigate the possible developmental stages of syntactic knowledge, with regards to Malay adult second language learners writing in English. The data show that the learners can apply the word-order parameter and the null-subject parameter in their spontaneous writing at earlier stages. This implies the availability of the VP-related nodes of the X-bar tree at the first stage of learning grammar. The IP-related agreement parameter and the CP-related auxiliary movement emerge later as the learners become more and more proficient in the second language.

**Keywords:** Language acquisition device, syntax, universal grammar, X-bar theory, universal grammar accessibility

### INTRODUCTION

Grammar is an inevitable component of language, but learning grammar is an onerous task, especially when it comes to using the correct forms in the processes of speaking and writing. A lot of effort has been put to give an insight into the grammar learning process.

Thus, what is grammar actually? There are many definitions given by grammarians and linguists, among which, Noam Chomsky's description of grammar is in line with the objective of this paper. Chomsky (1965) defines grammar as the competence, or a set of mentally embodied rules, which are manifested by every individual's understanding of acceptable structures in a language. The actual language produced using the grammatical competence

is named performance. Language undergoes some processes to emerge from competence into performance. The Universal Grammar (UG) theory describes these processes in terms of principles and parameters (Chomsky, 1981; 1988; Cook, 2007), which explain that the speaker's knowledge of a language such as English is made of a number of general principles and a number of appropriate parameter settings. Investigating the nature of competence and the process of its manifestation in language performance can help to improve and facilitate this process for second or foreign language learners.

The component of UG which deals with the principals and parameters related to syntax is the X-bar theory which defines the internal structure

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of the sentence units. The original X-bar theory emerged from the phrase constituent rules. In this theory, variables are used to stand for particular parts of speech. Based on the X-bar theory, all the possible phrases in a language fit into a general phrase structural framework. In this schema or framework, X is a representation of a random syntactic category. X can be a Noun (N), Verb (V), Adjective (A), Preposition (P), etc., when in a zero-level or word-level category, it is combined with some other elements to form an X-bar level category; this X-bar level category can combine with some further elements to form an XP-level category (Chomsky, 1995; Kornai & Pullum, 1990). These categories are called projections. X is a variable that can stand for any category: N (noun), V (verb), A (adjective) or P (preposition) and XP is a general term to cover NP (noun phrase), VP (verb phrase), AP (adjective phrase), or PP (prepositional phrase). Similarly, X' or X-bar stands for N', V', A' or P', and X represents N, V, A, or P. The X label is what gives the theory its name. Using this variable notion, the generalization of the X-bar theory is captured (Collins, 2002).

Basically, the X-bar theory states that a lexical item X may have a complement and one or more specifiers. The complement and specifier are maximal projections. Chomsky's definition from the concepts of minimal, intermediate and maximal projections is that in the X-bar tree, a category that does not project any further is a maximal projection XP, and one that is not a projection at all is a minimal projection X, and any other is X-bar (or X'). The notion of projections is used in the explanation of certain parameters (Carnie, 2002). The combination of these levels in the X-bar Tree is illustrated in Fig. 1.

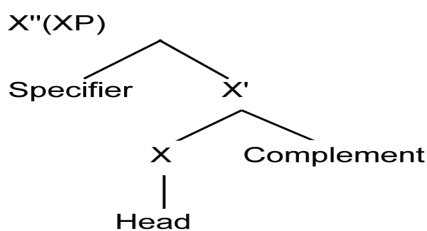


Fig. 1: X-bar tree

Chomsky (1965; 1981; 1988) introduced the notion that children are born with some special built-in ability to learn language. This innate ability is called the Language Acquisition Device (LAD). The terms LAD and UG are sometimes used interchangeably, although these two notions should be considered separately since UG is included within the structure of LAD. The LAD consists of UG and other elements, namely the triggering data, a regulatory mechanism to make parameters available for setting, and some sort of algorithm for mapping the triggering data onto parameter values (Hilles, 1991; Grimshaw, 1981).

This device supposedly contained the main rules for all possible human languages. All the child needs is a small sample from some specific language (e.g. English or Japanese) to be able to add a few language-specific rules. For example, English is said to be a "head first" language because it builds structures like:

The-> clever -> boy

Malay (Bahasa Malaysia), on the other hand, is called a "head last" language because it builds structures like:

anak<- yang <-cerdas

boy<- the <- clever

All a child needs to learn is whether the language is a head first or head last language. This would set a parameter in the LAD. The child only needs to set a finite number of parameters to learn the structure of the language (Chomsky, 1993; Cook, 2007).

Thus, the acquisition of a language is only achieved through given innate syntactic knowledge. Clearly, not all the elements of a language can be innately encoded; otherwise, there would be no cross-linguistic variation. In the principles and parameters theory, this variation is assumed to result from the setting of various parameters in response to the environment during acquisition. These parameter settings interact with an inventory of invariant principles which (in combination with a set of lexical items) make up the mature I-language of a speaker (Kirby, 1999). Hence, acquiring language means

learning how principles apply to a particular language and which value is appropriate for each parameter.

The present study was conducted to investigate the nature of the above mentioned parameter resetting for the adult Malay speakers. The parameters from the VP, IP, and CP projections were chosen to enable the researcher to comprehend the developmental stages of these projections as the proficiency level of the participants changed from low to intermediate and advanced. The parameters were chosen based on their projection level and their different settings in English and Bahasa Malaysia. To make it clear, each chosen parameter is explained in this part along with some examples from the two languages.

1. The Word Order parameter: this parameter occurs in the minimal projection and defines the order of the head, complement and specifiers in a phrase. English is considered a head last language in which the head of a phrase occurs after the complement, while Bahasa Malaysia is a head first sentence, in which the head of a phrase comes before its complement, as illustrated below:

The book  
\* Itu buku  
Buku itu

Green book  
\*Hijau buku  
Buku hijau

I bought the big green book on poetry.  
\*Saya beli itu besar hijau buku tentang puisi  
Saya beli buku besar berwarna hijau tentang puisi.

2. The Null Subject parameter: this parameter takes place in the minimal projection and differentiates between languages which allow a sentence without an explicit subject, like Bahasa Malaysia and languages which do not allow this setting. For instance in English:

It is cold  
\*Is cold  
Hari ini sejuk  
Sejuk

3. The Subject-Verb Agreement parameter: this parameter occurs in the intermediate or IP projection and stands for the explicit manifestation of the person's element. In some languages, including Bahasa Malaysia, this parameter has a neutral setting and is not seen in the performance, but in other languages, including English, it is explicit to some extent (third person singular in English), as exemplified below:

He/she goes (3<sup>rd</sup> person singular)  
They/I go (plural)

Perempuan/lelaki pergi (3<sup>rd</sup> person singular)  
\*She / he go

Saya pergi  
I go

Mereka pergi (plural)  
They go

4. The Aux Raising Parameter: this parameter explains the movement of the elements in a sentence (for example, when an auxiliary is moved to the beginning of a sentence to make a question in English). This is called 'raising' since this movement is allowed only from a lower to a higher projection. This parameter is not explicitly represented in Bahasa Malaysia since auxiliaries are not used; for example:

What is in the box?  
\*Apa (ada) --- dalam itu kotak?  
Apa dalam itu kotak?

How do you go to school every day?  
\*Bagaimana --- awak pergi ke sekolah setiap hari?  
Bagaimana awak pergi ke sekolah setiap hari?

In their work on X-bar theory and first language acquisition, Guilfoyle & Noonan (1992), Platzack (1990) and Radford (1990) argue that the first language learners begin the acquisition of syntax with the lexical projections (like the bare VP Tree shown in Fig. 2) and build their functional projections gradually, leading to more complete structures (IP projections and CP projections are illustrated in Figs. 3 and 4).

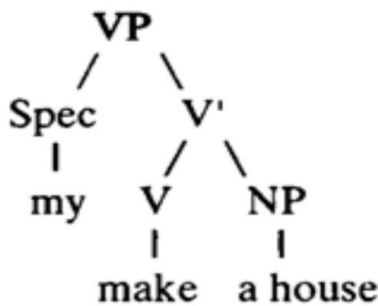


Fig. 2: VP level tree

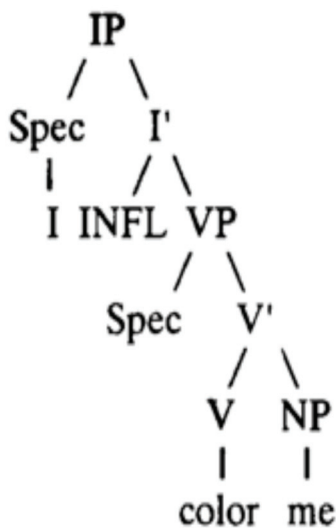


Fig. 3: IP level tree

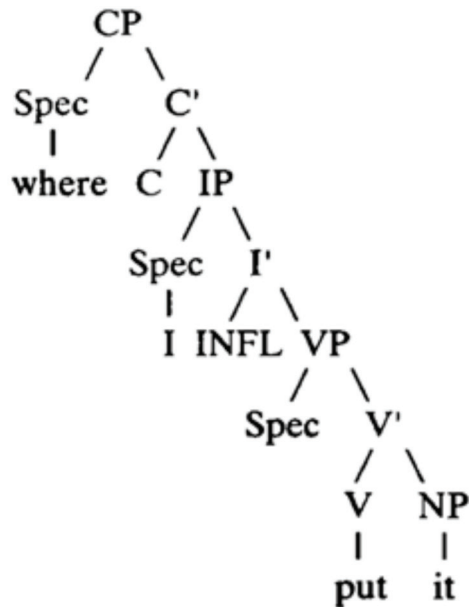


Fig. 4: CP level tree

On the other hand, Wexler, (1993), Hyams (1992) and Weissenborn (1990) are among the opponents who contradict this hypothesis and argue that WH-question formation and verb raising parameters are present from the beginning of acquisition. Therefore, the parallel functional projections are accessible from the very beginning of second language learning.

Later, another version of the original idea has emerged by Radford, and it suggests that functional projections develop one by one, as a result of sequential applications of the X-bar Theory. This approach, called the Weak Continuity Hypothesis, is presented for L1 German in Clahsen *et al.* (1994) and is further defined and developed for English in Vainikka & Young-Scholten (1996a, b; 1994) who introduced the three stages of development in English in early childhood, as shown in Figs. 2, 3 and 4.

*Previous Work on the X-bar Theory*

*Availability for Second Language Learners*

Many cross-sectional and longitudinal studies have been conducted by SLA researchers

with regard to X-bar theory and its principles. The main objective of all this research was to investigate the nature of language acquisition, its components and the way the principles of Universal Grammar are acquired and applied throughout the process of language acquisition in children learning their first or second language and adults acquiring a second language. A few of these studies, which are related to the subject of this research, are mentioned below.

*Schwartz and Sprouse (1994)*

This is a longitudinal study on word order and nominative case in non-native acquisition. The researchers try to exemplify one way in which the linguistic theory can be employed in SLA research to produce theoretically revealing results. The interlanguage data came from a longitudinal study of one adult native speaker of Turkish acquiring German. They argued that the displayed linguistic development followed a path that is intriguing in light work done in syntax related to word order and nominative case checking. They used the parametric values for Turkish and German as a base to show the interlanguage stages followed by their subject. This study aimed to determine whether it is possible to capture each intermediate phrase of the interlanguage system via the principles of UG. It finds evidence for the hypothesis that the L2er's linguistic knowledge is comparable – in terms of knowledge type - to that of the native speaker competence.

*Vainikka and Young-Scholten (1994)*

This research proposed an analysis of German by adult Korean and Turkish speakers based on the weak continuity approach of L1 acquisition. The researchers claimed that L2 acquisition initially involved a bare VP whereby its headedness was transferred from the learner's L1, with functional projections evolving entirely on the basis of the interaction of X-bar theory with the input. Under this approach, they posited what they called as the "minimal trees" to account for the development of phrase structure. The claim is that utilizing X-bar theory in this fashion does

not involve or require maturity; and therefore, both children and adults are able to posit new maximal projections based on the input data. Vainikka and Young-Scholten also used the results of their study to claim that adults access to X-bar theory related parameters is gradual, beginning from lexical projections and moving towards the IP and CP functional projections.

*Vainikka and Young-Scholten (1996a and b)*

Vainikka and Young-Scholton conducted two other studies which are similar to their work in 1994. The first (1996a) is an attempt to extend the findings of the previous study to the data from other sources. The data for this study were taken from Korean, Turkish, Italian and Spanish speaking adults acquiring German without formal instruction. The findings of this study showed that these learners transferred their L1 VPs and then switched the headedness to the correct, head final value for German. Although functional projections in Korean and Turkish are head-final and these are head-initial in Italian and Spanish, all the four groups of learners subsequently posited head-initial functional projections in German. The researchers concluded that only lexical projections constitute the L2 learners' initial state. The development of the functional projections is driven exclusively by the interaction of X-bar theory with the target language input. The second study was done by the same researchers (Vainikka & Young-Scholton, 1996b) and it used the data collected from Italian and Spanish native speakers acquiring German. The findings of this study support the claims made in the previous work by Vainikka and Young-Scholten.

*Vainikka and Young-Scholten (2007)*

More recent work on parameter availability in adults was carried out by Vainikka & Young-Scholten (2007) under the notion of organic syntax. In their study, the researchers argued that the minimal projections are available for adults and the intermediate and maximal projections are built gradually as they learn more and their second language grows.

## MATERIALS AND METHODS

The objectives of this study were to find out whether Malay adult second language learners of English have direct access to the X-bar theory and to identify the developmental stages of the phrase structure learning in these adult second language learners. To achieve these two objectives, a cross-sectional study was conducted and the occurrences of the parameters of X-bar theory were investigated in the participants' spontaneous writing in different levels of English language grammar proficiency.

### *Participants*

A total of 138 students from the Teaching English as a Second Language (TESL) programme at University Putra Malaysia had participated in this study. All the participants were Malays; the Chinese and Indian students were excluded to control the variable of the first language. It is important to note that the age of the students was not considered as an intervening variable (their age ranged from 19 to 23 years). This group of students was divided into 3 English Grammar proficiency levels of low, intermediate and high, based on the results of the Oxford Placement Test (OPT) (Allan, 1992). The wide range across the different proficiency levels in English can be attributed to their different family or educational background. They come from different educational levels; namely, *Sijil Pelajaran Malaysia* (SPM), *Sijil Tinggi Pelajaran Malaysia* (STPM) or Matriculation Colleges, which present different language proficiency. Some communicate in English with their parents and family members at home. 15 participants were chosen randomly from each level (n=45) to participate in sentence eliciting tasks, the result of which was compared to their proficiency level.

## INSTRUMENTS

### *Proficiency Test*

The Grammar section of the Oxford Placement Test (OPT) (Allan, 1992) was used to place the

participants in three different levels. The use of OPT as a L2 proficiency test has been justified in the research previously conducted by Wistner *et al.* (2009). To ensure the relevance of this test, the test items were analyzed. As the test included all the related X-bar theory parameters in a random order, it was considered relevant to the scope of this study. The test was conducted at Universiti Putra Malaysia at two separate times under similar conditions.

### *Pictorial Tasks*

The pictorial tasks were used as eliciting devices to collect the utterances from the participants. Eliciting written or spoken language via different kinds of pictorial tasks is elaborated in the literature. The work by Van Der Werff (2003), Hamyan (1995) and Pierce & O'Malley (1992) are among the studies done in this respect. In this study, three kinds of tasks were used, taking into consideration the suggestions made by Van Der Werff (2003). An example of each pictorial task is included in the appendix.

#### a. Story-telling

Each picture contained 5 or 6 sub-pictures depicting a simple short story. The participants were asked to write a story based on their own understanding following the sequence of the sub-pictures. This was a semi-guided task to ensure that the participants produce almost similar sentences but they were given the freedom to use any vocabulary or structure they preferred.

#### b. Caricatures

The pictures in this task contained one comic scene. The participants were required to express their own understanding of each picture in as many sentences as possible. This task was designed to encourage the participants to produce more sentences in a less restricted way than that of the story-telling task.

c. Pictorial Dialogues

This task is also known as text balloon. Each picture shows two people having conversation in different situations. One of the balloons was filled with a question or/and the participants were asked to imagine as if they were taking part in the conversation and to fill in the empty balloon. This task was designed to elicit questions and negative sentences which are less likely to emerge in the other tasks.

*Composition Task*

This task required the participants to write 2 or 3 paragraphs on a recent pleasant experience. This open-ended task was included to collect non- cliché sentences and to maximize the number of elicited sentences. There were no restrictions, such as word or time limit, for the participants to write as many sentences as they can under normal circumstances and with as little stress as possible.

*Data Collection*

The 45 randomly selected participants were asked to complete the writing tasks within 90 minutes. Instructions were written on the cover of the tasks folder and also given orally by the researcher. All the written sentences were analyzed. The details of the analysis are provided in the result section. For each participant, the number of relevant errors (violation of the Null Subject parameter, the Word-order parameter, Subject-Verb Agreement, and Auxiliary Movement) were calculated. The data were then incorporated into an implicational Table of developmental stages. The method of implicational scaling was used to divide the cross-sectional samples to developmental stages of acquisition. The table indicates that the presence of any higher projections in a syntactic phrase marker requires the prior acquisition of all lower ones (Lardiere, 1998). The path which was used by the Malay speaking English learners to master the English phrasal structures is indicated in the form of implications.

**RESULTS AND DISCUSSION**

A total of 723 sentences were collected from the participants using the pictorial eliciting tasks and the composition, but only a proportion of these sentences were useful to investigate their linguistic behaviour related to the development of the X-bar theory. One-word utterances (like yes, no, or why), exclamations (such as Wow!) and repetitions were excluded from the analysis because they were not complete sentences to give any information about the four investigated parameters. Some of the remaining utterances were considered suitable to investigate one or two of the parameters but for other parameters. An example for this type of sentences is the imperative form which can show the cases of word-order parameter violation, but it does not determine the null subject parameter. These were excluded from the analysis of the unrelated parameters as described below:

- All the imperatives were excluded in the analysis of the Null Subject Parameter.
- Utterances such as “she is go to the park every day” and those without a verb were also excluded in the analysis of the Subject-Verb Agreement because it was not clear whether they were made in the Simple Present Tense or the Present Continuous Tense.
- As far as the auxiliary movement was concerned, only the questions and negatives were analyzed and all the other sentences were excluded because only questions and negative sentences could provide explicit information on the raising parameter.

Table 3 shows the number of the utterances analyzed for each case.

The implicational table shows the frequencies of syntactically incorrect features in the speech of which speakers were above a preset cut-off point. Following Vainikka and Young-Scholten (1994), a cut-off point of 60 percent was employed as a general criterion for the acquisition of the parameters in question, and a parameter was judged to have been acquired if it was used correctly in at least 60

TABLE 1  
OPT placement results

	Participants	OPT score	Proficiency
1	49	30-60	Minimal users (Low)
2	57	90-110	Limited users (Intermediate)
3	32	130-170	Competent users (Advanced)

TABLE 2  
Average number of utterances

Level	Average number of sentences	Word order	Null-subject	Subject -verb agreement	Auxiliary movement
High	296.1	291.6	266.9	270.3	36.7
Intermediate	186.7	182.7	174.8	123.7	36.1
Low	184.8	168.2	108.8	87.7	28.8
Total	667.6	642.5	550.5	481.7	101.6

percent of the obligatory context. The data were then incorporated into the Implicational Table illustrated in Table 3.

The Guttman coefficient of reproducibility ( $C_{rep}$ ) and coefficient of scalability ( $C_{scalability}$ ) calculated for this scale were ( $C_{rep}=.975>.9$ ) and ( $C_{scalability}=.85>.6$ ) to ensure that the data were able to predict the participants' behaviour with regards to phrase structure parameters and to determine that the given set of variables (parameters here) were truly scalable and unidimensional (Hatch & Farhady, 1981).

The results shown in the Implicational Table, along with the X-bar theory based analysis of the sentences collected from the participants in each proficiency level, showed that the parameters related to the minimal projection (VP) were accessible even at the lowest levels of grammar proficiency. Nonetheless, the intermediate projection (IP) and maximal projection (CP) were not accessible at the lower proficiency level. The IP related parameter emerged in the intermediate proficiency level and the CP related parameter was accessible only for the participants in the higher proficiency levels. This evidence is compatible with the Radford (1990) and Vainikka & Young-Scholten's (2007) hypotheses which state that there is a partial

access to the X-bar theory at the beginning of second language acquisition and the higher projections can be accessed as the proficiency improves, and when sufficient data input is provided to the learners.

The findings of this study can provide a better understanding of the nature of the learning a second language for Malay students, and this in turn helps the curriculum designers and teachers to provide them with the adequate input in the appropriate time by triggering the parameter resetting process.

It is important to note that this study has some limitations with regard to time duration, participants and methods. This is a cross-sectional study and for this reason, the researcher had to follow the progress of the X-bar projections by studying the participants at different levels of proficiency. The participants at the low proficiency level had some exposures to the language before participating in the study, so it was possible that they had passed some of the progressive phases. These limitations can be further considered in any study in the future, particularly in relation to the availability of the principles and the parameters of the X-bar theory and the Universal Grammar. In addition, a longitudinal research could be conducted



TABLE 3  
The implicational table

	English proficiency level	Word order	Null subject	Subject-verb agreement	Auxiliary movement	X-bar tree levels
Low	1	-	-	-	-	VP
	2	-	+	-	-	
	3	+	-	-	-	
	4	+	-	-	-	
	5	+	-	-	+	
	6	+	-	-	-	
	7	+	+	-	-	
	8	+	-	-	-	
	9	+	+	-	-	
	10	+	+	+	-	
	11	+	+	+	-	IP
	12	+	+	+	-	
	13	+	+	+	-	
	14	+	+	+	-	
	15	+	+	+	-	
Intermediate	16	+	+	+	-	IP
	17	+	+	-	-	
	18	+	+	+	-	
	19	+	+	+	-	
	20	+	+	+	-	
	21	+	+	-	-	
	22	+	+	+	-	
	23	+	+	+	-	
	24	+	+	+	+	
	25	+	+	+	+	
	26	+	+	+	+	
	27	+	+	+	+	
	28	+	+	+	+	
	29	+	+	+	+	
	30	+	+	+	+	
High	31	+	+	+	+	CP
	32	+	+	+	+	
	33	+	+	+	+	
	34	+	+	+	+	
	35	+	+	+	+	
	36	+	+	+	+	
	37	+	+	+	+	
	38	+	+	+	+	
	39	+	+	+	+	
	40	+	+	+	+	
	41	+	+	+	+	
	42	+	+	+	+	
	43	+	+	+	+	
	44	+	+	+	+	
	45	+	+	+	+	

to follow up the same participants from the beginning of their second language learning and to cover more parameters to get more precise results.

### CONCLUSION

The implicational data tabulated in Table 3 suggest that even the least proficient learners of English could correctly apply the word-order parameter and the null subject parameter in their writing. As far as the X-bar theory is concerned, this implies the availability of the VP related nodes of the X-bar tree from the early stages of the acquisition of English as a second language. The IP-related agreement paradigm and the CP-related auxiliary movement emerged as the second language learners became more and more proficient in it. It may be inferred that lexical positions are more readily available than such functional positions as those associated with IP and CP.

The implicational table also suggests that the participants have access to Universal Grammar only based on the weak continuity approach: the whole CP tree is not yet available at the earlier stages of second language acquisition. Instead, lexical projections are more easily accessed. Functional projections are gradually added in successive, implicational stages and become more accessible as L2 learners attain higher levels of L2 proficiency. The effects of the mother tongue seem to be negligible. The word-order parameter is differently set in Malay and English. Yet, this parameter was found to be successfully reset even for the less proficient participants. Moreover, the learners' access to IP and CP in their first language proved to have little effect on the availability of IP and CP at lower levels of English proficiency.

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APPENDIX 1

Sample of the pictorial tasks: Story-telling, Pictorial Dialogue and Caricature, respectively.



Please write a question and an answer in the form of dialogue between the characters





**"You can remember 'Dental Health Week', but you can't remember my birthday?!"**