Acquisition of infinitival complements: the case for semantic or syntactic development, or both

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Abstract

This article revisits the topic of the acquisition of infinitival complements in children, considering the extent to which longitudinal data for one child in the CHILDES corpus supports one, the other or both of the following two frameworks, namely: 1) the lexical/semantic approach which suggests among other things that verbs taking infinitival complements are acquired in a semantically meaningful order, that is: a) modality, b) manipulative, and c) cognition utterance verbs; and/or 2) the maturational syntactic interpretation which suggests that children at first have no functional syntactic levels such as either a tense phrase (TP) or complementizer phrase (CP) in their language. The data show support for the first framework in the sense that verbs taking infinitival complements appear to enter the informant's productive speech in a predictable semantic order, and that there was also a certain order to the appearance of infinitive types as related to verb type. It also appears that structure expands to accommodate separate subjects for the complement taking verb and the complement infinitive. In terms of the second framework, syntax appears to trail behind semantics with the idea that the TP is not initially present but begins to emerge while the child amasses verbs and forms. This seems reasonable in that at this stage the child would be sorting out the very nature of the TP level, processing simultaneously the different possible items such as tense, infinitival *to,* auxiliaries, modals such as *can, could* and *will,* and the progressive copula *be,* all of which have been shown to occupy the head of the TP. The paper shows that analysis of the early behavior of these other elements must be taken into account in addition to that of infinitival 'to' in order to provide a more complete picture of the development of the TP in the broader sense, and that a focus solely on the nature or behavior of infinitival 'to' without looking at these other forms would fall short in capturing what may be truly happening at the level of the TP. As has also been demonstrated in this paper, knowing that there are other forms that "compete" with the space typically occupied by infinitival *to*, it would make sense that initially, Sarah would alternate between correct production of infinitival *to* and omitting it, while she is trying to figure out the many purposes of the head of the TP.

Keywords infinitival complements, English, incipient clause structure, semantics, syntax

1. Introduction

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One of the most prominent polemics in language acquisition research has been the divide between 1) proponents of universal grammar, or UG, namely, Chomsky (1995; 2007) and others, and 2) semanticists such as Schlessinger (1988). Those from the UG camp argue that despite the varying language of input, language structures emerge in children according to universal principles innate to the child. By contrast, those in support of the semantic approach to language acquisition assert that a child learns structure, not with a universal roadmap, but rather on semantically based notions. In other words, syntactic notions come about from semantic assimilation by distributional facts about categories.

Despite the fact that Chomsky's work was already making a buzz on the linguistics scene in the 1960s and 70s, and this having no small implication on the field of language acquisition, any real data-driven generative studies on the acquisition of syntax in children did not start to play catch-up until the mid- to late-80s. Pre-UG studies that were based on longitudinal child data included such pioneering work as Limber (1973), Brown (1973), and Brown & Hanlon (1970). The focus of these early studies was incrementalist in nature and concerned themselves with finding a "natural" order in the acquisition of structure. Accordingly, it was observed cross-linguistically that language acquisition takes place in somewhat predictable increments, hence each advance adding some element that didn't exist before. In contrast to UG, the incrementalist theory minimized the importance of innateness in acquisition, but on the other hand, presupposed the notion of cumulative complexity. It was Limber (1973) who suggested the following order for acquisition of complex sentences in children as illustrated in Table 1:

Table 1
Stages in Acquisition of Complex Sentences during the Third Year according to Limber (1973)

I.   An N-V-N sequence is the common simple sentence.
II.   Form complements: expand (or substitute) an N-V-N sequence for certain noun phrases.
III. Conjoin two sentences as S_1-C-S_2.
   a. conjunction: C = ϕ, *and* …
   b. *wh*-adverbial: C = *where, how, when*
   c. relative: C = ϕ, *that*
IV. Do not explicitly express an N in a lower clause if that N is coreferent with the last (i.e., rightmost) N in the main clause.
V.   Do not apply syntactic operations to any subject NPs.

When pioneering work by Chomsky and others did finally take hold, studies of child data took a greater interest in the extent to which the child's innate ability might have an impact on how s/he learns language structures. Studies by Radford (1990) took the maturational approach, suggesting that

language structure could be predicted by the maturational level of the child. In contrast, researchers of the usage based/constructivist position, including Diessel (2004), suggest that children do not have an innate syntactic knowledge, but rather more advanced structures are built up from existing structure through exposure to the language and which cooccur with lexical items they appear with frequently in the input.

1.1.   Purpose

This paper has a dual purpose. The first is to explore the nature of the acquisition of infinitival complements in children, with a special focus on prior work conducted by two differing frameworks, the first of which is Diessel (2004) on behalf of the usage-based/constructivist position, who observes the acquisition of infinitival complements in part as a gradual evolutionary process beginning with a semantically compact relationship between matrix verb and its compliment in cases of modal-type verbs like *wanna* and *gonna*, to a more independent relationship in manipulative type verbs like *want* and *make*, and completing the process with cognition-utterance verb types such as *know* and *learn*. The second framework to be evaluated here is the nativist/ maturational position, with Radford (1990) who claims that early omission of infinitival *to* has more to do with the absence of the functional tense phrase (TP) projection in children. As such, this paper aims to test: 1) the extent to which longitudinal data for one child in the CHILDES[2] corpus (MacWhinney, 2000) supports Radford's maturational assertion of a missing TP (or tense phrase) projection early on; 2) what correlations might obtain among the different syntactic items that typically occupy the head of the tense phrase in addition to infinitival *to* and 3) whether any of these possible elements predominantly precedes the others, perhaps even facilitating the acquisition of the TP. Results will be compared to findings by Diessel (2004).

2. Methodology

The methodology employed for this study is a longitudinal analysis of the transcripts of a healthy child in the CHILDES database to determine whether the progress the child makes with regard to the acquisition of infinitival complements and other items that typically fill the position occupied by infinitival 'to' in the TP can help explain the initial absence of infinitival 'to' in early child utterances. The child chosen for this study was Sarah, one of the three well-known subjects of Roger Brown (1973) and one of five subjects

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[2] The Child Language Data Exchange System (CHILDES) is a web-driven, state-of-the-art, first language data resource that is accepted and utilized by acquisitionists worldwide. A very powerful, multi-tiered system, CHILDES has evolved and been in use since the early 1980s, including corpora from renowned first language studies in English such as Brown (1973) as is utilized for this analysis, and also a growing variety of international language data as well. Most importantly, CHILDES includes a powerful search engine/analytical software called CLAN (Computerized Language Analysis) that may be utilized to sort through data to determine the presence and emergence of certain syntactic/morphological structures.

analyzed in Diessel's (2004) study. Sarah's database, as described on CHILDES, suggests that among the children included in Diessel's analysis, hers would be the most adequate for a longitudinal study on the acquisition of progressively more complex structures, being that of all three of Brown's subjects included in Diessel's study, Sarah had the greatest number of sessions (139) spread out over the longest period of time (from the age of 2;3 through 5;1). Two-word production is usually attributed to the age of two years and beyond and Sarah's first infinitival complement-taking verb *want* was observed among the very first transcripts. On analysis, out of a total of 38,255 utterances, 1,176 tokens were identified as being targets for infinitival complements in Sarah's speech, as well as for purposes of comparison, an additional 1,659 as targets for other elements that typically occupy the same head position within the TP. These elements include the modals *can, could* and *will,* the contraction *don't* in do-support constructions, and the copula *be* used as an auxiliary in progressive constructions. In other words, unlike Diessel's study that relied on the complement-taking verb and its semantic type as its starting place, this study took a more syntactic approach and considered as tokens not only Sarah's production of infinitival complements, but these other occupiers of the TP head as well throughout her sessions.

2.1. Previous work on infinitival complements
2.1.1. Infinitival Complements in Adults

Before delving into the special problems that infinitival complements present to children acquiring English, it would first be wise to understand how these have been alleged to work in adult language. According to Diessel (2004), in the language of healthy adults, infinitival complements are non-tensed, noun-like versions of sentences that function as nominals in an outer sentence (e.g., I want [you to go] where [you to go] is an object complement of the verb want.). Infinitival complements are just one of two varieties of nonfinite complements--where the verb of the nonfinite clause is not tensed--manifesting itself as either: 1) an infinitive (in the case of infinitival complements, hence, the topic of this paper); or 2) a participle. According to Diessel, infinitival complements may appear in the following three forms: 1) *to*-infinitives (e.g., I want to run); 2) bare infinitives (e.g., I can hear him breath); and 3) *wh*-infinitives (e.g., I know what to do). Diessel (and to some extent Limber (1973) and Bloom et al. (1984)) also point out that infinitival complements are both preceded and governed by certain complement-taking verbs (Table 2) that can be divided into semantic classes:

Table 2

Semantic classes of English verbs governing infinitival complements as suggested by Bloom and Tackeff (1984)

Verb type	Examples
i. Volitional	*want, like,* etc.
ii. Aspectual	*start, stop,* etc.
iii. Perception	*see, hear,* etc.
iv. Causative	*make, have,* etc.
v. Communication	*tell, ask,* etc.

Further consideration by Givón (1980, 1984, and 1990) suggests that Bloom's five semantic classes might instead be collapsed into three categories that are employed by adults for complement-taking verbs: 1) modality verbs that elaborate the semantic structure of the activity denoted by the nonfinite verb (e.g., *want, try, begin*); 2) manipulative verbs that describe activities that bring about the activity denoted by the embedded verb (e.g., *make, force, cause*); and 3) cognition-utterance verbs that provide a viewing frame for the situation in the complement clause (e.g., *know, see, say*). Givón further argues that the closer the semantic relationship is between the nonfinite complement and its governing verb, there will be a greater degree of syntactic integration of the complement within the matrix clause. He points out that first two types of governing verbs, modality and manipulative, are more closely related semantically with the activity denoted in the complement clause and that this greater closeness predicts a greater degree of syntactic integration within the outer clause. This, as we shall see, will be important to Diessel's hypothesis (below).

2.1.2. Infinitival Complements in Children

Complements are the first overall complex constructions to ever appear in child language, the first ones being object nominals (want cup) (Lees, 1960), shortly followed by subjectless infinitival phrases (want [. do it]) (Limber, 1973). Shortly thereafter, infinitival complements with overt subjects (want [lady open it]) appear.

Another important consideration when discussing infinitival complements, is the development of the infinitival morpheme *to*. Radford (1990), as we shall see, points out that in early cases the infinitival word *to* is absent. According to Aldridge (1989) and others, the morpheme *to* begins to occur with infinitives at about the same time as modal auxiliaries appear (around age 2;0), also another important observation as we shall also see in Radford. Bloom et al. (1989) suggests that children's early use of infinitival *to* first happens with verbs expressing a wish or intention toward an action (e.g.,

want or go) implying that learners may perceive a semantic similarity between prepositional and infinitival uses of *to*.

Other work on infinitival complements includes studies that have focused on the omission of *to* in child language (Bloom 1973, Diessel 2004, and Limber 1973), while others have focused on the relationship between infinitival *to* and prepositional *to* (Bloom, 1984, Rice (1999, 2003), Pinker (1984) and Tomasello (1987). Another line of research (Kirjavainen et al., 2009) supporting the usage-based/constructivist account of language acquisition looked at a combination of these issues and found that omission errors correlated with certain verb sequences and the frequency of these in the input. More recent work by Kirjavainen et al. (2017) looks more closely at the role of priming in either inhibiting or facilitating the production of infinitival *to*.

2.1.2.1. Diessel's semantic explanation for the acquisition of infinitival complements

In his analysis of the data of five children from different longitudinal studies, Diessel (2004), proposes that the acquisition of infinitival complements in children might be explained as the development from: 1) a more semantically compact relationship between matrix verb and infinitival complement (i.e., a single proposition and a single state of affairs as in almost modal like verbs such as *wanna* and *hafta*) to 2) a more independent relationship between matrix verb and infinitival complement (i.e., two separate propositions and separate state of affairs as in verbs such as *know*). Accordingly, Diessel suggests the following separate yet interrelated sequences that he has observed children to undergo when they acquire infinitival complements:

1) modality > manipulative > cognition utterance verbs: Diessel finds that children initially use exclusively what Givón terms modality verbs such as *wanna* and *hafta*, explaining that these are very much like modals in that they elaborate the semantic structure of the nonfinite verb that follows. They do not constitute a separate action and they never have different subjects. These verbs tend to take bare infinitives. Children then begin to use manipulative verbs such as make or want where the complement taking verb no longer just elaborates the action of the complement verb but rather semantically exercises some force or influence over it. These may either take bare or *to* infinitives and may also have different subjects

2) NP-V-VP > NP-V-NP-VP: A) Using the verb *want* as an example, Diessel suggests that children start out with the simple I want N (nominal complement structure) and this quite early on B) forks into both I want N (for objects) and I want BARE INF (for actions). Diessel sees this extension a logical step because of the semantic similarity between both structures, one being used for objects and the other for actions. C) The next structure to arise (as a result of I want N and I want BARE INF) is I want NP XP (a nominal complement with a location expression such as 'I want baby in house' or 'I

want ice cream in the refrigerator'). Here, the child begins to elaborate with one clause and there is still one verb but, as Diessel suggests, the child can manipulate more information semantically. Having now mastered the internal goings-on of one clause, Diessel explains that this paves the way for the next step where the child can manipulate two separate propositions. D) Finally, the syntactically independent I want NP VP arises where two semantically distinct verbs, the matrix verb and the infinitival complement, coexist in the sentence ('I want baby cry). Figure 1 visually represents this process.
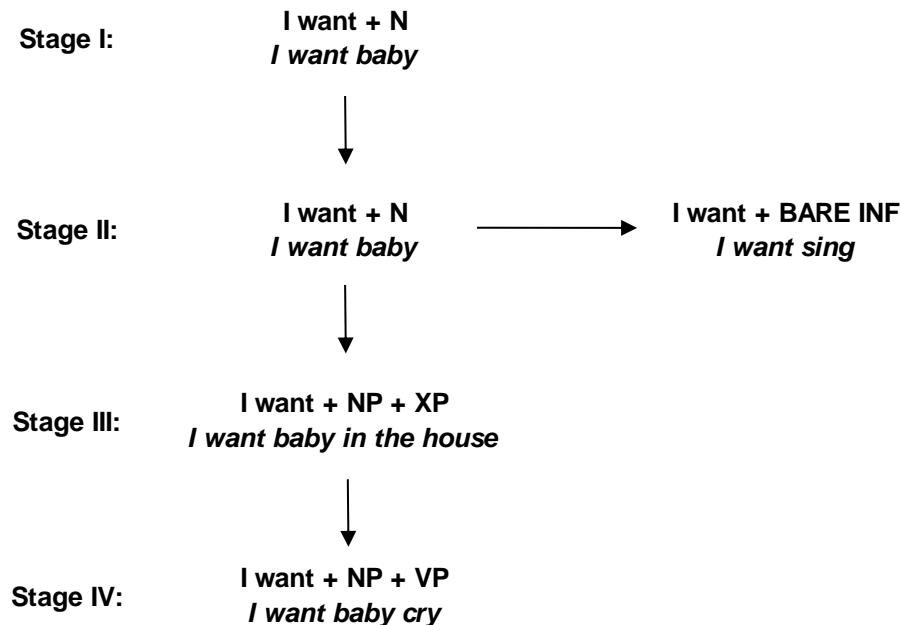
Stage I: **I want + N**
          I want baby

Stage II: **I want + N**   **I want + BARE INF**
          I want baby   *I want sing*

Stage III: **I want + NP + XP**
           I want baby in the house

Stage IV: **I want + NP + VP**
          I want baby cry

Figure 1. Expansion of complement structure (based on Diessel (2004))

3) Bare infinitives > *to* infinitives > *wh-* infinitives. With this proposed order of acquisition of infinitive forms, without ever saying it, or perhaps even realizing it, Diessel is confirming Radford's hypothesis as we shall see below, that a child starts out with no TP or CP, then develops a TP, and then a CP. The difference in the two orientations is primarily that, instead of giving a syntactic explanation, Diessel interprets this sequence in semantic terms, suggesting that: 1) bare infinitives most likely pair with modality verbs which like auxiliaries have meanings that are so semantically tied to their complements that bare infinitives suffice; 2) *to* infinitives most likely pair with manipulative verbs (although bare infinitives are also possible) because of the greater distance between the more separable meanings of the matrix and complement verbs; and 3) *wh-* infinitives most likely pair with cognitive verbs because they tend to introduce information.

2.1.2.2. Radford's syntactic explanation for the acquisition of infinitival complements

In contrast with Diessel, Radford (1990) suggests that the process of acquisition that a child goes through in acquiring infinitival complements can be explained at first by the lack of the TP syntactic layer, followed by its subsequent acquisition. Radford proceeds to cite much evidence in the early speech of children learning English where they might first lack a TP, potentially functioning solely with the VP layer. He goes on to say that children at this first stage typically have highly reduced clauses that are similar to what is known in adult grammar as small clauses or SCs. As compared to adult Ordinary Clauses (as Radford terms them), adult Small Clauses simply consist of a determiner phrase and a predicate phrase.
Examples of adult ordinary and small clauses:

(1) I consider [that this candidate would be unsuitable for the post].
                    Ordinary
(2) I consider [this candidate unsuitable for the post.]
                    Small

Children first produce clauses very much like (2) in adults, only usually (but not always) without determiners. Examples from real children are:

(3)   Wayne in bedroom.
(4)   Teddy want bed.
(5)   Daddy go?

Radford explains that this reduced version of a clause does not reach the level of TP or CP in either adult or child language. First of all, the verb is usually uninflected, and secondly, as in (5) there appears to be no movement in the case of questions.
Some of the indicators that Radford cites for the lack of a TP in early child language are the following absent items that typically appear in the head (T) of the TP, namely: 1) infinitival *to*; 2) modals; 3) finite verb inflections; 4) *do*-support; 5) copula *be*; 6) progressive *be*; and 7) perfective *have*. It is the lack of infinitival to that concerns us primarily here since this is the indicator that the level of TP has developed to support infinitival complements. Figure 2 illustrates what Radford would propose as the difference between the adult structure (with a full TP), namely *want to help you* and that of the child (without the TP), namely *want help you*:
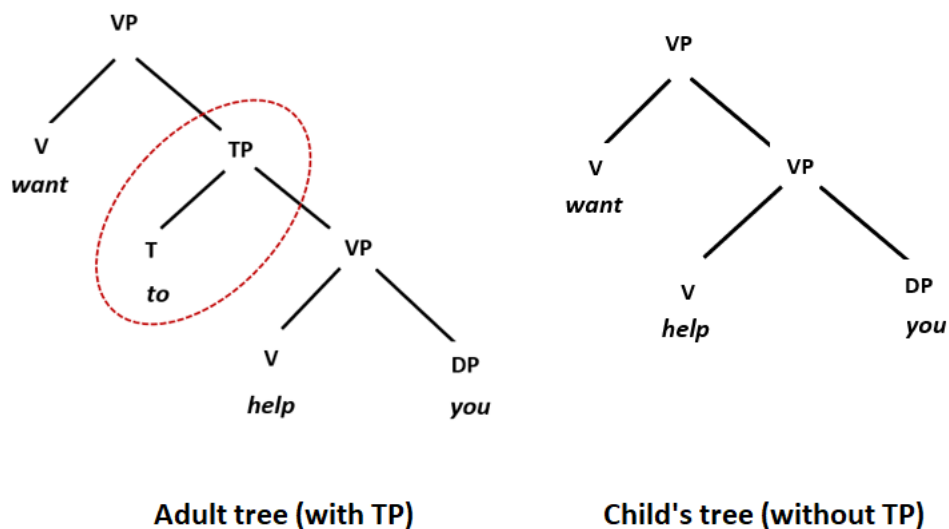
Adult tree (with TP)   **Child's tree (without TP)**

Figure 2. Adult versus early child structure (based on Radford (1990))

Figure 2 shows the proposal that in the adult structure (on the left-hand side of the figure), there lies a functional layer between both verb phrases (VPs) in the form of a tense phrase (TP) which, according to generative theory, serves several purposes, one of which is a placeholder for infinitival *to*. By contrast, the child's tree, as proposed by Radford and illustrated to the right of the figure, has not yet developed this TP layer, and therefore, it has no placeholder for infinitival *to*. Consider also how Figure 3 illustrates how the head of the TP layer, or T, serves as a locus for not only infinitival to, but other important functional structures in adult English, such as, 1) do in do-support structures, important for both negation and questions; 2) modals such as *can, could* and *will;* and 3) the copula *be,* used as an auxiliary verb with the progressive tenses.
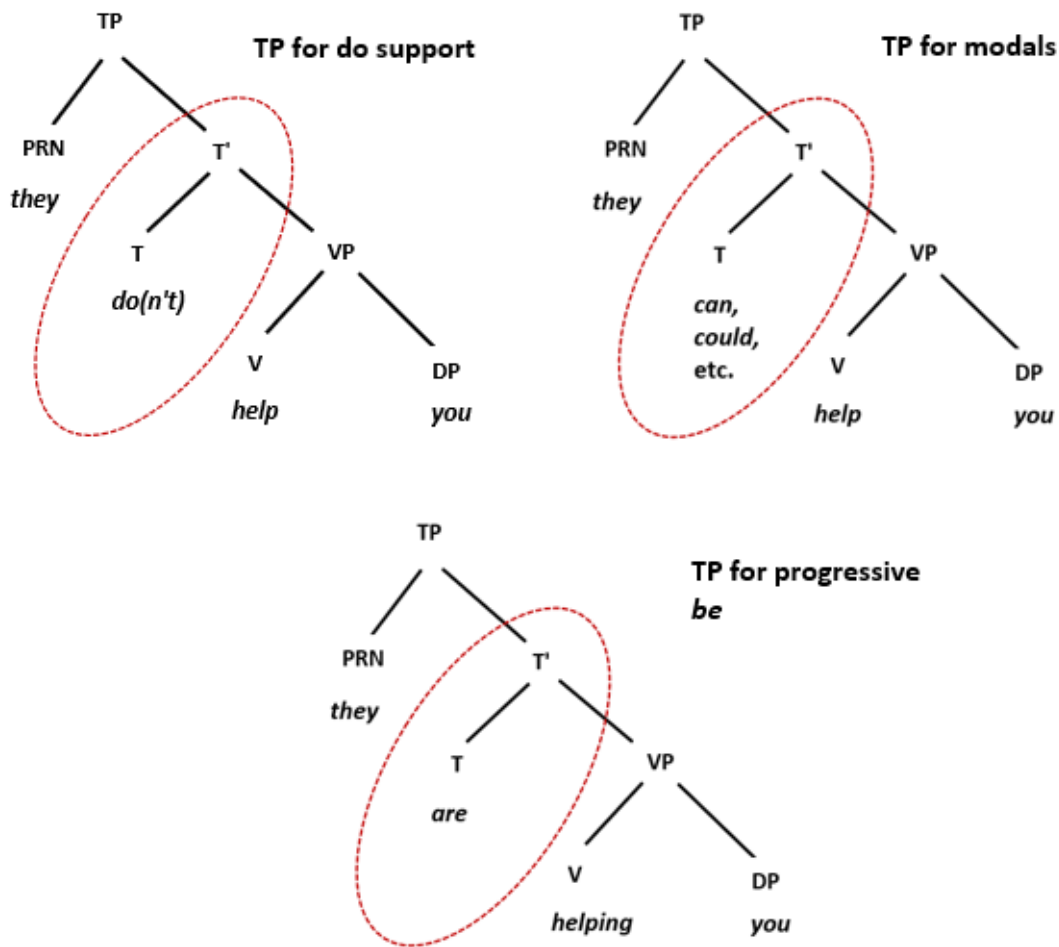
Figure 3. Adult TP structure accommodating do-support, modals and progressive copula be (based on Radford (1990))

Although this paper focuses on the emergence of the TP, it is worth mentioning that, in addition to the lack of a TP layer in children's speech, Radford suggests that there is also evidence for the lack of the complementizer phrase (CP) layer of syntax which, according to generative theory, is the functional projection that provides the ability to form questions and subordinate clauses. Radford argues: 1) that children are observed to first lack any complementizers whatsoever in their speech; 2) auxiliaries are usually never preposed in early children's speech, suggesting that without the head of a complementizer phrase, there is no landing site for a moving auxiliary; 3) children normally do not productively move wh-constituents from their place of origin to the specifier position of C, suggesting that without a complementizer phrase, there is no landing site in the form of the spec of the CP for a moving *wh*-constituent; and 4) when children are presented with input containing preposed *wh*-constituents, they rarely parse them correctly.

Studies by other researchers such as Phinney (1981) show that use of complementizers doesn't happen with children until 5 years of age.

3. Findings

This section of the paper evaluates the subject's use of infinitival complements throughout her sessions. I first draw on Diessel's (2004) perspective as it relates only to Sarah, the subject of the study. I then present the results of my syntactic analysis of Sarah's data, which tests Radford's assertions about the early absence of the TP. Diessel's and Radford's (1990) differing perspectives are summarized below.

Diessel
1) Sequence of acquisition by verb type: **modality > manipulative > cognition**
2) Expansion of complement structure: **NP-V-VP > NP-V-NP-VP:**
3) Expansion of infinitive type: **bare infinitives > 'to' infinitives > wh-infinitives**

Radford
1) At an early stage, children produce **Small Clauses (SC)**.
2) At an early stage, children seem to **lack the TP level** of syntactic structure.
3) At a later early stage, children seem to **lack the CP level** of syntactic structure.

3.1.   Analysis of Sarah's data from the perspective of Diessel (2004)
   3.1.1. Verb type

As in Diessel's study (2004), we would predict that in Sarah's data alone the evolution in the appearance of verb types that take infinitival complements would proceed in a similar order to the progression suggested by Diessel for all five subjects overall, namely: 1) modality, 2) manipulative, and 3) cognitive. Table 3 shows the sequence of appearance of complement taking verbs. for Sarah alone.

Table 3

Order of appearance of verbs that take infinitival complements according to semantic verb type in Sarah's speech alone (Diessel, 2004)

verb	age	verb type		verb (cont.)	age	verb type
wanna	2;3	modality		*love*	3;8	cognitive
gotta	2;7	modality		*start*	3;8	modality
hafta	2;9	modality		*wonder*	3;8	cognitive
got	2;10	modality		*tell*	3;10	manipulative
want	2;10	manipulative		*hard*	4;0	manipulative
make	2;10	manipulative		*need*	4;0	modality
watch	2;11	cognitive		*have*	4;1	modality
help	2;11	manipulative		*know*	4;1	cognitive
try	3;2	modality		*learn*	4;3	cognitive
see	3;3	cognitive		*hear*	3;6	cognitive
teach	3;4	manipulative		*mean*	4;7	cognitive
like	3;5	cognitive		*show*	4;9	cognitive
begin	3;8	modality		*forget*	5;0	cognitive

Table 3 data for Sarah alone corroborate Diessel's hypothesis that complement taking verbs tend to appear in the following order: modality, manipulative, and cognitive, although as might be expected, there are traces of overlap.

3.1.2. Complement structure expansion

Table 4 shows Sarah's structural use of particular complement taking verbs, whether N-V-VP or N-V-NP-VP. The second column of the graph indicate N-V-VP structure for the corresponding verb while the third column indicate N-V-NP-VP structure

Table 4
Complement structure in Sarah's speech: N-V-VP versus N-V-NP-VP

age	N-V-VP	N-V-NP-VP	
2;3	*wanna*		
2;7	*gotta*		*initial cluster*
2;9	*hafta*		*of N-V-VP*
2;10		*got*	
2;10		*want*	*subsequent cluster*
2;10		*make*	*of N-V-NP-VP*
2;11		*watch*	
2;11		*help*	
3;2	*try*		
3;3		*see*	
3;4		*teach*	
3;5	*like*		
3;8	*begin*		
3;8	*love*		
3;8	*start*		
3;8	*wonder*		
3;10		*tell*	*allternating*
4;0		*hard*	*structure*
4;0	*need*		
4;1		*have*	
4;1		*know*	
4;3	*learn*		
4;6		*hear*	
4;7	*mean*		
4;9		*show*	
5;0		*forget*	

As Table 4 illustrates, Sarah does indeed start out with a cluster of N-V-VP structure and this continues until the age of 2;9, but this is subsequently followed by a second cluster of N-V-NP-VP structure toward the end of her third year, namely at 2;10 and 2;11. After reaching the milestone of three years of age, Sarah's structure starts to alternate, not favoring one or the other structure. This makes sense both semantically and syntactically in that structures are becoming more complex not only in meaning (as seen in Table 3), but in structure as well, as illustrated in Table 4.

3.1.3. Infinitive type
Sarah appears to have acquired infinitive types more or less according to the following order, as predicted by Diessel, and illustrated in Table 5:

bare infinitives > *to* infinitives > *wh*-infinitives

Table 5
Order of appearance of infinitive types in Sarah's speech

verb	age	infinitive type		verb (cont.)	age	infinitive type
wanna	2;3	bare INF		*love*	3;8	*to* INF
gotta	2;7	bare INF		*start*	3;8	*to* INF
hafta	2;9	bare INF		*wonder*	3;8	bare INF
got	2;10	*to* INF		*tell*	3;10	*to* INF
want	2;10	*to* INF		*hard*	4;0	*to* INF
make	2;10	bare INF		*need*	4;0	*to* INF
watch	2;11	bare INF		*have*	4;1	*to* INF
help	2;11	*to* INF		*know*	4;1	*wh* INF
try	3;2	*to* INF		*learn*	4;3	*wh* INF
see	3;3	bare INF		*hear*	3;6	bare INF
teach	3;4	*to* INF		*mean*	4;7	*to* INF
like	3;5	*to* INF		*show*	4;9	*wh-* INF
begin	3;8	*to* INF		*forget*	5;0	*wh-* INF

Table 5 shows that Sarah begins to use bare infinitives and continues to do so until the age of 2;9. At 2;10, she starts to use *to*-infinitives, but continues to use bare infinitives at the same time for certain verbs. This alternation continues until 4;1 when she appears to use her first *wh*-infinitive This also correlates both semantically and syntactically in that structures are becoming more complex not only in meaning (as seen in Table 3), but in structure as well, as illustrated in Table 4.

3.2.   Analysis of Sarah's data from the perspective of Radford (1990)
3.2.1. Small Clauses (SC):
Sarah's earliest production of multiword utterances can all be classified as small clauses as Radford refers to them.

(6)   I wan a bottle. 2;3
(7)   I wan milk. 2;4
(8)   Marie go. 2;3
(9)   I pull dat? 2;5
(10)   I have some? 2;6

3.2.2. Lack or presence of infinitival to
Among the things Radford recommends to look for in early children's speech to determine the lack of a TP level is the lack of infinitival *to.* Diessel says at first children overextend the bare infinitive phase. Rather than seeing this as an extension of a bare infinitive phase, Radford would instead classify this as a phase in which the TP is absent in the child's language. Sentences 11 through 37 have been carefully chosen from Sarah's data to illustrate and comment upon the child's development of infinitival complements between the age of 2;9 and 5;0.

(11)   I wan(t) play record [?]. 2;9

(12)   I wan(t) go swimming now . 2;10
(13)   he want get a blanket. 3;1
(14)   ³I want a go to sleep. 3;1
(15)   I want get in. 3;1
(16)   Mommy # <I wan(t) go get> [/] # I wan(t) go get xxx . 3;5
(17)   I don('t) wan(t) do my home+work on it . 3;6
(18)   I goin(g) do my dance . 3;6.
(19)   I have to wear these penguins . 3;7
(20)   you want to go out ? 3;8
(21)   then he taught [/] # taught me how to swim ! 3;9
(22)   I just goin(g) make a bubble 3;9
(23)   huh # who's goin(g) to put me up there ? 3;10
(24)   You want I do a cartwheel? 3;11
(25)   I'm tryin(g) to hol(d) my bunny this week . 4;0
(26)   want to go under the bed . 4;1
(27)   I know how to write my name now # huh ? 4;2
(28)   know how to fix it all up ? 4;3
(29)   you want me keep it ? 4;4
(30)   this [//] the puzzle's hard to do # huh ? 4;4
(31)   I know how to write Donna . 4;5
(32)   and # y(ou) want me to make my daddy ? 4;6
(33)   I meant to tell you this . 4;7
(34)   it's hard to cut the snowman out . 4;8
(35)   I only want to stay over one # time . 4;9
(36)   you try to get em on slowly. 5;0
(37)   I'm goin(g) put eight on . 5;0

Sarah's use of infinitival 'to,' as Radford would predict, would start slow. At first it is nonexistent and then by about 3;7 it becomes much more productive with some exceptions after certain verbs. For example, at both 3;9 and 5;0 years of age, Sarah tends to leave out infinitival *to* after 'going' in expressions such as 'I'm going put eight on.' Also, even with verbs where Sarah has already begun to use infinitival *to* when the subject of the infinitival complement is the same (e.g., Sentence 20) You *want* to go out? 3;8), she later does not supply infinitival *to* for the exact same verb when the infinitival complement has a different subject (e.g., Sentence 29) You *want* me keep it? 4;4).

From the maturational syntactic perspective, the fact that Sarah is observed to start out with complement-taking verbs that require infinitival *to* but at first delays in using them would be strong evidence for the initial non-existence of the TP in early children's speech. Also important in terms of development is the inconsistency that develops once Sarah starts to produce infinitival *to* in which she appears to alternate at random between correctly producing the form and omitting it. This would suggest that the child has developed the TP, but may still be working out the details of how it works. This is especially important as we consider the following section of the paper which reports the findings for Sarah's early production of other elements that, like infinitival *to*

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³ This sentence was taken directly as already transcribed in the CHILDES CHAT file. No effort was made to determine whether "want a" here should be interpreted as "wanna."

also occupy the head of the TP, and may cause early delays while she is trying to sort out different purposes that the TP serves.

3.2.3. Emergence of other elements in Sarah's early speech as further evidence for the TP

As explained previously, my analysis of Sarah's speech to determine the presence of a TP did not end with an analysis of the presence or absence of infinitival *to* alone. As Radford (1990) suggests, other elements that occupy the same slot of the head in the tense phrase should also present evidence as to whether the TP exists or not. With this in mind, I conducted an additional analysis of Sarah's data to evaluate her use of three elements that, like infinitival *to,* also occupy the head of the TP. These were her production of *do*-support, the modals *can, could* and *will,* and the copula *be* for the present progressive.

Consider Table 6 which illustrates the first three appearances of both *do*-support and three modals found in Sarah's early speech, both structures as shown in Figure 3 of this paper occupying the same location (the head of the TP) as does *to* in infinitival complements.

Table 6
Early emergence (first three appearances) of do-support and modals in Sarah's speech

	Tokens (#)	First appearance	Second appearance	Third appearance
do support (do/*don't*):	560	2;3.5 (e.g., "I don't know")	2;5.7 (e.g., "I don't know")	2;6.13 (e.g., "don't touch that")
modals:				
(can/can't)	507	2;4.12 (e.g., "I can ride horsie")	2;8.25 (e.g., "I can come get you")	3;1.10 (e.g., "I can stan(d) up")
(could/couldn't)	55	3;0.27 (e.g., "you could find em too")	3;5.1 (e.g., "we could put it right on")	3;6.30 (e.g., "I could stand xxx than one")
(will/won't)	292	3;2.10 (e.g.,, "you will shake it")	3;2.20 (e.g., "will I break it?")	3;4.9 (e.g., "will you make a dog?")

According to Table 6, both *do*-support (in the form of *don't*) and the modal *can* were the first of these elements to appear in Sarah's speech during the first half of her third year of age. As the table shows, Sarah first produced "I *don't* know" at 2;3.5 and then "I *can* ride horsie" at 2;4.12. She then repeated "I don't know" at 2;5.7 and soon after, at 2;6.13, her third occurrence of *do*-

support occurred with "*don't* touch that." Sarah would not produce the modal *can* for the second time until 2;8.25 with "I *can* come get you" and for the third time at 3;1.10. After *can,* the second modal Sarah would produce was *could* for the very first time at 3;0.27, with the utterance, "You *could* find them too," after which she would not produce it again until five months later (at 3;5.1) with "We *could* put it right on." Shortly thereafter, she would produce it again at 3;6.30 with "I *could* stand xxx than one".

The third modal Sarah produced was *will* at the age of 3;2.10 with "You will shake it," and only ten days later (at 3;2.20) she correctly formed the question "Will I break it?" and then again (at 3;4.9) she correctly forms another question, "Will you make dog?," both structures suggesting that not only has she mastered the structure of the TP, but also movement of *will* from the head of the TP to that of the CP, as required for questions in adult speech.[4]

The preceding account of Sarah's production of *do*-support and modals suggests that although she was at first slow in producing these items in the first half of her third year, shortly after the age of 3, she begins to produce these structures more regularly. This lends further support to the notion that the TP may be formed, but competition between the different forms that can occupy the head of TP may contribute to a delay in its regular production.

This leaves us with another form that is also an occupier of the head of TP, namely, progressive *be*. Unlike the data presented for both *do*-support and modals, for which it was more difficult to determine with any degree of certainty those cases in which these structures might have been omitted by Sarah in her speech, omissions (in addition to occurrences) were indeed possible to track for Sarah's targeting of progressive *be,* since this item is always accompanied by the verb in the form of the present participle, which Sarah frequently produced early on without the auxiliary, hence, Table 7.

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[4] According to generative theory, *do*-suport, modals and auxiliaries all move from the head of the TP to the head of the CP to form questions. Although acquisition of the CP level is less important for purposes of this study, it is still worth mentioning briefly here to help complete the picture of a syntactic analysis according to Radford (1990). Here we have evidence that CP structure indeed becomes significantly relevant as it relates to the expansion of Sarah's sentence complexity, namely, the evolution from structures consisting of verb-plus-infinitival-complement to sentences with two tensed clauses. In other words, early evidence in Sarah's data which suggest the early absence of a CP level in her syntax would be the lack of the following items: 1) complementizers; 2) *do*-support, modals and auxiliaries that have moved from the T to C position; and 3) wh-constituents that have moved to the specifier position of C. The earliest appearance of these according to Table 6 are with *will* in the early part of the fourth year, confirming Radford's hypothesis that these items would be absent from Sarah's speech at first and then gradually appears after the presence of TP components.

Table 7
Early emergence of progressive auxiliary be in Sarah's speech

	Correct appearance	Omissions
progressive *be*: (245 tokens)	2;3.7 (e.g., "I'm going")	
		2;3.19 (e.g., "raining out here")
		2;4.10 (e.g., "poor Donna crying")
	2;5.25 (e.g., "he's playing peekaboo")	
		2;6.13 (e.g., "he painting")
	2;8.25 ("he's eating")	2;8.25 ("he swimming")

Table 7 shows how the progressive auxiliary *be*, like *do*-support and the modal *can*, was also an early item to emerge in Sarah's speech, at 2;3.7 with the utterance "I'm going." Also, according to the table, all of the first auxiliaries correctly produced were in fact contractions of the auxiliary with the subject pronoun, as in the previous example and "he's playing peekaboo" at 2;5.25 and "he's eating" at 2;8.25; however, Sarah doesn't always produce the auxiliary during this early period. in fact, as the table also shows, she frequently omits the auxiliary, as in "raining out here" at 2;3.19, "poor Donna crying" at 2;4.10, and, as the table also shows, this would continue into the second half of the third year with "he painting" at 2;6.13 and "he swimming" at 2;8.25.

Comparing the two tables, one quickly notices that of all the different elements that could appear as the head of the TP, auxiliary *be* not only appears early on in Sarah's data, but, unlike the data presented previously for both *do*-support and modals, the occasion for its use happens more frequently in the data than it does for these other structures, whether the form is correctly produced or omitted.[5]

4. Conclusions

The purpose of this paper was to conduct a syntactic analysis on the speech of one child from the CHILDES database, with a particular focus on the production of those elements that typically occupy the slot reserved in the structure of infinitival *to* in adult speech, namely the head of the TP or tense phrase. Two differing frameworks were presented to evaluate the data, namely: 1) the lexical/semantic approach of Diessel (2004); and 2) the generative

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[5] This would support Brown's (1973) observation that the first grammatical morpheme produced is the present progressive form of the verb in –ing without an auxiliary verb.

syntactic maturational approach of Radford (1990). The child chosen for analysis was Sarah from the studies of Roger Brown (1973) using the CHILDES database.

Diessel (2004) focused on the acquisition of infinitival complements as a lexical/semantic phenomenon and, based on work by Givón and others, suggested that verbs that take infinitival complements tend to be acquired in a certain semantically meaningful order: 1) modality, 2) manipulative, and 3) cognitive. Diessel suggests that this order corresponds to a progressively more independent semantic relationship between the complement taking verb and its nonfinite complement, starting with modality verbs that have the same subject and tend to take bare infinitives, moving to manipulative verbs that may have two separate subjects and may take 'to'-infinitives, and finally, cognitive verbs that can take what Diessel refers to as wh-infinitives.

Radford (1990), on the other hand, focused on children's language acquisition through the lens of generative syntax and suggested that children at first have no functional TP or CP levels in their language. In fact, Radford suggests that children's sentences at first will look for an extended period of time very much like adult simple clauses. Radford claimed that proof of no TP in early child language would be things like no infinitival 'to,' no modals, no finite verb inflections, no *do*-support; no copula be, no progressive *be*; and no perfective *have*, all being items that have been proposed to occupy the head of the TP.

The data in Sarah's transcripts overwhelmingly support both Diessel's and Radford's hypotheses. In the case of Diessel, Sarah was indeed found to acquire complement-taking verbs in the order of modality, manipulative, and cognitive. According to this data, Sarah also acquired infinitives in the following order: 1) bare infinitives, 2) to-infinitives, and 3) wh-infinitives. Finally, as predicted, Sarah also progressed from simple N-V-VP structure to the more complicated N-V-NP-VP. When it came to Radford's predictions, Sarah was observed at first to lack any of the elements that are typically found in the head of a TP, including infinitival 'to.'

But what can this seemingly odd combination of semantic and syntactic evidence tell us about Sarah's acquisition of infinitival complements? I would argue that the interaction between meaning and structure in the case of the acquisition of these structures is not only in fact not odd, but rather crucial. In the first place we have seen that verbs that take infinitival complements enter a child's productive speech in a predictable semantic order, and that there was also a certain order to the appearance of infinitive types as related to the type of verb. We then saw how structure expanded to accommodate separate subjects for the complement taking verb and the complement infinitive.

Syntax appears to be a little behind semantics where the TP level is not fully acquired while the child is amassing the verbs and forms. This seems to be reasonable in that at this stage the child would be sorting out the very nature of the TP level, observing the different possible items such as tense, 'to,' auxiliaries, and modals that can occupy the T slot. If *to* were the only item to occupy the T position, perhaps it would be acquired and used much earlier and in a more consistent fashion than it does. However, the fact that there is a large variety of forms with different grammatical purposes that find their

way into the same place in the structure of the TP may in fact delay early acquisition and facilitate what seems to be the early alternation between production and omission of the targeted forms, as we saw in the case of both infinitival *to* and progressive *be* in Sarah's early data.

In conclusion, I would propose that both semantic and syntactic forces propel the acquisition of infinitival complement structures and work together to make it happen in the little time that it does. Figure 4 summarizes the steps and suggests how this might happen.
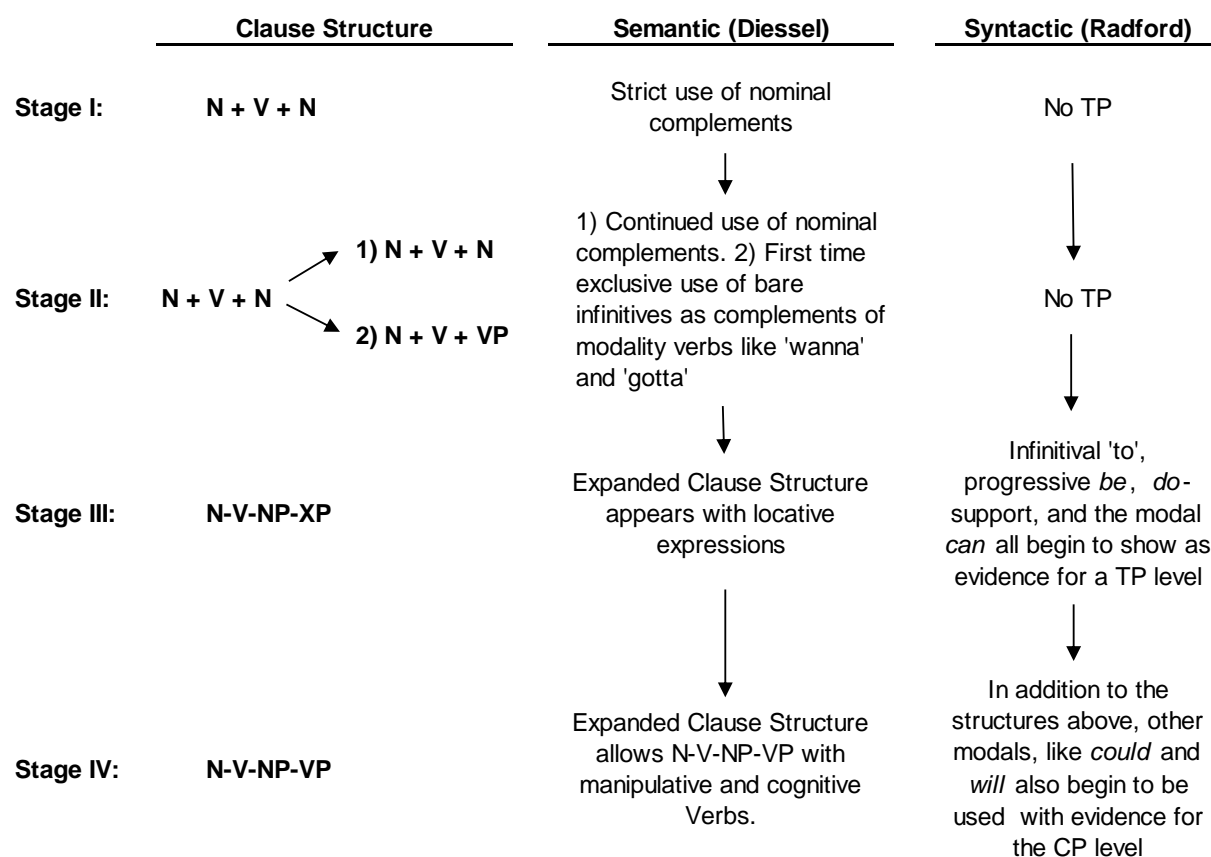
	Clause Structure	**Semantic (Diessel)**	**Syntactic (Radford)**
Stage I:	N + V + N	Strict use of nominal complements	No TP
Stage II:	N + V + N → 1) N + V + N, 2) N + V + VP	1) Continued use of nominal complements. 2) First time exclusive use of bare infinitives as complements of modality verbs like 'wanna' and 'gotta'	No TP
Stage III:	N-V-NP-XP	Expanded Clause Structure appears with locative expressions	Infinitival 'to', progressive *be*, *do*-support, and the modal *can* all begin to show as evidence for a TP level
Stage IV:	N-V-NP-VP	Expanded Clause Structure allows N-V-NP-VP with manipulative and cognitive Verbs.	In addition to the structures above, other modals, like *could* and *will* also begin to be used with evidence for the CP level

Figure 4. Combined syntactic and semantic forces at play in the development of infinitival complements in children

This paper was a preliminary effort to evaluate the syntactic implications of not only the early production of infinitival *to,* but several other elements that also represent the head of the functional TP structure. The paper shows that analysis of the early behavior of such elements as progressive *be,* modals, and *do* support must also be taken into account in order to provide a more complete picture of the development of the TP in the broader sense, and that to focus solely on the nature or behavior of infinitival *to* without looking at these other forms would fall short in capturing what may be truly happening at the level of the TP. As has also been demonstrated in this paper, knowing that there are other forms that "compete" with the space typically occupied by infinitival *to,* it would make sense that initially, Sarah would alternate between

correct production of infinitival *to* and omitting it, while she is trying to figure out the many purposes of the head of the TP.

An expansion of this study might look at elements, other than those that have been analyzed here, that have also been shown to occupy the head of the TP. These would include tense markers (although this would be more challenging for languages like English due to its impoverished morphology), perfective *have*, and other modals, such as *would, might,* etc., in order to explore any differences that obtain with respect to the acquisition of TP, or perhaps even dialectal differences in the emergence of elements that as shown here typically occupy the head of the TP.

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