

**Evidence for the Optional Tense Hypothesis:
tense in subordinate clauses in the acquisition of English**

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INTRODUCTION

When children acquiring English begin to form sentences at around two years old, they produce both inflected and uninflected main clauses for several months, despite the fact that the adult grammar requires that main clauses be inflected. Examples of such OPTIONAL INFINITIVES (OIs) are given in (1):

- (1) a. Adam drop it train (Adam 2;5.12)
b. Write dat piece a paper (Adam 2;6.17)
c. Hold baby (Sarah 2;4.26)
d. He bite me (Sarah 2;6.13)

Two proposals have recently been put forth to explain this phenomenon. The TRUNCATION HYPOTHESIS of Rizzi (1994*a*, 1994*b*) and others suggests that children may produce clauses exhaustively dominated not by a CP (which is the root node commonly assumed to represent adult clauses), but rather by a lower node. In contrast, the OPTIONAL TENSE HYPOTHESIS of Wexler (1994) allows the child to omit only the TP projection while retaining higher functional projections. Each hypothesis accounts for a set of generalizations associated with the OI stage; for example, the cooccurrence of null subjects, *wh*-movement, negation, infinitival *to*, and so on. (For some recent discussion, see several of the papers in Schütze et al. (1995).) Furthermore, these hypotheses predict properties of subordinate clauses that seem not to have been discussed or tested, and so this paper undertakes this area of inquiry. The speech of two children is examined in order to determine the extent of correct tense marking in subordinate clauses. It

will be shown that the Optional Tense Hypothesis yields more accurate predictions about tense marking in the earliest subordinate clauses that appear in children's speech.

Adult clauses are generally assumed to have a structure similar to (2). See, for example, Chomsky (1993):

(2) [CP . . . [AgrSP . . . [TP . . . [AgrOP . . . [VP . . .

Of particular relevance to the OI phenomenon is the medial projection TP (Tense Phrase), since tense is crucially missing from OIs. Adult English shows complementarity between its tense morphemes: a clause may be finite—in which case T bears a [\pm past] feature—or nonfinite, in which case T is empty (as in small clauses) or headed by the infinitival particle *to*. In order to account for the absence of tense in OIs, the Truncation Theory allows (2) to be abbreviated, by permitting the child to represent a sentence with a root node lower than CP; since tense is absent, the root node for an OI would be AgrOP or VP. Sentence (1d) would thus have the following S-structure representation:

(3) [VP he [V' bite me]]

Because TP has been truncated from (3), there is no T node bearing [\pm past] features to which the verb may raise and be inflected, as it would be in the adult sentence *he bit me* or *he is biting me*. Note also that the absence of the infinitival *to* particle is also expected, since there is no T node under which it may appear. The specific manner in which the child's grammar differs from that of the adult is that the following principle is not yet operative in the child's grammar:

(4) Root = CP

Until this principle appears in the grammar (whether by acquisition or by maturation), the child is free to take categories other than CP for the root node. Rizzi (1994a: 162) and others assume that the principle in (4) expresses the fact that speech generally takes the form of propositions, and that the canonical structural realization of the proposition is CP.

A desirable prediction of the Truncation Hypothesis is that it explains the rarity of the cooccurrence of null subjects with *wh*-movement; in other words, why the null subject sentence in (5b) seldom appears as a variant of (5a). On the other hand, *in situ wh*-words frequently appear with null subjects, as in (5c).

- (5) a. Where Daddy go? (Adam 2;3.18)
b. Where go?
c. See what bear? (Adam 2;4.3)

Since null subjects are otherwise generally permitted in early English, sentences like (5b) should be as common as are null subjects in non-*wh* sentences, and yet it is reported that they are not. The failure of *wh*-movement to correlate with null subjects receives a straightforward explanation under the Truncation Hypothesis. Rizzi (1994a, 1994b) suggests that null subjects are allowed in the acquisition of such non-null subject languages as English and French because the higher levels of structure have been truncated, and so a null subject in a lower projection, such as Spec/IP or Spec/AgrSP, may be identified by a referent from the discourse; if there were projections above IP, the null subject would seek a c-commanding controller within its own sentence, and a failure to find one would result in ungrammaticality, since the null subject would not be bound by any referent. Because *wh*-movement entails the presence of CP (the *wh*-word moves to Spec/CP), a null subject would not be licit in Spec/IP, since it would fail to find an antecedent in its own clause. A rarely attested sentence like (5b) would have an S-structure like the following (ignoring irrelevant details):

(6) [CP where_i [IP e [VP go t_i]]]

As the null subject does not have an antecedent within its own clause in this structure, it is ill formed, and hence such a structure is rarely produced in children's speech. When the *wh*-word remains *in situ*, however, as it does in (5c), there is no overt evidence for the presence of the CP projection, and so this sentence would be assigned the following truncated structure:

(7) [IP e [VP see what bear]]

There being no structure above the null subject in Spec/IP, it is free to find its antecedent in the discourse, and hence this structure is well formed for (and frequently produced by) the child. A paradigm similar to that in (5) may be constructed also for verb-second languages like Dutch and German; null subjects seldom appear in verb-second sentences, since the verb has presumably moved to C0, making it impossible for a null subject below, in Spec/IP, to be identified within its own clause.

Note, incidentally, that Rizzi's (1994*a*, 1994*b*) analysis is characteristic of what Wexler (1994: 305) calls the "Strong Universal Grammar" view of language acquisition: children are assumed to know most of the grammatical principles of the language, although initially it may be difficult for the linguist to discern this knowledge; because sentences that are ungrammatical (from the perspective of the adult grammar) result from the small number of principles that the children do not yet control, the underlying grammatical knowledge that the children do possess is obscured, and frequently this knowledge may be inferred only by observing subtle asymmetries in production as between such structures as those exemplified in (5).

In contrast to the Truncation Hypothesis representation shown in (3), the Optional Tense Hypothesis offers the following, fuller representation of (1d):

(8) [CP [AgrSP [AgrOP [VP he [V' bite me]]]]]

As in the Truncation Hypothesis representation (3), the Optional Tense Hypothesis does not offer a TP projection in which tense elements or infinitival *to* may be borne. With respect to the other functional projections, however, the child has full competence—a highly desirable characteristic for both empirical and theoretical reasons, as discussed by Wexler (1994), Poeppel and Wexler (1993), and the references there. Both hypotheses allow T to be absent in early grammatical structure, but the absence of T in the Truncation Hypothesis entails the absence of several higher projections, while the absence of T in the Optional Tense Hypothesis is taken as an axiom. Both theories predict the absence of tense in main clauses, as well as the cooccurrence (or not) of other properties in OI sentences, but the strongest version of the Truncation Hypothesis makes the additional prediction that only the tense of main clauses may be omitted; subordinate clauses—because their maximal projections (CPs) are selected by a predicate in the matrix clause—should show adult-like tense properties. In contrast, the Optional Tense Hypothesis suggests that TP may be omitted more broadly, predicting that subordinate clauses in children's speech will display the same degree of incorrect inflection in embedded clauses during the OI stage as do main clauses.

METHOD

Subjects

The correctness of tense marking in subordinate clauses is examined in the speech of two children, Adam and Sarah, both of whom speak American English. The data originate from computerized transcripts of the Brown (1973) corpora, which form part of the CHILDES database (MacWhinney and Snow, 1985, 1990, 1992; MacWhinney, 1995). Adam's speech is examined from 2;3.4 through 2;11.0, and Sarah's from 2;3.5 through 2;10.11.

Procedure

The speech of each child was examined starting from the earliest appearance of subordinate clauses, while—crucially—each child is still clearly in the OI stage with respect to main clauses. Subordinate clauses in Adam's speech appear in the earliest records available for him (around two years and three months):

- (9) a. Go get it (Adam 2;3.4)
- b. Want sit down (Adam 2;3.4)
- c. Go belong (Adam 2;3.18)
- d. Adam put boot on looking for (Adam 2;5.12)
- e. Laughing being cowboy (Adam 2;5.12)
- f. Look birdie fly (Adam 2;5.12)
- g. Gon (t)a ride dat (Adam 2;6.3)

As may be seen from the above examples, it is often hard to determine the structure of the subordinate clause. For example, *Go get it*, while grammatical in the adult language, could also take the form *Go to get it*, and so an example like (9a) cannot be counted as having either correct or incorrect tense marking in the subordinate clause, and are accordingly excluded from the scoring. Other examples, like (9d) *Adam put boot on looking for*, are too skewed—and the context too spare—to determine their structure. An example like (9e) *Laughing being cowboy*, though, may be unambiguously regarded as correct, since the corresponding subordinate clause in the adult language (*I'm laughing at being a cowboy*) also lacks tense. An utterance like *Laughing am cowboy* or *Laughing to be cowboy*, on the other hand, would be counted as incorrectly bearing tense. Such subordinate clauses are here called adjuncts, since they are not obligatorily selected by the matrix verb. The other very common kind of subordinate clause in Adam's early speech is the 'imperative complement', as in (9f) *Look birdie fly*. The adult language could realize the imperative complement as *Look at the birdie fly* or as *Look at the*

birdie flying. However, because each of the adult variants lacks tense, an utterance like (9d) is counted as being correctly inflected. An utterance like *Look at the birdie flew* or *Look at the birdie to fly*, though, would be counted as incorrectly bearing tense. A sentence like (9g) *Gon (t)a ride dat* is regarded as containing a subordinate clause, since the semi-auxiliary *go* in the adult language obligatory selects an infinitival *to* clause, and so if infinitival *to* were missing from such a clause (*Going ride that*), it would indicate that the T projection was missing from the subordinate clause. Such clauses are called 'to complements'. Another matrix verb that selects a *to* complement—which Adam uses most frequently—is *want*, as in (9b) *Want sit down*; here, infinitival *to* is missing from the embedded clause, and so the inflection of the embedded clause is counted as an error.

The general methodology, then, is to count all and only those subordinate clauses whose tense properties—i.e., whether or not T bears [\pm past] features or is headed by infinitival *to*—are unambiguously determined by the matrix predicate. Matrix predicates that may ambiguously select more than one complement type (with respect to tense) are counted as 'other complements' in the tables, but are not scored.

RESULTS

It is particularly interesting that, from the moment that subordinate clauses begin to appear in Adam's speech, several different kinds appear at the same time. There seems not to be a period in which one kind of subordinate clause is learned, then another, and so on. An exception, however, is the class of unambiguously finite complements, which appear only rarely; for example, (9c) *Go belong* (which Adam's mother interprets as *Go where it belongs*).

Table 1 summarizes tense marking in Adam's subordinate clauses. Many of his first *to* complements are correctly inflected for tense:

- (10) a. Gon (t)a take suitcase out (Adam 2;4.3)
 b. Gon (t)a ride dat (Adam 2;6.3)
 c. Want to ride truck (Adam 2;6.3)
 d. Want to ride dat (Adam 2;6.3)
 e. Want to sit down (Adam 2;6.3)
 f. No wan(t) (t)a sit dere (Adam 2;6.3)
 g. Mommy want to ride dat (Adam 2;6.3)

These data initially suggest that the Truncation Hypothesis best characterizes the presence of tense in subordinate clauses. The main clauses of (10a,b,f,g), in particular, lack tense, while their subordinate clauses do have tense. However, after 2;6.3, Adam's performance on embedded tense declines significantly, so that by 2;11.0, he correctly inflects only one of his 55 *to* complements. Some examples are given below:

- (11) a. Do you want me get in (Adam 2;11.0)
 b. Do want he walk (Adam 2;11.0)
 c. Do you like come in with me (Adam 2;11.0)
 d. I going play baseball (Adam 2;11.0)
 e. I going swallow it (Adam 2;11.0)
 f. She going buy another one (Adam 2;11.0)
 g. I going drink it all up (Adam 2;11.0)
 h. Going take a wheels off (Adam 2;11.0)
 i. I going turn hot water on (Adam 2;11.0)

With respect to matrix clauses, Adam is still firmly in the OI stage, having dozens of such tokens, some of which are listed below:

- (12) a. Wheel turn? (Adam 2;11.0)
 b. Cowboy hat shoot with me (Adam 2;11.0)
 c. I say soxy soccer (Adam 2;11.0)
 d. Wait for grapefruit (Adam 2;11.0)
 e. Come with you (Adam 2;11.0)
 f. She need some (Adam 2;11.0)
 g. Make you very best (Adam 2;11.0)
 h. I spill it again (Adam 2;11.0)

This situation is very familiar from first language acquisition: the child initially appears to know the adult forms, but later begins making mistakes, appearing to regress. An explanation for Adam's initial, apparent knowledge of how to inflect *to* complements is suggested by the fact that the majority of the matrix verbs are *want* (with the occasional *go*). It is very likely that Adam, who was only beginning to use embedded clauses, did not know that *to* is the infinitival marker, and instead analyzed *want to* and *going to* as single lexical items—not an unlikely possibility, given that these words are frequently contracted to *wanna* and *gonna* in adult English, and also even in Adam's speech in (10a,b,f) above. Further evidence for this misanalysis is that Adam acquired imperative complements at the same time, exemplified below:

- (13) a. Look birdie fly (Adam 2;5.12)
 b. Let Adam write (Adam 2;6.17)
 c. Let Adam cut it (Adam 2;6.17)
 d. Let Adam do it (Adam 2;6.17)
 e. Stop playing? (Adam 2;6.17)
 f. Let me ride dat (Adam 2;6.17)

- g. Let Adam finish (Adam 2;6.17)
- h. Oh let Adam tear it (Adam 2;6.17)
- i. Let Adam play busy bulldozer (Adam 2;6.17)

As imperative verbs select bare infinitival complements (rather than *to* infinitival complements), it is possible that, at around 2;6—when Adam appeared to inflect all embedded clauses correctly—he was applying a rule that required all embedded clauses to contain bare infinitivals, with the unanalyzed matrix verbs *wanna* and *gonna* falling perfectly into this schema. Once these verbs were analyzed into verb-plus-infinitival-*to* constructions (around 2;7.14), Adam's performance on *to* complements declined considerably. As shown above in (11), most of Adam's errors are caused by his producing bare verb complements for *want* and *go*, as he likewise produces for complements of imperative *let* in (13) (though correctly for that class of verbs). At this stage, then, Adam clearly has trouble distinguishing the several classes of embedded clauses.

These facts provide dramatic support for the Optional Tense Hypothesis. As was explained in the previous section, the Truncation Hypothesis does not predict that there will be tense errors in embedded clauses, since the non-appearance of tense in OIs is analyzed as clausal truncation. The Optional Tense Hypothesis, though, correctly predicts that embedded clauses will show the same proportion of missing T projections in the OI stage as do main clauses.

Although the cooccurrence (or not) of overt complementizers (e.g., *that*) with tense would yield further significant insight into the correctness of either the Truncation Hypothesis or the Optional Tense Hypothesis, overt complementizers unfortunately do not appear in any of the early data examined here. However, sentences like (11d-i) provide additional support for the Optional Tense Hypothesis, since these sentences have tense missing from both their main and embedded clauses—a distribution that is not predicted by the Truncation Hypothesis, in which main clauses may lack tense while embedded clauses are expected to be intact. In contrast, the Optional Tense Hypothesis makes the broader (but correct) prediction that the tense projection may be absent generally.

Table 2 summarizes tense marking in Sarah's subordinate clauses. Although Sarah does not produce as many embedded clauses as does Adam, the data from Sarah corroborate the conclusions drawn above. Sarah most frequently produces *to* complements, like the following:

- (14) a. I wanna waid [= *ride*] (Sarah 2;3.7)
 b. I wanna ride my horse (Sarah 2;3.7)
 c. I want do that (Sarah 2;7.28)
 d. Want do again (Sarah 2;7.28)
 e. Want go read it (Sarah 2;7.28)

Although she has only two of them, Sarah's first *to* complements, in (14a,b), appear to be correctly inflected. However, like Adam's speech in (10a,b,f) above, the infinitival *to* has been contracted with the verb, suggesting that Sarah has likewise regarded *wanna* as a single lexical item, rather than as a contraction of *want to*. Like Adam, her matrix verb selecting a *to* complement is nearly always *want*, with an occasional exception like *come* (15f):

- (15) a. I want have some in dere (Sarah 2;8.25)
 b. I want put my (Sarah 2;8.25)
 c. I want fit in there (Sarah 2;8.25)
 d. I want see something (Sarah 2;8.25)
 e. Want see (Sarah 2;8.25)
 f. I come get you (Sarah 2;8.25)
 g. I want see Romper Room (Sarah 2;9.29)
 h. Want see Measles (Sarah 2;9.29)
 i. I want do it (Sarah 2;9.29)
 j. I want hear it (Sarah 2;9.29)
 k. I want play record (Sarah 2;9.29)

- l. I want buy two them (Sarah 2;9.29)

Note, importantly, that Sarah—like Adam—is still in the matrix OI stage when she begins producing embedded clauses:

- (16) a. Her get my book (Sarah 2;9.6)
b. I write crayon (Sarah 2;9.6)
c. Just walk? (Sarah 2;9.6)
d. He park here (Sarah 2;9.6)
e. I pinch you (Sarah 2;9.6)
f. I hurt again (Sarah 2;9.6)
g. Her pour like dis (Sarah 2;9.6)
h. Taste good (Sarah 2;9.6)
i. Go square (Sarah 2;9.29)
j. Her make pancakes (Sarah 2;9.29)
k. Say moo (Sarah 2;9.29)
l. He tickle a feet (Sarah 2;9.29)
m. Sit potty (Sarah 2;9.29)
n. I fall off (Sarah 2;10.11)
o. I play (Sarah 2;10.11)
p. I break it (Sarah 2;10.11)

The fact that Sarah's OI stage characterizes not only main clauses, but also her embedded clauses, argues in favor of the Optional Tense Hypothesis, and against a strong version of the Truncation Hypothesis.

DISCUSSION

The Optional Tense Hypothesis predicts that tense may be freely absent from both main and embedded clauses, whereas the Truncation Hypothesis predicts that the tense projection is merely truncated along with other, higher functional projections. Given that proposition-taking verbs are generally assumed to subcategorize for full clausal complements like CP and IP, a strong version of the Truncation Hypothesis would predict that embedded clauses should retain their tense projection. The speech of Adam and Sarah shows that these children in fact omit tense across the board, and do not merely truncate the initial projections of their main clauses. This observation argues strongly for the Optional Tense Hypothesis.

A weaker version of the Truncation Hypothesis could be maintained if it were supposed that not merely root clauses, but also embedded clauses, could have their topmost projections truncated. However, this would entail loosening the isomorphism between semantics and syntax that is achieved by compelling proposition-taking verbs to select the maximal projection CP (or IP, for exceptional case-marking verbs). Such an analysis would fail to capture the intuition that the primary task facing the child in language acquisition is not the semantics of language, but rather the considerably more exception-ridden FORM of language, i.e., its syntax. Exchanges like ones in (17) show that children's comprehension of embedded clauses is perfect, long before they can produce such clauses with correct tense marking themselves:

- (17) a. INVESTIGATOR: Do you want to play with them?
CHILD: Yeah. (Adam 2;3.4)
- b. MOTHER: Wouldn't you like to pick these up?
CHILD: No. (Adam 2;3.4)
- c. MOTHER: What do you want me to do with the book?
CHILD: Read. (Eve 1;6)
- d. MOTHER: You gonna play music for us?
CHILD: Yep. (Eve 1;6)

- e. MOTHER: Santa Claus going to bring you another Bobo?
CHILD: *[nods]* (Sarah 2;3.22)
- f. MOTHER: Want me to take it away from you?
CHILD: No. (Sarah 2;3.26)

Facts like these are not surprising, particularly when one considers that general cognitive ability is acquired well before language ability, and extremely complex lexical properties are often acquired upon initial exposure (Chomsky 1995: 15). Empirically and theoretically, then, the Optional Tense Hypothesis offers the best account of embedded optional infinitives.

TABLE 1. *Tense in Adam's subordinate clauses*

Age	Adjuncts			Imperative complements			<i>to</i> complements			Finite complements			Other complements (number)
	Correct	Total	% Correct	Correct	Total	% Correct	Correct	Total	% Correct	Correct	Total	% Correct	
2;3.4	0	0	-	0	0	-	1	6	17	0	1	0	4
2;3.18	0	0	-	1	1	100	0	2	0	0	1	0	6
2;4.3	0	0	-	1	1	100	1	1	100	0	2	0	2
2;4.15	0	0	-	0	0	-	0	0	-	0	0	-	0
2;4.30	0	0	-	0	0	-	0	0	-	0	0	-	0
2;5.12	1	1	100	1	1	100	0	0	-	0	0	-	2
2;6.3	1	1	100	0	0	-	6	6	100	0	0	-	1
2;6.17	3	3	100	8	8	100	26	31	84	0	0	-	2
2;7.0	0	2	0	8	8	100	9	10	90	0	0	-	4
2;7.14	2	2	100	19	19	100	0	5	0	0	0	-	3
2;8.0	0	0	-	26	26	100	1	9	11	0	1	0	5
2;8.16	0	0	-	29	32	91	0	5	0	0	0	-	0
2;9.0	0	0	-	6	6	100	1	5	20	0	0	-	2
2;9.18	0	0	-	4	4	100	2	8	25	0	0	-	0
2;10.2	0	0	-	7	7	100	1	16	6	0	0	-	3
2;10.16	0	0	-	16	16	100	4	26	15	0	1	0	0
2;11.0	1	1	100	25	25	100	1	55	2	0	1	0	2

TABLE 2. *Tense in Sarah's subordinate clauses*

Age	Adjuncts			Imperative complements			<i>to</i> complements			Finite complements			Other complements (number)
	Correct	Total	% Correct	Correct	Total	% Correct	Correct	Total	% Correct	Correct	Total	% Correct	
2;3.5	0	0	-	0	0	-	0	0	-	0	0	-	0
2;3.7	0	0	-	0	0	-	2	2	100	0	0	-	0
2;3.19	0	0	-	0	0	-	0	0	-	0	0	-	0
2;3.22	0	0	-	0	0	-	0	0	-	0	0	-	0
2;3.26	0	0	-	0	0	-	0	0	-	0	0	-	0
2;3.28	0	0	-	0	0	-	0	0	-	0	0	-	0
2;4.10	0	0	-	0	0	-	0	0	-	0	0	-	0
2;4.12	0	0	-	0	0	-	0	2	0	0	0	-	0
2;4.17	0	0	-	0	0	-	0	0	-	0	0	-	0
2;4.19	0	0	-	0	0	-	0	0	-	0	0	-	0
2;4.26	0	0	-	0	0	-	0	0	-	0	0	-	0
2;5.7	0	0	-	0	0	-	0	0	-	0	0	-	0
2;5.15	0	0	-	0	0	-	0	0	-	0	0	-	0
2;5.25	0	0	-	0	0	-	0	1	0	0	0	-	0
2;5.30	0	0	-	0	0	-	0	0	-	0	0	-	0
2;6.4	0	0	-	0	0	-	0	0	-	0	0	-	0
2;6.13	0	0	-	0	0	-	0	0	-	0	0	-	0
2;6.20	0	0	-	0	0	-	0	2	0	0	0	-	0
2;6.30	0	0	-	0	0	-	0	0	-	0	0	-	0
2;7.5	0	0	-	0	0	-	0	1	0	0	0	-	0
2;7.12	0	0	-	0	0	-	0	1	0	0	0	-	1
2;7.18	0	0	-	0	0	-	0	0	-	0	0	-	1
2;7.28	0	0	-	0	0	-	0	3	0	0	0	-	0
2;8.2	0	0	-	0	0	-	0	0	-	0	1	0	0
2;8.25	0	0	-	0	0	-	0	1	0	0	0	-	0
2;8.25	0	0	-	0	0	-	0	6	0	0	0	-	0
2;9.0	0	0	-	0	0	-	0	1	0	0	0	-	0
2;9.6	0	0	-	0	0	-	1	3	33	0	0	-	0
2;9.14	0	0	-	0	0	-	0	3	0	0	0	-	0
2;9.20	0	0	-	1	1	100	2	10	20	0	0	-	1
2;9.29	0	0	-	0	0	-	0	9	0	0	0	-	1
2;10.5	0	0	-	2	2	100	1	15	7	0	0	-	0
2;10.11	0	0	-	0	0	-	0	3	0	0	0	-	0

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