Cognitive Neuroscience In Second Language Acquisition

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Abstract

In the investigation of the morphosyntactic development of the English verb, this study examines whether or not the cognitive neuroscience has any role in the acquisition of the inflectional category by L2 learners from the beginning, that is, if the functional category I exists in L2 grammars from the earliest stages which is guided by some pre-programmed sequence guided by mental cognition. Furthermore, this study will also reveal some striking facts from Urdu pronouns which show some acquisition problems in the syntactic representation of English grammar. We adopted the hypotheses that the acquisition of the English inflectional morphology develops in brain similarly across all L2 learners in which the functional category I is present in the L2 grammars from the beginning, but the features [±tense, ±agr] of I develop separately over time. The study of syntactic development proceeds with the framework of the Government-Binding Theory (Chomsky 1981, 1986).

The data were drawn from random sample of 240 normally distributed population learning English as their second language cross-sectionally (from different groups of L2 learners, where each group was exposed to a specific teaching time, that is, of interest for us) in classes at school.

Introduction

This study is concerned with the existence of the elements of the English verb system such as copula *be*, auxiliaries, past tense inflection *–ed,* 3rd person singular *-s*, *do*-support, and infinitival particle *to* by Pakistani children. In Chomsky's Government and Binding theory (1981, 1986) these elements are seen belonging to a functional phrase I (Inflection), formerly abbreviated to INFL. The interest of this study is in exploring the syntactic representation of functional category I over time.

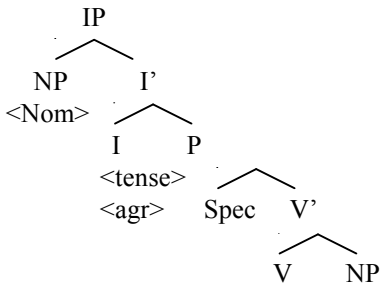
We gathered data from Urdu speakers learning English as a second language in Pakistan. The data were elicited through Imitation, Grammaticality Judgement, Interview, and Picture Story tests from 240 cross-sectional studies. L2 learners were exposed to

English only in schools otherwise they spoke Urdu or Punjabi with families and friends. Year 1 had the least exposure to English in the classroom environment whereas Year 3 reveals the maximum exposure in this study.

Theoretical Framework

This study of the morphosyntactic development proceeds within the theoretical framework of Principles and Parameters as set out in Chomsky (1981, 1986a, 1986b) to analyse L2 learners' language in a more focused manner, although other references are presented within this framework. Within this theory, grammatical development is assumed to be an 'interactive' process, that is to say, the various principles of UG (Chomsky, 1981), constitute the learners '*a priori* knowledge' concerning the form of grammar, interact with the data of language learners on the basis of the exposure to the target language to determine what they know, and what they don't know. The clause structure given in 1 below is assumed in this study, in accordance with Chomsky (1981, 1986)[1]. Tense and agreement are then treated as separate features [± tense] and [± agr].

1.



This format allowed us to describe the early syntactic structure of L2 learners in their least exposure time. We analysed whether or not L2 learners' language had access to the functional category I[1] at the start of their language development, and whether or not the tense and agr features associated with the head I are present from the beginning or develop later.

The focus of our Study

The English verbal inflections with which we shall be dealing are based on the conventional analysis of the English verb system, as incorporated in such L1 studies as Brown (1973), and adapted to more recent syntactic analysis of L1 in Radford (1990).

1- The structure is modified by Pollock (1989) and Chomsky (1993) who propose that tense and agr head separate maximal projections Also, we follow Abney's (1987) and Fukui's (1986) Proposal and assume that the category NP is dominated by the functional category DP; however, we will refer to them a NPs since such a distinction is not crucial to the point under discussion.

2- By INFL or I category, Chomsky (1981) refers to the tense feature, and the person, number and gender of the subject, which can be realized as an agreement feature on verb.

The targeted INFL elements in this study in terms of their correct use in obligatory contexts are explained in 2 below:

2.	INFL elements	Examples
1	copula *be*	(he is a boy)
2	progressive *be* + V-*ing*	(he is playing)
3	perfective *have* + V-*en*	(I have done)
4	modals + V	(he will play)
5	finite verb Past Tense inflection V–*ed*	(he played)
6	*do* + V (for negation only)	(I do not play)
7	3rd person finite verb Present Tense singular V–*s*	(he plays)
8	infinitival particle *to* + V	(I like to play)

The overall question of the nature of the grammars of early L2 learners so far as the functional category I is concerned is broken down into separate aspects in 3 below, this means:

3. a) Is there any evidence for the functional category I at the earliest stage of syntactic development in English Verb by L2 learners?

That is, do any of the targeted INFL elements emerge from the beginning to show their productive occurrence in the learners' speech?

b) How does the functional category I develop in L2 learners?

In other words, do the INFL elements come in together or separately?

c) Is there a difference of I between different syntactic stages?

In other words, do the changes in I with time occur due to the features such a [+tense, +agr] associated with the I phrase?

In 3a, for the investigation of I, we also looked into the related properties of morphological Case of English pronouns in L2 learners' syntactic process. Our concern in the context of Case was to get some additional evidence for the syntactic structure by looking at what type of pronouns (i.e. nominative, accusative, genitive) were used by L2 learners in their early grammar. These findings provided the impetus for 3b, that is, 'how does the functional category I develop?' For this purpose, L2 learners were compared in three different time exposures (Year 1-Year 3) which suggested that children's innate ability created language construction through the interaction of X-bar Theory[1]. 3c explains the gradual effect of the development of I from one stage to another over

time. The suggestion here is that the I features [±tense, ±agr] will show their syntactic representations by presenting different acquisition pattern of I over time. (Footnotes)
[1] X-bar theory is assumed to provide a universal format according to which constructions are structurally represented (Haegeman, 1991,1994).

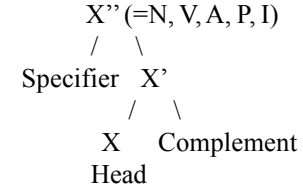
Theoretical considerations

Within the framework of Principles and Parameters, a specific proposal based on the investigation of the early morphosyntactic structure of L2 grammar has been put forth in this study regarding the properties of UG which are believed to constrain all natural languages. It is impossible to acquire a language without knowing the X-bar and projection principles. We concentrate on just the development of one area of syntactic development namely, the functional projection of the I-system from the X-bar syntax viewpoint. For our theoretical and descriptive framework, we will give reference to other areas only in as far as they contribute to determining the structure of the I-system.

X-bar theory

X-bar theory is assumed to provide a universal format (i.e. UG Principles) by which constructions are structurally represented. We adopt the standard version of X-bar theory (cf. Chomsky 1986; Abney 1987). Chomsky (1986b:3) postulates a hierarchy of syntactic expressions of category X as explained in 4 below.

4. English



In the X-bar schema above, the word level category X is said to be the immediate head of the X' constituent containing X and its complement. This X' is itself the immediate head of the X'' containing it and the specifier phrase.

The functional category I in syntactic theory

Our major concern here is with the functional category I which dominates the inflectional morphology of the verb, such as, copula *be*, aspectual auxiliaries, modals, and infinitival *to*. Tense ending (i.e. 3sg *–s*, past *–ed* etc) ends upon V; auxiliaries, modal and infinitival *to* are followed by a verb. The agreement between specifier and head in IP is morphologically realised. According to X-bar theory of phrase structure syntax, the functional categories constitute heads of phrases. If the head of the phrase structure is I, then the phrase is an Inflectional Phrase (IP). According to the government

3- X-bar theory is assumed to provide a universal format according to which constructions are structually represented (Haegeman, 1991, 1994).

4- A governs B iff

definition[1], the functional category I is a governor, and IP is its maximal projection[1]. The maximal projection IP consists of I' and its specifier. Thus the structure of I can be assimilated to the X-bar format as given in 5 below.

5. IP ⟶ Spec; I'
   I' ⟶ I; VP

If we analyse the content of the functional category I in terms of the features[2] [±tense] and [±agr] there ought to be four combinations as given in 6 below.

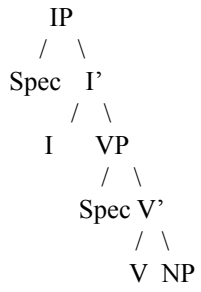
6. [+tense, +agr]
   [-tense, +agr]
   [+tense, -agr]
   [-tense, -agr]

These features together constitute the inflectional node I. I assigns Case[1] to NP in specifier position and NP moves from its base generated position from VP to IP through movement to fulfil case assignment.

Movement

In Chomsky (1981: 52) two features [± tense] and [± agr] together constitute the inflectional head I. We assume that in English main verbs do not raise to I. In English I lowers to V for agreement, and NP raises from Spec of VP to the Spec of IP by Case requirement as shown in 7 below.

7.



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1) A is a governor (i.e. either of the category A, N, V, P, I);
2) A c-commands B;
3) no barriers[4] intervenes between A and B.

5- In order to exclude multiple governors and to define maximal projections as barriers, the notion minimality is introduced in the definition of gtovernment (see Rizzi, 1990: 6 for detail).

6- In the literature both features and prosperties of the funtional category I are used for each other.

7- Case theory deals with the morphological properties of categories and the positions in which they can and cannot occur. Movement of the subject from VP to Spec-IP is motivated by Case requirements.

In 7 above, all arguments (=NPs) of a verb are base-generated within the maximal projection (VP) of that verb (cf. e.g. Fukui & Speas 1986; Kitagama 1986; Koopman & Sportiche 1988 among many others), therefore, NP must raise to the maximal projection of an inflectional category to receive (abstract) nominative Case. According to Chomsky (1981; 1986) NP in the Spec IP position is assigned abstract nominative Case by I (i.e. tense, agr). Movement of the Spec-VP to Spec-IP is thus assumed to be motivated by Case considerations.

Case Theory

The theory of Case strongly interacts with X-bar theory. Chomsky (1986a: 193-4) distinguishes two types of Case assignments, first structural Case assignment: Nominative and Accusative. Structural Case is subject to the requirement that the Case assigner governs the NP which it case-marks. Second, inherent Case assignment: the English Genitive and the German/Urdu Dative and Genitive, that is, the inherent Case assigner must govern and theta-mark the NP which it case-marks.

Consider the following examples shown in 8 below where (*) shows wrong Case.

8. English: a) He (Nominative) attacked him.
   b) *Him (Accusative) attacked him.

   Urdu: a) us-ay gaarii calaa-ni aa-tii hai
   S/he DAT. knows a car to drive.
   (S/he knows how to drive a car)
   b) *us (he- NOM) gaarii calaa-ni aa-tii hai

   (Butt, 1995:82)

In Principles and Paramaters, the functional category I which is the head of IP, is said to govern the subject position (SPEC-IP) to which nominative Case is assigned. In 8a, English I governs the subject *he* and assigns it NOM case, and V governs the direct object *him* and assigns ACC case whereas the 8b sentence violates the rules since the default Case in English is Accusative (e.g. me/him/her etc). In other languages such as German and Urdu, the Case system is different; nominative is the default case in both languages[8].

Language Syntactic Stages: Theoretical assumptions

In the linguistic theory, the functional phrasal structure is projected from the functional categories. This theory is directly related to first and second language acquisition. Specially, it has been proposed for English L1 (Guilfoyle & Noonan, 1992; Radford, 1990; Aldridge, 1990) that the lexical categories are present from the beginning but the functional categories emerge according to a maturational schedule. This linguistic acquisition theory is known as Maturational Approach.

[8] For German default Case, see Haegaman (1994), and for Urdu, see Mohannan (1994:100).

According to some linguists (Clahsen, 1990; Clahsen & Penke, 1992; Clahsen, Eisenbeiss & Vainikka, 1994; Muller, 1994b etc.) children's earliest sentences lack a CP, but children have an IP projection from the beginning of acquisition.

And an other theory is proposed by Hyams (1986, 1992, 1994), Poeppel and Wexler (1993) and many others that lexical as well as functional categories are present from the beginning. This linguistic acquisition theory is known as Continuity Approach.

We are making different assumptions for the investigation of the functional category I by using different linguistic acquisition theories explained in the previous literature. All assume that functional categories are built in, but all stages differ in the existence of functional categories. How good are these linguistic stages in the context of Second Language Acquisition? This study answers the question what syntactic stage second language learners' early grammars have, that is, whether the early L2 grammars have a VP-stage which proposes that functional categories only become part of the child's grammar once they are lexicalized; or in contrast L2 early grammars have the IP-stage which proposes that the functional category IP is part of the early grammar.

Methodology

240 subjects were examined in two different Age groups (younger, 5-7 years; and older, 11-13 years) in Pakistan crosslinguistically. The data are collected from four instruments, namely Elicited Imitation, Grammaticality Judgement, Interview, and Picture Story tasks at three different time exposures (Year 1 - Year 3). All subjects were exposed to English only in schools, otherwise spoke Urdu with families and friends.

The whole study depended on the testing of the targeted INFL elements if they were used productively, that is, when L2 learners know how and where to use the targeted INFL elements/nominative pronouns correctly on the right contexts like English native speakers. In the wrong instances, we tested the inappropriate answers separately, such as 'he write; he writing; he is write, he gone' etc. to see what is missing at which syntactic stage. It showed the developmental patterns of the targeted INFL elements in L2 grammars across time. We scored each INFL element as follows:

Correct INFL element supplied	= 1 score
Wrong or no INFL element supplied	= 0 score

This scoring process resulted in each response being either correct or wrong. Thus if any of the targeted INFL element showed up at least once its correct and productive appearance in L2 grammars in the least time exposure (i.e. Year 1), we assumed that the functional category I existed in the early grammar of L2 learners. In the same way any nominative pronouns at subject positions regardless of the targeted verb type INFL element being correct or incorrect in each response were considered correct such as; *he* goes*, he* go*, he* is going*, he* is go*, he* has gone*, he, he* going*, he* gone*, he* has go etc.

The statistical test for the analysis of results was ANOVA (Analysis of Variance)[9] test which fits this design.

Results and Discussion

The results in the early L2 grammars in Year 1 show that all the targeted INFL elements are absent except the minimal presence of the Copula *be* as shown in Figure 1 below. Figure 1 presents correct score responses in the targeted INFL elements in four tasks across Year groups separately in visual form.

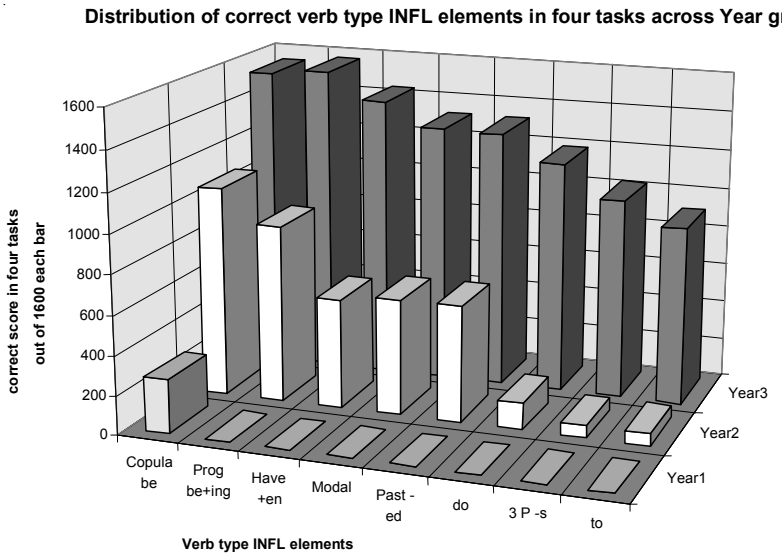


Figure 1

Figure 1 shows difference between the Year groups for all the targeted INFL elements. Only copula *be* appeared in Year 1 group, all other INFL elements appeared gradually in Year 2 group. Year 3 group showed the successful increase in the targeted INFL elements. Figure 1 is explained in Table 1 below.

[9] An Analysis of Variance (ANOVA), a statistical procedure that provides an estimate of how robust differences in responses to different stimuli are across groups of subjects. Any result in which the value of p is less than .05 is taken as statistically significant.

Distribution of correct score for 8 verb type INFL elements out of 1600 between Year groups

Year groups	copula be	Prog. be+ing	Perf. have+en	Modal +verb	Past -ed	do +verb	3P (sg) -s	to +verb
Year1	273 (17%)	0	0	0	0	0	0	0
Year2	1069 (67%)	900 (56%)	554 (35%)	586 (37%)	590 (37%)	134 (8%)	62 (4%)	63 (4%)
Year3	1540 (96%)	1567 (98%)	1431 (89%)	1313 (82%)	1309 (82%)	1179 (74%)	1019 (64%)	905 (57%)

Table 1

Or our convenience, the results in Table 1 are given in 9 below.

9. Copula *be* is present but only in 17% of responses where it is required
   Modals are absent
   Auxiliaries *have*, *be* and *do* are absent
   Past tense -*ed* is absent
   Third person singular -*s* is absent
   Infinitival particle *to* is absent

These results do not appear to straightforwardly support the research question 3a in term of the existence of the functional category I in the early grammar of L2 learners in Year 1.

We wish to consider the implications of our results for the L2 grammars, arguing:

a) that the presence of English copula *be* from the earliest stages shows the evidence for the existence of the functional category I;

b) that the functional category I exists from the earliest stages;

c) that [±tense] and [± agr] features develop gradually and independently;

We will discuss (a) – (c) separately one by one and try to establish that the functional category I present in the early stages of language development, but that the ±tense and ±agr features develop separately over time. The possible constituents of the functional category I are in 10 below.

10. The head of the functional category I can be:

    copula *be*; auxiliaries *have, be*, and *do*; finite past tense inflection -*ed*; modals such as *will, can* etc; 3rd person singular finite verb present tense -*s*; infinitival particle *to*.

It is an empirical question here as to whether L2 learners' early grammars contain the minimal presence of at least one of the targeted INFL elements productively showing the availability for operation of a principle to give evidence for the existence of the functional category I from the earliest stages in L2 acquisition.

In Table 1, L2 learners produced only copula *be* in Year 1 with all the other INFL elements being absent. Obviously, this figure of 17% creates doubts as to whether or not L2 learners used copula *be* productively which could give evidence for the functional category I. Therefore, we will argue:

11. i) that there are only 17% correct copula be examples;

ii) they might provide evidence for:
   a) *be* being used productively;
   b) there being I-system

But

iii) this neglects the important relationship between the presence/absence of INFL elements and the form of pronominal subjects

And when we examined this, we found

iv) subjects are predominantly nominative pronouns in L2 responses in Year1.

Consideration of (iii) and (iv) above require extensive discussion of pronominal subjects used by L2 learners from the earliest stages, therefore, first we will look at them before discussing (i) and (ii) for the existence of the functional category I.

The results show that there are predominantly nominative pronouns i.e. 99% in L2 learners early grammar. The score correct nominative and non-nominative and other instances are given in Figure 2 below.

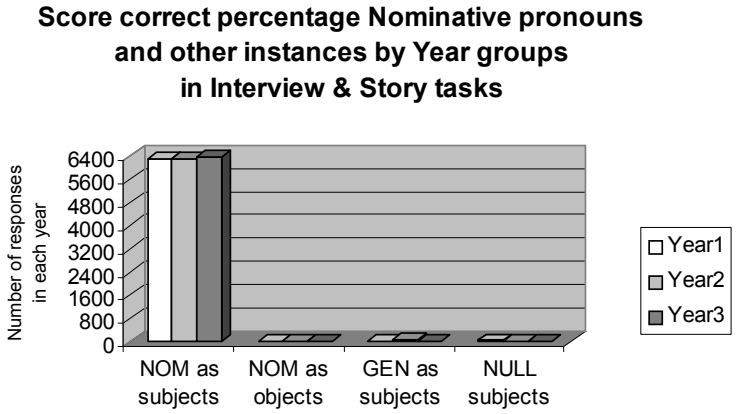


Figure 2

Figure 2 for the correct nominative pronoun differences between Year groups is explained in Table 2 below.

CORRECT SCORE NOMINATIVE AND OTHER INSTANCES BY YEAR GROUPS IN INTERVIEW & PICTURE STORY TASKS

Year group	NOM as subjects I/he/she/they	NULL subjects	GEN as subjects my, his, her their	NOM as objects
Year1 (N=80)	6315	85	–	36
Year2 (N=80)	6323	0	77	3
Year3 (N=80)	6392	0	8	–

Table 2

The score in Table 2 shows that L2 learners used a large number of nominative pronouns in correct subject position in their responses throughout their L2 acquisition with a high degree of success. Although L2 learners' both groups produced a small ratio of non-nominatives and null subject responses as well, we cannot ignore this small ratio.

Given that L2 learners used nominative pronouns in Year 1, the real question that arises is whether or not they have mastered the adult nominative rule in which the functional category I assigns/checks nominative Case to its clausal subject, in other words whether or not the operation of movement from VP to IP has occurred in the early L2 grammars. Since the landing site for the nominative pronouns is in SPEC-IP, we expect to find a close connection between nominative pronouns, INFL elements, and the emergence of phrase structure positions.

We analysed whether the nominative pronouns are actually used by L2 learners as adult English nominative forms in subject position or whether they merely have the shape of English nominative forms without being licensed by familiar mechanism of Case assignment. There are two options for consideration:

i) L2 learners have L2 grammars containing the functional category I, and I has the appropriate properties to account for nominative subjects;

ii) L2 learners have L2 grammars which contain no I, and nominative subjects are accounted for in some other way.

We will argue here in favour of L2 grammars with no I, that is, for (ii). We expect that most probably L2 learners' grammars will involve transference from Urdu into their second language under common subject/object morphological forms in L2 learners' L1.

IP-analysis for the NPs at subject position

The overall results in Year 1 show that L2 responses included 99% appropriate nominative pronouns, and less than 1% showed other instances as given in Figure 2 above. L2 learners showed significant difference in nominative pronouns between years (F= 21.16, p= .000). The shared variance was 16% (R-squared = .162). The difference between Year 1 and Year 2 groups (p=.539) was not significant, but the difference between Year 2 and Year 3 groups (p= .000) was significant.

With respect to the syntactic structure associated with morphological Cases, we assume that L2 learners in our data used nominative pronouns due to their L1, in which a single form of subject and object pronouns can be used in subject and object positions as explained in 12 below.

12. *usay* [gaarii calaa-ni] aa-tii hai
S/he (SUB) knows a car to drive.
(S/he knows how to drive a car)

(Butt, 1995:82)

ram-ne usay yaad kiyaa
Ram (SUB) him(OBJ) memory do-PERF-M
Ram remembered him/her.

(Mohanan, 1994)

me-ne *usay* raam ki kitaab dii
I(SUB) *him/her*(I-OBJ) Ram gen. Book-f give-perf-f
(I gave him Ram's book)

(Mahajan, 1990:36)

These examples show that how *usay* in Urdu can be used in subject and object positions and the contrast between Urdu and English is schematised in 13 below.

13. [3] [sing] [masc/fem] [SUB] usay Urdu
[3] [sing] [masc/fem] [OBJ] usay

[3] [sing] [masc] [SUB] he English
[3] [sing] [masc] [OBJ] him

Some examples from the 99 % of nominative pronouns in our L2 data in Year 1 are given in 14 below: (omission of articles is acceptable here)

14. *he eating *he gone school *she milk
*he gone *I playing *he throwing ball
*he is office * he is wet *I hungry
*I no/not football *I no out *I no night

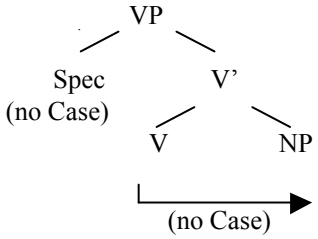
From the responses given in 17, we assume that L2 grammars are Case marked by a quite different mechanism to that usually assumed to operate in English (the

intrusion of the transfer strategy vs. Case marking by I), that is, the nominatives *I/ he/she* are either subjects or non-subjects in Year 1. But presumably this requires identity of subject/object pronominal forms in the learners' L2, so the crucial observation becomes whether L2 learners use nominative forms in object positions, given that we have established that they use nominative forms in subject position. If they do not, we can immediately discard the 'transfer of identical forms' strategy. The results in Table 3 above indicate that L2 grammars have surely a very few instances of nominative forms (=36 responses) used in object position in Year 1 as given in 15 below.

15. *She is she cake (she has baked her a cake)
*she is red dress she (she has stitched her a red dress)
*I big boy like he (I am a big boy like him)
*she is I school (she brings me to school)
*she I school (she brings me to school)

The identical forms in subject/object positions in L2 would not establish that the functional category I does not exist, but it would enable us to tell about Case assignment which does not involve I. L2 grammars have subjects in [Spec- VP] where no Case is available as given in 16 below.

16.



16 shows that the presence of nominative pronouns in L2 learners' early grammar in Year 1 does not show the correct use of subject pronoun forms in the absence of Case assignment, and in that way, lacks productive nominative Case assignment (Radford; 1992:240). L2 learners initially have a single form (he, she, they, I etc.) to convey a given meaning for he/him, she/her, they/them, I/me, otherwise it is null as explained in 17 below.

17. SINGLE PRONOUN FORM : I he she they etc.
NULL[10] : otherwise (i.e. none)

We are suggesting that an Urdu-based strategy of a common subject/object form applies to subject/object pronouns in English from. Thus, L2 learners operate with an "objective-subject" rule. Radford (1992) argues that the rules operate in complementary environments, therefore, both rules could be collapsed into a single "generalized subject

[10] Null/none is a universal default form.

rule". Having the same subject/object forms is not a phenomenon peculiar to Urdu. This kind of situation can also be found in other languages like German and Kikonogo (Radford, 1990:173). For example in German 'ihm'[11] (him) can be used in both positions as shown in 18 below .

18. Ich gab ihm ein Buch.
[I gave him (Dative) a book]
*Er wurde ein Buch gegeben.
[He (Nominative) was a book given]
Ihm wurde ein Buch gegeben.
Him (Dative) was a book given]

In a language like Kikongo, pronominal subjects of finite verbs are not morphologically distinct from pronominal objects. It has neither correlate of English nominative Case nor indeed of accusative/genitive. Subjects of infinite verbs have the same morphological form as objects of verbs or prepositions as given in 19 below.

19. Yandi bulaka munu
(s)he hit me
Munu bulaka yandi
I hit him/her

Yandi tubaka na munu
(s)he spoke to me
Munu tubaka na yandi
I spoke to him/her

Since there were no Case forms available other than adult English nominative-like forms in our L2 data in Year 1, therefore, L2 learners did not have I/me or I/my and he/him or he/his contrast at that stage[12]. They have defective pronoun paradigms in Year 1, therefore the early nominatives are simple NPs. In Year 2, we observed two points: i) L2 learners used only 3 nominative forms in object position as compared to 36 in Year1; ii) L2 learners used 77 Genitive subjects such as 'my, his, her' instead of nominative pronouns. This is illustrated in 20 below:

[10] Null/none is a universal default form.

20. *Her is not well
*My is big girl
*His is bad wolf
*My bring cake

[11] The orthodox view is that *ihm* is not structural but inherent Case. We are concerned with the identical subject/object pronominal form here.

[12] Note: we did not use YOU in our data because in English YOU remains the same form in NOM/ACC, similar to the same SUB/OBJ from in Urdu, most probably otherwise we could have found YOU/YOUR contrast.

It seems that L2 learners assumed a lexicon organised in Year 2 as given in 21 below.

21. 1SG: I = nominative subject
MY = otherwise (i.e. non-nominative subject)

3SG: HE/SHE = nominative subject
HIS/HER = otherwise (i.e. non-nominative subject)

It is notable that English children produce a significant number of non-nominative subjects as observed by Bloom (1970), Brown (1973:210), Budwig (1989), Radford (1990), Valian (1991), Rispoli (1994), Powers (1994), and Vainikka (1994) in first language. Some examples are given in 22 below.

22. *her have a big mouth
*my make a house
*my hold it
*my have it the whistle
*my do it (Vainikka, 1993/94)

*my taked it off (Budwig, 1989)
*her crashed (= she crashed) (Brown , 1973)
*her smoking (Brown , 1973)
*her go home (Brown , 1973)
*my had a tape recorder (Bloom, 1970)

In Year 2, all Case forms appeared in L2 grammars; nominative, accusative and genitive which were not available in Year 1. L2 grammars indicate that learners had a minimal Nominative-objects and Nominative-Genitive contrast in Year 2.

We are proposing here that the forms such as *I/me, he/him, she/her, they/them* in L2 learners' early grammar in Year 1 are identical to, say, second person pronouns in English which are identical in their nominative and objective forms like neuter pronoun *it* such as:

I hit you (OBJ).
You (SUB) were hit.

L2 learners in Year 2 have two kinds of pronouns in subject position as given in 23 below:

23. NOMINATIVE I he she they etc.
GENITIVE my his her -

In the presence of minimal Nominative-Genitive contrast, L2 learners knew the correct use of the nominative pronouns in Year 2. In Year 3, L2 learners rarely made errors in the correct use of nominative as indicated in Figure 2, Table 2 above.

The analysis of nominatives outlined here indicates that:

24a. L2 learners transferred the morphological identity of subjective/objective forms in Urdu to English, and used them frequently as default forms in Year 1;

b. L2 learners clearly used *I, he, she* and they as nominative pronouns in Year2 because at this stage they have started using other forms, such as, *he/him, I/me,* and *my/her* in the sense of *I/she*.

Thus the present analysis of pronouns forces us to the conclusion that in Year 1 forms like *I/he/she/they* are not actually nominative forms assigned by the functional category I (or any functional head corresponding to I. Thus, L2 learners have yet to acquire the Case-system in Year 1, given that nominative Case marking is uniquely associated with clause having finite I which assigns/check nominative case to NPs.

So far, the presence of default pronoun forms leads us to reject the hypothesis that the functional category I exists in the early L2 grammar. But how can we deal with the presence of 17% copula *be* as explained earlier in 11 above? We need to look into the results of copula *be* in detail which might provide evidence for:

a) *be* being used productively;
b) there being I-system

Syntactic analysis for copula *be*

Although 17% presence of copula *be* is not the evidence for the presence of the functional category I. The implication here is that in the presence of copula *be*, the other seven targeted INFL elements in our research which can appear in the I position are not used by L2 learners in Year 1, therefore copula *be* might not be productive at this stage revealing VP-stage.

Here we want to argue that in Year 1:

25. a) Copula *be* is used productively by L2 learners;
b) L2 learners have an IP from the beginning;
c) L2 learners have [+tense, -agr] in Year 1; copula *be* and NEG phrases provide the evidence for it.

We dismiss the alternatives that:

d) default nominative forms and the absence of the seven targeted INFL elements in Year 1 are accounted for the absence of the functional category I in the early grammar of L2 learners.

The 17% correct occurrence of copula *be* in Year 1 is obviously important to us here.

Productive use of Copula *be* in Year 1

The common correct responses in Year 1 are given in 26 below (our concern here is only to test the targeted INFL element *be* and not to test any other item such as articles a/an/the etc).

26. He is wet
    He is hungry
    He is big boy
    She is old lady
    He is wolf
    She is weak
    He is happy

According to our criterion if L2 learners use the targeted INFL element productively, their grammar is assumed to contain the functional category I. The contexts in the examples in 26 above make it clear that L2 learners 'knew' that IS is present tense, so the entry is as given in 27 below.

27. IS = Present-Tense

L2 learners produced 273/1600 correct responses of the targeted copula *be* sentences as presented in Table 1 above, where IS form is used correctly. If we find the overall existence of the copula *be* on the targeted INFL element sentences in Year 1, we will see that L2 learners have also used the form IS other than the copula *be* sentences in their responses as shown in Figure 3 below.

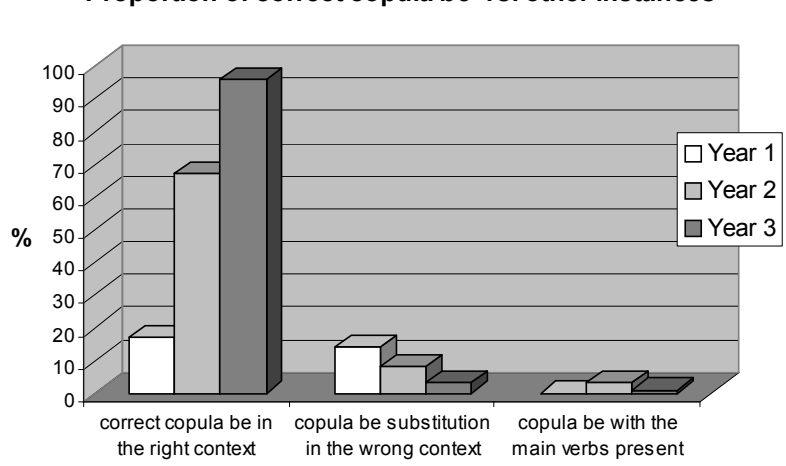


Figure 3

Figure 3 presents the visual picture of the correct copula *be* INFL element with the other instances where IS is grammatically correct, but where it is not required, therefore it is considered as wrong. But we can not ignore the overall presence of IS (i.e. the presence of IS in the right and wrong contexts) in Year 1. It is explained in Table 3 below.

Year groups	Proportion of correct % copula be vs. other instances			
	Correct copula be in the right context	Copula be substitution in the wrong context	copula be with the main verbs present	copula be completely absent
Year1	17%	14%	0	69%
Year2	67%	8%	3%	22%
Year3	96%	3%	1%	0

In Table 3, along with the presence of 17% copula *be* in the right context in Year 1, 14% copula *be* was substituted for other INFL element sentences. L2 learners used IS in their responses where other INFL elements than IS were required, that is to say, that L2 learners used IS for other INFL elements due to the multi-dimensional use of *hai* (= English *be*) in Urdu as explained in 28 below.

28. Urdu *hai* = English copula *be*

    Urdu *hai* = Present tense, *hai* with other auxiliaries and verbs as an obligatory use

    (such as = with English Pres.tns; Perfect tns *have*; infinitive particle *to*; modal such as *can & could*; 3rd P *–s*; and possessive *have*)

The only form that is substituted for other targeted INFL elements is IS. The errors made by learners in Year 1 are lexical such as '*he is/I is/they is'* etc, that is to say, they have defective paradigms for IS at the relevant stages as shown in 29 below.

29. a) He [I 3rd sg. Pres-Ten] wet/boy — he is wet

    b) They [I 3rd pl. Pres-Prog-Ten] ball — *they is ball

    c) We [I 1st pl. Pres-Prog-Ten] football etc. — *we is football

In 29a, I will be realised as IS, and the structure is 'He is wet'. Due to the lack of the agreement features on INFL, NP will not be able to trigger nominative case in (b & c), L2 learners (when they mark tense) mark it on an auxiliary in I, and use the default form IS as an all-purpose tense marker. It means that L2 learners used IS as present tense or IS a default form for other targeted INFL elements which is explained in 30 below

30. IS = Present-Tense (which covers all instances of *be* i.e. is, am, are)
    IS = All-purpose Tense marker (i.e. for all other tenses, that is to say, for 3rd P sg *–s*, progressive *be*, perfective *have*, *do*, infinitval *to* etc.)

More likely, the L2 learners simply have the IS marking for present tense, and use the default form IS as an all-purpose tense marker. This is simple to reconcile with an IP approach. We are suggesting here that 17% copula *be* was used productively, and also L2 learners overgeneralised copula *be* for substitution in Year 1.

In Year 1, the overall responses produced by L2 learners either show IS at the

right context, or show IS at the wrong context, or the responses are with zero copula, that is, without IS.

This is explained in 31 below:

31. L2 learners' lexical entry for IS may be:

IS : Present-Tense (which covers all instances of *be*)
IS : All-purpose Tense marker (for 3rd P sg *–s*, progressive *be*, perfective *have*, *do*, infinitval *to* etc.)
NULL : Otherwise

We would interpret 31 as suggesting correct syntactic structure which in turn indicates the existence of the functional category I.

L2 data also reveal that L2 learners failed to produce IS in the progressive aspect although they have IS in Year 1, and probably with the perfect aspect since both auxiliaries have contracted forms in 's as shown in 32 below.

32. *he going
*they throwing
*I working
*he eaten
*he broken

More likely that L2 learners in Year 1 simply have the entry +S specified as marking present tense, and the default form IS as an all-purpose tense marker to substitute other all targeted INFL sentences, but unspecified as to its aspectual properties (for progressive and perfect auxiliaries). It is explained in 33 below.

33. He [I 3SG PRESENT-TNS] going

In the presence of the defective verb forms, L2 structure is NULL for tense. In this way, the functional head I is empty as in 34 below:

34. He [I 3SG 0Tns] going (0Tns = unspecified for tense other than IS)

Since IS means Present tense only, IS cannot be used. Since the learners have no other form of *be* in their lexicon (i.e. auxiliary *be*), INFL here cannot be lexicalised and so will be null. We are not saying here that tense is optionally left unspecified. Given earlier in 31, INFL is specified for tense in the IS examples, and unspecified for tense in the other examples, therefore it is not a syntactic error, rather the error is lexical where they have defective paradigms for verbs, it is the common pattern found in L1 also (cf. Radford, 1988, 1990) where L1 children produce same kind of utterances presented in 32 above in their early speech. Thus L2 learners have defective verb paradigms in Year 1, and the learners' lexical entry say for GO may be as given in 35 below:

35. GOING : progressive
GONE : perfect
NULL : otherwise

These findings suggest that the functional category I is present from the earliest L2 grammars. When L2 learners mark tense, they mark it on an auxiliary in INFL, and use the default form IS as an all-purpose tense marker, otherwise NULL. In consequence, they fail to produce any other INFL element in the functional head I.

More evidence for IP-stage

Another way of resolving the issue of early syntactic stage, whether the L2 structure is in SPEC-IP due to the presence of copula *be,* or in SPEC-VP due to the absence of all the targeted INFL elements and lack of Case morphology, is to find some more evidence from the data. In relation to the early L2 syntactic stage, we will look into the targeted INFL element *do* in negation, because English negation marker is assumed to occur above the VP structure. We will see if L2 learners say in Year 1:

Not I football

Where the NP follows NEG and so is arguably in SPEC-VP, or

I not football

Where the NP precedes NEG so is arguably in SPEC-IP

Now we have data on this as given in 36 below.

36. *I not school
*I no/t punishment
*I not dark
*I not ball

In English syntax, NPs precede negation markers as shown in 36 above. L2 data indicate that L2 learners knew from the beginning of L2 acquisition the operation of movement principle. There are no instance of negative marker preceding NPs found in the data.

To summarise, so far we have mentioned three kinds of data supporting IP-stage as given in 37 below.

37a) [tense = Present tense] IS as:

He is wet
He is hungry
She is lady

b) [tense = All-purpose tense marker] IS as:

*he is cake (he eats cake)
*she is school (she brings me to school)

*he is bank	(he works in a bank)
*I is football	(I like to play football)
*They is ball	(they are playing with a ball)

c) Negation marker where the NPs precede NEG:

*he not football
*I is not punishment
*he is not football

(37a & b) show tense feature marking, and (37 c) shows that NEGP dominates VP.

All the above examples in 37 show that the use of Copula *be* by L2 learners in Year 1 is in fact corresponding to the functional head I which gives evidence that they 'knew' the INFL head *be* in their earliest grammar.

So far, we have tried to explain various issues from our Year 1:

38. a) L2 grammars have default nominative forms due to the lack of Case at this stage;
    b) the absence of the seven INFL elements do not account for the absence of the functional category I in L2 grammars;
    c) L2 grammars have productive copula *be* in their earliest stages;
    d) L2 learners have the functional category I in their earliest grammar

The analysis presented in 38 above confirmed that L2 grammars have the functional category I from their earliest stages, but Nominative Case is yet to be acquired, that is to say, [+agr] features in the functional category I are not available to L2 learners in Year 1 which could assign NOM case, though the pronouns forms are English nominative-like forms. We are suggesting here that the functional category I exists in L2 learners' early grammar with its features [+tense, -agr]. It is explained in 39 below.

39. L2 learners have an IP from the beginning.
    In Year 1, it has [+tense, –agr] features, when I carries tense, it is filled by IS, otherwise it is NULL.

Thus, in terms of our research question 3a, that is, 'Is there any evidence for the functional category I at the earliest stage of syntactic development in English Verb by L2 learners?' we propose that the functional category I exists in L2 learners' earliest grammar. Considering these results, next we will look at what point L2 learners learn fully [+tense] and [+agr] features.

Development of tense and agr features in the functional category I

In this section, we will examine how the features (i.e. tense and agr) associated with the functional head I develop gradually presenting differences in the I structure over time. Our questions for this section are repeated from 3 above:

b) How does the functional category I develop in L2 learners?
c) Is there a difference of I between different syntactic stages?

The results in Year 1 showed the existence of only copula *be,* all the other targeted INFL elements were non-existent in the early L2 grammar. The results in Table 2, show that L2 learners started using progressive *be V- ing*; perfective *have + V en*; *modal + V; past V-ed* above 35% in Year 2.

The correct percent in the INFL elements such as *V + 3rd person sg-s; do not + V; and infinitival particle to V* was very low, that is less than 10%. The results show that the structure the L2 learners exhibited involve some forms of production deficit as shown in 40 below.

40 a. He [I 3SG -S] go home
b. I [I 1SG INFINITIVAL TO] go home

In 40, I is realised as 'He go home, not 'He goes home' and not 'I want to go home' in 40b by L2 learners at the relevant stage. L2 responses of the past *–ed* at this stage also reveal the same kind of evidence as explained in 41 below.

41. He [I 3SG PAST] go home

In 41, I is realised as 'he go home, not 'he went home' and in that way L2 grammars are similar to 3rd P *–s* and *to* as given in 40 above. The simple form of verb GO in Year 2 is explained in 42 below.

42. Aux + GOING : progressive
Aux + GONE : perfect
GO : otherwise

In the light of 42, the results show that tense is marked on I rather than being marked on V in Year 2. This could be because the learners still lack the lexical resources to mark tense on V (i.e. not having learned verb paradigms fully accessing the default form GO only). The analysis of Year 2 shows that at this stage, L2 learners' grammar has both [+tense, +agr] features, but L2 learners still lack the tense marking on V.

In Year 3, all of the INFL elements reached high enough in correct use as shown in Figure 2, Table 2, and L2 learners at this stage know how to mark tense and agreement features on V as well as on I. They started using correct 3rd P *–s*, *-do,* and infinitival *to* productively in Year 3.

An interesting point to mention here is that a few overgeneralization errors[13] on past tense verbs such as boughted, ated, eated. Wtoted, writed, knewed etc. are also attested at this stage, which provide strong evidence for the presence of *–ed,* that in Year 3, L2 learners knew how to mark tense on V.

In the light of the Year 2 and Year 3 analysis, the results show that the features related with the functional category I grew separately and gradually over time. The

development of [±tense, ±agr] is explained in 43 below.

43.

Functional head I		Description	examples
a.	[+tns, -agr]	NOM unassigned (unspecified), though the form looks like an English nominative, Tense specified (tns=Present)	he is wet *I is hungry/*he is bank
b.	[+tns, +agr]	NOM assigned, tense agreement invisible (i.e. 3sg *–s*, past *–ed*, *to*)	*he go, for 'he goes, he went, he wants to go'
c.	[+tns, +agr]	NOM assigned, both tens & agr specified	he goes/he went/ I want to go

In (a) L2 learners have [+tense, -agr} features in their grammar where NOM case is unassigned; in (b) they have both [+tense, +agr) features, but 3rd person singular *–s*, past *–ed*, and infinitival *to* are still to be acquired and they are shown with Vo, and in (c) they have [+tense, +agr] with fully developed features present in them. This three-staged modal is explained in Table 4 below in terms of the Syntactic stages.

Characteristics of the syntactic projections in terms of their presence

Syntactic Stages	Highest projection	I features (±Tense, ±agr)
Stage1	IP	Specified for Present tense, unspecified for agr
Stage2	IP	Specified for tense & agr marked on I
Stage3	IP	Fully specified for tense & agr marked on V and I

Table 4

Table 4 shows the highest syntactic projection IP in three Syntactic Stages in connection with our L2 data. We treat each Stage to show I features of that stage. Thus there is an I at all various syntactic stages. At Stage I, it has tense but not agr. When the functional category I carries present tense, it is filled by IS (such as he is wet; I is wet etc.), when I is unspecified for tense, it is null. As soon as modals and auxiliaries appeared in L2 learners' responses, L2 learners are able to associate tense and agreement features (recall I is the head for INFL elements). At Stage II, I has agr as well as tense features, but L2 learners still seem to be marking tense only on auxiliaries, not on lexical verbs (such as *he go; *he eat etc.). At Stage III, I has tense and agr features marked on V as well as I (such as he goes; I ate etc.). A number of studies in the filed of syntax (see Clahsen, 1982; Felix, 1978; Pienemann, 1981; Ellis, 1994) strongly suggested that systematic staged development could be found in a number of syntactic domains as well. Ellies (1994:99-105) reports that despite the differences in the final states of the

[13] In all the four tasks, intentionally only five irregular verbs are used to see L2 learners' reaction to them. Though their proportion in the results is very small, otherwise it is not crucial here.

target language, learners showed similarities in the syntactic structures of acquisition. Zobl & Liceras (1994) proposed that the development of functional projections in L2 is consistent with the claim that functional projections appear to be available from the beginning. Also, affix movement seems to play a key role in the development of those affixes having a syntactic function. Lardiere (1998) argued for a dissociation between the morphology and the syntax. Against her claim that 'the course of development for inflectional morphology as independent from the development of the syntactic representation of functional categories, projections and features' (1998: 23), our L2 data provide evidence that syntactic representation and inflectional morphology are associated with each other. The [± tense] and [± agr] features of the functional category I does a better job of accounting for different development stages in L2 acquisition order of inflectional verbs than any processing strategies so far proposed.

Next, we will consider our findings in relation with the different language approaches already presented in literature.

The Maturational approach (cf. by Radford, 1990) suggests that the early language structure is an I-less stage, because of the apparent lack of functional categories. According to the Weak Continuity language approach (cf. by Clahsen, 1994; Vainikka and Young-Scholten, 1994, 1996) , IP projection is present from the start but the functional projection CP emerges late with the interaction of X-bar principles and the input. According to this approach, children initially have VP and one functional category above VP which is unspecified known as FP (Finite Phrase) as proposed by Clahsen (1994). The same idea is claimed by Vainikka and Scholten (1994, 1996)[14] in their study of the L2 acquisition of German. The same stage is similar to the OI stage[15] presented by Wexler (1992, 1994, 1995), Rizzi (1994), and Schutze and Wexler (1996) which is characterized by verb raising and optional agreement. Schutze and Wexler (1996) claimed that [+tns, -agr] cannot assign NOM. These are accounted for by assuming the presence of an underspecified functional projection.

Eubank (1993/94; 1996), and Vainikka and Young-Scholten (1994, 1996) argue for the morphological deficiency due to which L2 learners lack associated functional features or phrase structure in their early stage, and that the syntactic knowledge is acquired gradually. This claim was challenged by Gavruseva and Lardier (1996); Groddin and White (1995); Lakshmanan and Selinker (1994), and Schwartz and Sprouse (1994, 1996)

[14] We personally discussed these issues with Vainikka, and Young-Scholten, Martin Atkinson , Andrew Radford, and with Clahsen in 1997 & 1998.

[15] OI is proposed by (ch. Wexler 1992, 1994, 1995; Rizzi, 1994; Peoppel and Wexler, 1993; Schutze and Wexler, 1996). Under this analysis, the OI stage is characterised by a grammar under which Tense or Agr may be independently missing (or have a negative value) in finite environments. They present this analysis under OI (Optional Infinitive) stage by suggesting that subjects of OIs surface with default case in the child's grammar. Their claim is that "both NOM and non_NOM subjects occur in OI clauses: NOM is syntactically assigned by one kind of OI, whereas another kind of OI assigns no case feature, allowing default ACC to be spelled out" (1996:678). Our early L2 data is quite compatible with their findings.

who suggested that functional categories and their projections are available at early stages of L2 acquisition. In the L2 data we have been considering, we have also suggested that IP is present from the start of a language. L2 learners initially established a minimally-specified I in their L2 grammar. The functional category I first starts out as a position for copula *be*. Vainikka and Scholten (1994, 1996) have proposed that when the functional category I emerges, it is at first unspecified for tense and agr. It looks strange to us if I does not carry tense, and if it does not carry agr, then what does it carry? If I carries [tense, agr] features in English, how can we have I carrying neither of any features?

Over all, the maturational approach is not compatible with our results. Our results are quite compatible with the Weak Continuity approach. This approach appears convincing in the sense that our L2 data also show an under-specified IP-stage. In Urdu learners' early grammar, when the adult-like NOM subjects lack Case features, then default case surfaces. The L2 data projected an underspecified IP-level projection that provided the specified [+tense] to mark on I, but unspecified [-agr]. At this stage, the Case requirement is unfulfilled, that is, NP is not in the checking domain of an INFL which agrees with it, therefore this stage is underspecified IP-level. Although, our account is by no means conclusive, the proposed analysis is in keeping with the IP grammar of language acquisition, and at this stage, the grammar is more restrictive than that of the later stages (i.e. CP grammar).

Conclusion

Overall, the framework presented here enabled us to see interesting development of the targeted INFL elements in the functional category I where the function of the cognitive neuroscience in the acquisition processes is very much active. The presence of minimal copula *be* provided the evidence for the existence of the functional category I in the early grammar, although the adult-like English nominative forms are simple NPs. The results and their analysis gave answer to our overall research questions that the functional category I does exist in the earliest grammars of L2 learners but all the features associated with I are not accessible to L2 learners at the early stages. L2 learners refined the representation for I at different syntactic stages. First L2 learners acquired morphemes belonging to I (i.e. auxiliaries), and later acquired belonging to V (i.e. past *–ed*, 3rd P *–s* etc.), and this is how early language develops. L2 data gave empirical evidence for the existence of the functional category I. It developed from underspecified IP-level to IP-fully specified. L2 data have suggested that UG principles incorporated with input are always operative in L2 as they are in L1.

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