The Optional-Infinitive Stage in Child English
Evidence from Negation

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1. Introduction

For more than 30 years, extensive research has gone into the documentation of characteristics of early inflectional and clausal development in the grammar of English-speaking children. From this research we have learned much about particular characteristics of children's productions. It seems fair to say, however, that a general picture of English grammar at this stage has eluded the field of developmental psycholinguistics.

The purpose of this paper is to show that a general picture of the distinctive characteristics of early grammar has recently been built up under the name of the OPTIONAL-INFINITIVE STAGE (Wexler 1990, 1992, 1994) which also applies to English. The optional-infinitive stage is one in which the child's grammar accepts root infinitives as grammatical, for example, *she go*, while at the same time it accepts tensed forms as grammatical, e.g., *she goes*. Between the ages of approximately 1;10–2;7,[1] both forms occur.

We maintain that the child knows the grammatical distinctions between finite (e.g., marked *-ed, -s*) and nonfinite forms (appearing as bare stems in English). In particular, we will show that the tensed form *goes* is not allowed by the child's grammar after the negative *not*. We will show that this result and some further results follow from the optional-infinitive stage. We will also show that other possible hypotheses about the tenseless forms of the verb do not predict the observed data.

Most of the evidence came from languages other than English, languages, in which the stage was directly observable. Wexler argued that the optional-infinitive analysis also applied to early English, and provided some predictions

that the theory made, along with some preliminary data. This paper provides much more detailed evidence concerning those predictions, evidence both from natural production and from an elicited production experiment. We will conclude that, in fact, the predictions are borne out by the data.

If our claims can be justified, then this is quite important for the study of child grammar. The optional-infinitive analysis was created based on patterns and processes in languages other than English, patterns and processes which (as Wexler argued) are obscured by ambiguous English morphology. Following standard methodology in comparative syntax, we can nevertheless look for consequences of the optional-infinitive stage in English, and find that they do clearly exist. Thus we find a strong generalization that is all the more strong for the fact that it suggests a reanalysis of the original English data. If this method works in a number of cases, (as it did, for example, in Wexler's original papers), we can see the birth of a field of comparative language acquisition, to parallel the field of comparative syntax.

That the optional-infinitive stage exists in many languages is by now fairly uncontroversial. Many of its properties are quite clear. There has been, in fact, major activity in attempting to understand the underlying theory and cause of the optional-infinitive stage. A number of theories have been proposed (e.g., Wexler 1992, 1994, 1995, in press; Rizzi 1994; Hyams, this volume).

We will not review the theories here, but will concentrate on documenting that English falls into the optional-infinitive analysis. The theory which we will adopt is one of the variants of the theory presented in Wexler(1992, 1994), The intuition which underlies the Wexler (1992, 1994) theory to which we are referring is that in the optional-infinitive stage, TENSE is optional, and all other aspects of grammar are known to the child.[2] Wexler (1995, in press) suggests how a deficit in interpretive/pragmatic abilities might underlie the optionality of TENSE, but we will not discuss this here. We will simply take TENSE as optional.

The syntactic framework in which we will present this work is that of MINIMALIST THEORY, although it could have been presented in other versions of syntax, as it has been before. However, the minimalist analysis will allow us to show very clearly why the child's 'deficit' is not simply morphological, i.e., defined on word formation, but must be rooted in a difference in (one very small aspect of) the child's representation of the sentence, namely in the obligatoriness of ⟨+/–⟩ past features. Moreover, a new theory of the optional-infinitive stage developed in Wexler (1995), uses properties of minimalist syntax to help explain the optional-infinitive stage and its properties, so that the presentation here will be compatible with that theory.

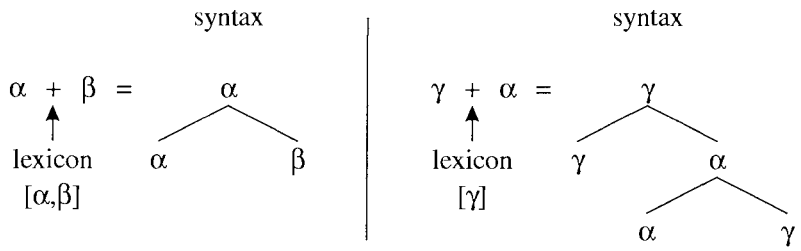
Section 2 discusses briefly the general syntactic framework in which we are working. It also summarizes the characteristics of the optional-infinitive stage. Section 3 applies the optional-infinitive theory to child English, in particular the problem of the 'omitted' inflection *-s*. We make predictions concerning various phenomena and we also compare the predictions to those made by alternative theories. Section 4 discusses the natural production data evidence concerning these predictions and Section 5 is a report of a new experiment. The conclusion is contained in Section 6.

2. Background

According to the minimalist approach, lexical items are drawn from the lexicon and linked together under the operation of MERGE. Items are merged asymmetrically, meaning that the resultant structure has the identity of only one of the combined elements. This ensures that MERGE is a binary operation.

Lexical items are nouns, verbs, tense, agreement, determiners, etc. Lexical items need not be overt (e.g., tense and agreement). The phrases which they project (e.g., VP, NP, etc.) are maximal projections (XPs). The lexical items themselves are heads (X^0s). Heads which do not project may have simultaneous existences as maximal projections. In (1), β may be both a head and a maximal projection. The lower α is only a head and the superior is only an XP.

(1)

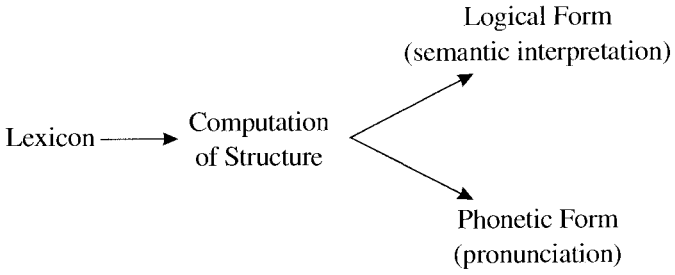


When two elements are merged, one must project a maximal projection. For example, if a verb (V) and an object (NP) are merged, they are both dominated by a verb phrase (VP), a projection of V. (While MERGE does not dictate which element must project, the structure generated must satisfy conditions of well-formedness not discussed here.)

MERGE continues its work until all items drawn from the lexicon have been integrated in some syntactic structure. During this time, certain sites in the structure may be targeted for the placement of moved items (e.g., the fronting of

wh-words in questions). At any point during the derivation, the structure is subject to the operation SPELL-OUT, to being sent to the semantic (LF) and phonetic (PF) interfaces. If the structure meets the conditions of well-formedness demanded by each interface, the derivation is said to *converge*, if it fails any condition of either interface, it is said to *crash*.

(2)



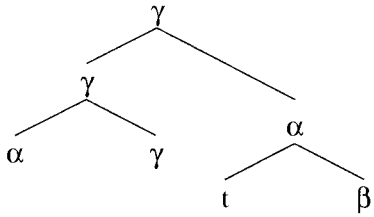
The minimalist view allows two possibilities for the realization of inflection on the verb.[3]

(i) The verb (*walk*) and the morphological affixation (*-s*) are drawn as two separate elements and joined by MERGE, or

(ii) The verb and the affixation are drawn as a whole, but with the appropriate inflectional and agreement features inherent in it.

We will not attempt to make a distinction between the two here. What will be important in this discussion is that the appropriate features either appear or fail to appear on the verb prior to SPELL-OUT.

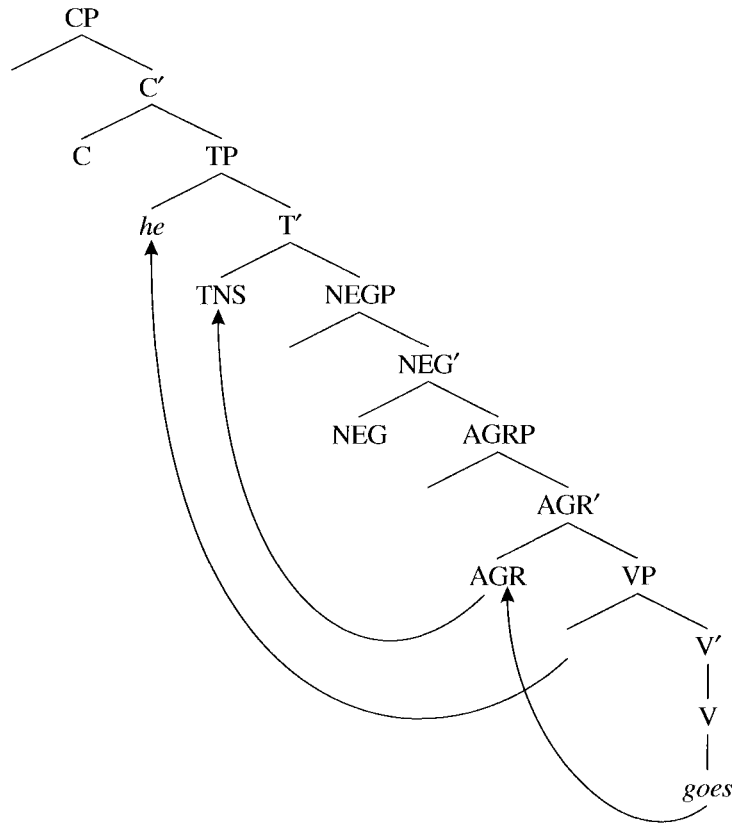
(3)



Any element bearing a strong feature (such as a tense or agreement feature) must have that feature checked by a functional category before the derivation is spelled out to the phonetic interface. This is driven by the principle of GREED. A feature is checked when the item bearing that feature moves into the checking domain of the appropriate functional category. This is satisfied when the item has adjoined to the head of the functional category. (3) shows us an example in which α has moved into the checking domain of γ. In English, the relevant features are weak, meaning that they needn't be checked before SPELL-OUT. The

movement of the verb is covert (at LF). This illustrates the principle of PROCRASTINATION, which requires that any necessary movement be delayed as long as possible, in this case, until LF.

(4)



In (4), illustrating *he goes*, the verb must raise to AGR at LF to have its agreement checked. In order to have its tense feature checked, it must continue on to TNS. In this sentence, there is no negation, so NEG is not a necessary intermediary landing spot. The verb raises directly from AGR to TNS. Notice that this is irrelevant to the pronounced sentence, since movement occurs *after* SPELL-OUT.

In the other child form observed, *he go*, the only difference here is that the main verb does not move at LF. Obviously, these examples cannot provide any evidence which bears on whether movement has taken place.

If a lexical item is selected with a set of inflectional features, it must have those features checked by the appropriate inflectional category. Since we assume that the child's grammar is subject to UG constraints, this means that the child's grammar must check off the appropriate features, if the inflectional category appears at all. Since the optional-infinitive hypothesis holds that the inflection on the verb is indicative of the underlying feature, then we expect the distribution of inflected verbs to be different from the uninflected.

The prediction is that a functional category may/may not be present depending on whether the corresponding lexical item was selected. But when an item *is* selected, we expect to see it used grammatically. We predict no movement for agreement (least effort) when the category is absent, mandatory movement (greed) when it is present.

In English, the effects of this movement or lack of movement may be difficult to see because of impoverished inflectional morphology (which make it not so obvious whether a child is using a tensed form) and corresponding weak features, which require only covert movement. In languages with more overt morphology and also more overt movement, the effects of feature checking are more obvious.

It has been shown by Wexler (1990, 1992, 1994) that children acquiring French, German, Dutch, Swedish, Norwegian, and Danish all go through an optional-infinitive stage. There are two properties of this stage:

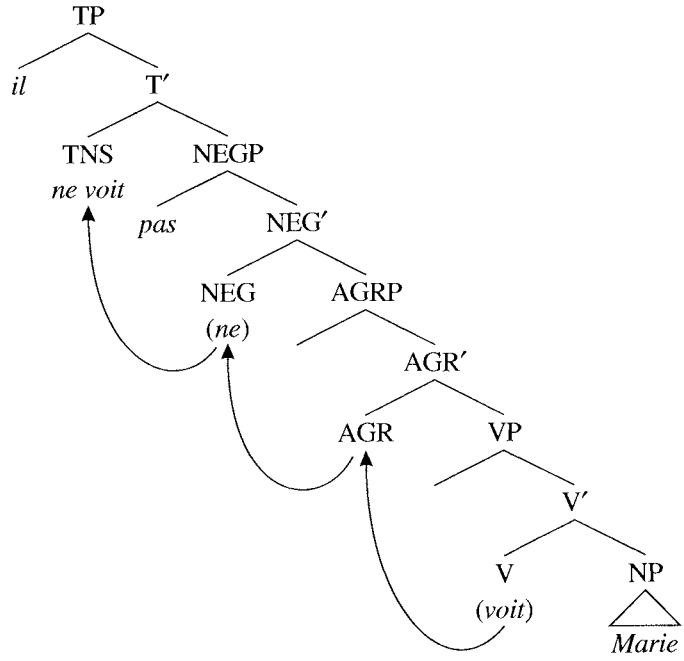
(i) Both finite and nonfinite verbs appear in the root clause.
(ii) The finite and nonfinite verbs appear in different word orders, corresponding to where they would appear in the adult grammar, that is, raised or not.

Consider French. It is unlike English in that [+INFL] bears a strong feature and must be checked prior to SPELL-OUT. Here, it is possible to see evidence of movement. In (5a), the matrix verb *sembler* is infinitival, and has not raised.[4] Indeed, as we see in (5b), raising an uninflected form results in ungrammaticality. The opposite is the case with the inflected form of *voir*. It *must* raise, as in (6). See the derivation in (7).

(5) a. *Ne pas sembler heureux est une condition pour écrire des romans.*
'To seem not happy is a condition for writing novels.'
b. **Ne sembler pas heureux est une condition pour écrire des romans.*

(6) a. **Il ne pas voit Marie.*
'He doesn't see her.'
b. *Il ne voit pas Marie.*

(7)



Whenever a verb appears before negation (*pas* here), we expect to see the verb in an inflected form (cf. (6b)). Where the negation-(*pas*) precedes the verb, as in (5a), we assume that the verb has not raised to TNS, and no inflection is observed in these instances. The child examples in Table 1 are from Pierce (1989):

Table 1. Examples of Inflection/Negation, Pierce (1989)

+finite...NEG	NEG...–finite
marche pas walks not	*pas casser* not break
ça tourne pas this turns not	*pas rouler en vélo* not roll on bike

The question is whether children respect this constraint on the distribution of verbs bearing inflection morphology. Pierce (1989) studied transcripts from four native-French speaking children aged 1;8–2;2.3. She found that the children overwhelmingly observed the constraint.

Out of 352 relevant utterances, only 11 (3%) violated the pattern described above. (See Table 2.)

Table 2. French Inflection/Negation and Word Order

	finite	-finite
pas verb	9	122
verb *pas*	216	2

Poeppel & Wexler's (1993) work in German illustrates the same phenomenon. German is a V2 language, meaning that it always has some verbal element in second position of a matrix clause. That element, whether it is an auxiliary or main verb, is finite. Poeppel and Wexler showed that in a 25–month old German child the finite verb almost always appeared in second (V2) position and the nonfinite verb almost always appeared in final position. They argued on the basis of the literature (see, for example, Mills 1985; Clahsen 1990; Clahsen & Penke 1992; Meisel & Müller 1992; Weissenborn 1990; Verrips & Weissenborn 1992; Boser *et al.* 1991) that this morphology/word order correlation was characteristic of young German-speaking children in the optional-infinitive stage. Wexler (1990, 1992, 1994) applied these kinds of arguments to a range of languages, showing that children in the optional-infinitive stage observed a characteristic word-order/morphology correlation: Although nonfinite root verbs frequently appeared, they appeared in the position corresponding to the (unraised) nonfinite verb, whereas the finite verb appeared in the raised position determined by the adult language. He concluded that children in the optional-infinitive stage knew both the relevant UG principles and the parametric values (e.g., strong vs. weak features) of the adult language that was developing.

3. Theory of Optional Infinitives in English

The languages studied by Wexler (1990, 1992, 1994) provide us with examples of overt inflection/non-inflection. In these cases, we see that two-year-olds make some kind of distinction between them with respect to their distribution in sentences. Since this distribution is compatible with what is known about feature-checking, we assume that it is the result of grammatical knowledge held by the children. Wexler (1992, 1994) suggested that English children also go

through the optional-infinitive stage, although there is no visible inflectional marking on the infinitive in English. Specifically, he suggests that, for example, when the English-speaking child says *he go* instead of *he goes*, this represents the workings of the optional-infinitive stage in English. Let us consider possible explanations for the incorrect, so-called *bare stem* form in child English.

What is the cause of the *he go/he goes* alternation in English-speaking two-year-olds? There are four possible hypotheses which explain the data:[5]

Hypotheses:

I. Children randomly use the *-s* morpheme.

II. Children randomly add the morpheme in third person singular contexts.

III. The [*-s* + verb] complex is a morphological variant of the stem.

IV. Children pass through an optional-infinitive stage in which they optionally omit TENSE, and the form without *-s* is the untensed (nonfinite) form of the optional-infinitive stage in English (Wexler 1992, 1994).

If one wants to argue some variant of the view that children do not have functional categories (in modern approaches) or know inflectional morphemes (in more traditional approaches), then it is necessary to account for the fact that during most of the period of inflectional development, children are producing the tensed, agreeing form alongside the untensed, non-agreeing form, that is, they are producing *she goes* at the same ages (i.e., in the same files) as *she go*.[6] This fact, as Wexler (1992, 1994) points out, is what underlies Brown 's (1970) use of the *percent production in obligatory contexts* measure. Hypotheses I to III are variants of an attempt to capture both the use of *-s* and its optional use in some framework which assumes that children are missing functional categories. These hypotheses (I through III) are not necessarily distinct, depending on exact assumptions which could be made.

Hypotheses I through III reflect doubt over whether children around two years of age have complete knowledge of inflectional categories. This concern is expressed in two forms: one suggests that inflectional marking is optionally added or deleted, subject to interference from processing-load demands. The latter proposal would be in the spirit of Bloom (1990), although Bloom made no such claim.

The other proposal (Aldridge 1989) suggests that a verb plus its inflectional marking are taken as an unanalyzed whole,[7] and that such a unit is a variant of the "uninflected" form. On this view, *take* and *takes* are homonyms, i.e., there is no analysis of *takes* as [take+3SG]. As Radford (1994) writes, on Aldridge's

view, "the absence of overt tense marking [e.g., in *Teddy cry*] is a low-level morphological error that has no syntactic correlate, so that *cry* has the same surface syntax as *cries* and carries covert tense.... What this implies ... is that *Teddy cry* has exactly the same superficial syntactic structure as *Teddy cries/cried*, with *cry* being a covert present/past tense form...."

It is quite clear that Hypothesis I can not be correct; children in this early stage do not use *-s* randomly, as Wexler (1992, 1994) points out.[8] Namely, *-s* is almost never used with other than third-singular subjects; for example, a child does not use *-s* with first singular subjects, e.g., *I goes*.[9] This fits with what Wexler (1992, 1994) and also Poeppel & Wexler (1993) claim about the optional-infinitive stage, that the child knows agreement, seldom using a finite verbal inflection with a subject which does not agree with it.

Hypothesis III is very close to Hypothesis I, and may not be distinguishable from it. Apparently, it also predicts that children use verbs with *-s* in the same environments as they use bare stem verbs, mistakenly predicting the occurrence of e.g., *I goes*.

Thus it is very difficult to find an 'inflected verbs are unanalyzed units' hypothesis that can begin to account for the agreement facts, namely that there are exceedingly few instances in the production data of finite verbal inflections with non-agreeing subjects. Our specification of Hypothesis II is an attempt to state such a hypothesis (just so we can argue against it, of course). Hypothesis II says that children know that verbs with *-s* have a third-singular feature, but they do not know any other grammatical aspects of the form. That is, the assumption of Hypothesis II is that children will use a verb with *-s* whenever the subject is third singular, but they do not know that the verb is tensed and is subject to distributional conditions on TENSE.

It is not clear to us, in fact, that Hypothesis II can be stated within a UG framework. At any rate, if Hypothesis II were actually to hold, we have to think of the child as having some kind of grammar, and in fact, not simply one without functional categories. This is because agreement is represented in terms of functional categories, and in fact, the usual 'no functional categories' theories (e.g., Radford 1990) state that children at an early age do not know agreement.[10] Thus even if Hypothesis II were to hold, it would not be compatible with a 'no functional categories' approach to the *she go/she goes* alternation. The implication of Hypothesis II is that children will not make agreement mistakes on *-s*; however, they will not demonstrate other knowledge of functional categories related to *-s*.

The question now becomes: can we find distributional evidence in English

concerning the word order/morphology correlation which would distinguish Hypothesis II from Hypothesis IV (the optional-infinitive hypothesis)? The phenomenon of optional infinitives in English is not obvious for two reasons. First, only the third person singular bears overt morphology in present tense. The opportunity to make the relevant observations is limited in this sense. Secondly, and most importantly, the uninflected form is not unambiguously a proper infinitival. In the other languages in which Wexler found evidence for the optional-infinitive hypothesis, the infinitival inflection was visible, e.g., *-er*, *-ir*, *-re*, in French, *-en* in German, etc. But English infinitivals are a case of *zero morphology*; the infinitival form of the verb is phonetically identical to the bare stem. *Walk* may simply be the stem of *to walk*, for example.

The only present tense marker in English is third singular *-s*. Wexler (1992, 1994) argues that the omission of *-s* by children could follow from the optional-infinitive stage in the following way: the child either chooses ⟨+TNS⟩, yielding *she goes* or ⟨–TNS⟩, yielding *she go*. The assumption is that *go* in *she go* is the English infinitival form. This is suggested by examples such as (8):

(8) a. *I want Mary to go.*
b. *I saw Mary go.*

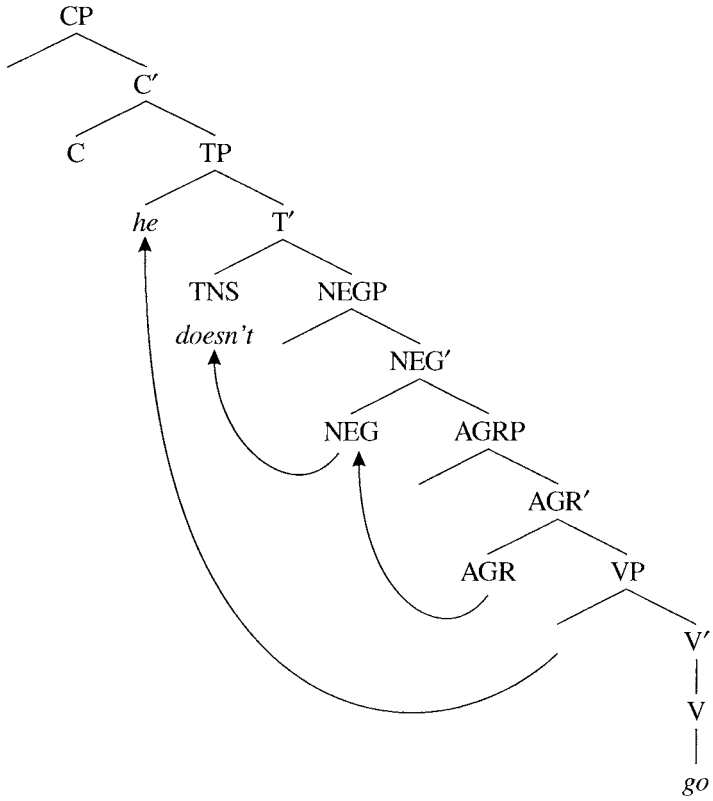
The embedded clause in (8b) is a 'small clause', typically taken to be a tenseless clause. Thus in both the 'infinitive' and small clause examples given in (8), we see that the form of the verb is *go*, the same form as in *she go*. This is what the optional-infinitive view predicts, given its assumption that English-speaking children may have root sentences with ⟨–TNS⟩. Here are some examples from CHILDES, with and without inflection (All CHILDES examples refer to MacWhinney & Snow 1985):

Table 3. Examples of 3rd Singular Verbs

child	file	age	example
Eve	14	2;0	*it only write on the pad.* *my finger hurts.*
Adam	01	2;3	*horse go # Mommy.*
Sarah	030	2;9	*he bite me.* *her cry.*
Adam	27	3;3	*dis go right here.*
Peter	08	3;3	*Patsy need a screw. This goes in there.*

Note that there is no distributional evidence for the optional-infinitive hypothesis here. English does not exhibit the surface word order movements that the other studied languages do. For example, it is not V2 (like German) and it does not raise the verb over negation on the surface (like French). Wexler (1992, 1994), however, suggests that English will have a manifestation of its own, involving negation.

(9)



Consider again feature-checking in English. The main verb raises to have its tense feature checked.[11] If it raises directly to TNS over overt negation, it will be unable to properly govern its trace, violating the Head Movement Constraint. The only other option is to adjoin to the intervening negation marker before continuing. However, English does not allow negation to cliticize on to main verbs. The sentence *he not goes* is ungrammatical.[12]

The only way to save a negated sentence is through the insertion of a semantically null modal, such as *do*. *Do* is base-generated under AGR with the

feature ⟨+TNS⟩. It raises to NEG, where it adjoins to the head there,[13] then continues on to TNS. It appears there with *n't* clitisized on to it. *Go*, here, is uninflected, and is not required to move.

Notice that the overt order is necessarily *he doesn't go* and not *he not does go*. Chomsky (1992) suggests that because *do* is semantically null, it is not visible at LF; it (like other auxiliaries in English) must move to have its features checked prior to SPELL-OUT.

Now consider what happens with sentences of the form:

(10) **He doesn't walks.*

where both the modal and the main verb bear ⟨+TNS⟩. Only one of them can have its feature checked at TNS. The unchecked feature on the other will cause the derivation to crash.

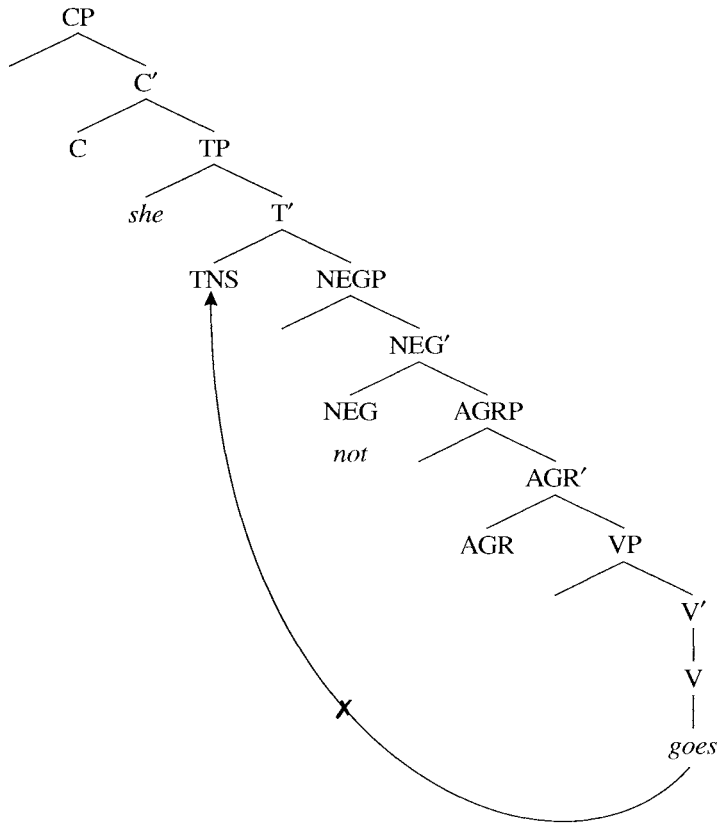
Now, what do we expect from the optional-infinitive hypothesis (Hypothesis IV)? We have stated this hypothesis as the possibility of children optionally omitting TNS. When children choose TNS in their representation, they will have exactly the adult forms; for example, they will judge (10) as ungrammatical. Suppose now that they omit TNS in a representation of a negated sentence. As Wexler (1992, 1994) observes, it is in just such a case that we would expect the omission of *do*, since, as we have pointed out, *do* has been inserted so that a ⟨TNS⟩ feature may be checked. If there is no ⟨TNS⟩ feature to be checked, *do* will not be inserted, since ECONOMY considerations allow a transformational operation only when necessary to check a feature.[14] In such instances we would expect negative sentences like (11):

(11) *she not go*

Since there is no TNS in (11), there is nothing to check; raising is not required at any level. In other words, since the verb is not marked for tense and TNS has not been selected as a lexical item, no feature-checking is required here. Economy principles restrict unnecessary movements, therefore the verb will not be raised vacuously. Thus (11) will be a grammatical form for the optional-infinitive child, that is, the optional-infinitive hypothesis predicts that negation may exist without *do*-support, in the form of sentences like (11).

In fact, as has been known since Klima & Bellugi (1966), children often omit *do* where it is required in negative sentences, yielding forms like (11). These authors took the existence of forms like (11) to indicate a 'medial NEG stage.' It was never clear why forms like (11) should exist; clearly it is a virtue of the optional-infinitive analysis that it in fact predicts that forms like (11) exist. However, other Hypotheses, for example, Hypothesis II, might take *do* to

(12)



be made necessary by a functional category, and also predict that *do* may be omitted.[15] However, Wexler suggested distributional evidence that follows from the optional-infinitive hypothesis.

Consider forms similar to (11), but with the verb showing TNS, in particular *-s*, as in (13):

(13) **she not goes*

The ⟨+TNS⟩ verb must raise to have features checked. The Head Movement Constraint in English restricts the verb from raising over negation. The optional-infinitive grammar will rule out such a sentence (12).

Note that in those instances when ⟨+TNS⟩ is either present on the verb or

present in the phrase-marker, but not both, the sentence will automatically be ruled out, regardless of whatever else appears in the structure. This means, as Wexler (1992, 1994) argued, that the optional-infinitive hypothesis predicts that when *do* has been omitted, two-year-olds will never inflect negated sentences.

Other hypotheses, however, predict otherwise. Consider Hypothesis II, the most difficult of the alternative hypotheses to falsify, since it assumes the children know third singular features of *-s*. Let us assume that somehow Hypothesis II can allow the omission of *do*, perhaps by saying that *do* represents a functional category, even though this might be difficult to formalize. However, there does not seem to be any way that Hypothesis II differentiates between (11) and (13). The hypothesis allows both *she go and she goes*, by saying that verb + *-s* is allowed as a morphological (allomorphic) variant of the bare verb stem as long as the subject is third singular. Apparently, both (11) and (13) should be allowed by Hypothesis II.[16]

In summary, we have the following predictions:

Table 4. Predicted Forms

	she not go	*she not goes*
OI Hypothesis	✓	*
Hypothesis II	✓	✓

The purpose of this paper is to test these varying predictions. So far as we know, aside from Wexler (1992, 1994), this question has not been discussed (Klima & Bellugi 1966), in describing the MEDIAL NEG STAGE, didn't discuss verbal inflection).

4. Natural Production Data

4.1. *Use of Bare Negation*

Transcripts of 10 children from the CHILDES data base were examined.[17] The age range was from 1;6 to 4;1.[18] In brief, we searched for all sentences containing negation but no auxiliary and which should have had some inflectional marking.

Sentences counted were those containing some negation (either *no* or *not*) preceding a main verb. Sentences including a modal or auxiliary (such as *do* or

can) were excluded. Questions were excluded. Since the purpose of the analysis was to investigate whether finite or nonfinite forms followed the medial negative (i.e., negatives where *do* should appear but does not), we only looked at verbs with singular third person subjects, since only third person singular morphology is visible on English main verbs. Only those sentences whose subjects (including null subjects) were unambiguously third person were included. Either *-s* or some form of the past tense were counted as inflected. Obviously progressive *-ing* was not included, since tense does not appear on *-ing* participles. Thus the sentences included in the analysis fell into two kinds, those with present or past tense on the main verb and those with an infinitival main verb, i.e., the bare stem. We will call these forms, both with and without tense, *bare negation* examples.[19]

(14) a. *not Fraser read it* Eve 08
b. *Saifi no knock on the door* Apr 02
c. *no Nathaniel has a microphone* Nat 01

The table below counts all determinable-tense sentences lacking auxiliaries.

Table 5. Frequency of Tensed and Untensed Verbs

	aff	neg
–inflection	782	47
+inflection	594	5

+inflection: verb is marked for present or past tense.
–inflection: verb is the bare stem (i.e., the infinitive).
aff: sentence is affirmative
neg: sentence is negated with no or not, without do-support.

As we can see, about 43% of the affirmative sentences were inflected (e.g., *He goes*). Compare this to the inflection rate for sentences negated by *no(t)* (e.g., *He not goes*), 9.6% . This comparison suggests that the addition of the inflectional marker is disrupted by the presence of negation. Notice that five of the negated sentences were tensed; these are given in Table 6. A complete listing of all examples of bare negation with determinable tense is located in the appendix.

Note that the example from Peter 15 is a nonstandard case of inflection (where the particle is inflected), not repeated elsewhere in the transcripts studied. Indeed, in Peter 15, this same sentence is uttered without the *-s* appended to any word. Even though this seems clearly a performance error, it remains in all our counts. Thus the inflection rate for the negatives is probably too large. Eliminat-

Table 6. All Tensed Bare Negation Sentences

Abe	28	*it not works Mom*
Nath	01	*no Nathaniel has a microphone*
Peter	08	*no goes in there*
Peter	15	*but the horse not stand ups*
Peter	17	*no goes here!*

ing this example would give four inflected forms and 47 non-inflected forms for the medial-negation sentences. This is a 7.8% inflection rate vs. a 43% rate for the affirmatives.

It seems fair to conclude that verbs that appear after negation are not tensed; there is an extremely large difference between the inflection rate for affirmative and negative sentences. Moreover, the inflection rate for negative sentences is extremely small (in the range of 7 to 9 %); we can take this small rate of inflection to indicate performance errors.

Now consider the use of main verb (possessive) *have/has*. This is an especially clear example for the optional-infinitive hypothesis, since here it cannot be the case that the *-s* marker is simply dropped, leaving the stem form. For example, if the child says *she have a book*, this cannot be accounted for by saying that the child 'drops' the *-s*, since that would result in the utterance *she ha the book*.

Of the affirmative tense-determinable examples of *have/has*, 30.6% are inflected (e.g., *has*) vs. 12.5% of the negated examples.[20] This follows the pattern seen in the other verbs, namely that the verb is not tensed after negation. The following table shows the number of tense-determinable examples of main verb *have/has*, for affirmative and negative sentences.

Table 7. Have *with 3rd Person Subjects*

	aff	neg
–inflection	66	7
+inflection	29	1

Notice that the children often use infinitival *have* with third person singular subjects (69% of the time for affirmative sentences). This clearly means that the children cannot be using a strategy which says 'drop *-s*' to form what we are calling the 'nonfinite' verbs. Otherwise they would be saying *ha*, not *have*, in

these cases. Clearly the children are giving the infinitival form of the verb.

One might argue, of course, that when the child uses *have* instead of *has*, the child is using incorrect agreement, that is, the child is using a finite form that is appropriate for any subject except a third singular one. However, there is evidence (see Poeppel & Wexler 1993; Wexler 1994) that children in the optional-infinitive stage know agreement; they very rarely make agreement errors, where 'agreement error' means the use of an incorrect finite form, i.e., a finite form used with a subject which does not agree with it in the adult language.

In the case of English, this means that we expect that the child will not use the *-s* inflection on the verb with anything but a third singular subject. In general this is the accepted wisdom in English language acquisition; *-s* may be omitted, but is rarely mis-applied. To confirm this, we examined instances of verbal inflection following *I* subjects (thus ignoring null subjects). The first person singular pronoun was selected because there were relatively few plural or *you* subjects in the corpus.[21] The corpus was the same as was used in the counts already presented. The sentences used were affirmative and did not include those with auxiliaries. The following table shows the numbers of such verbs that are 'bare' (i.e., correct, the 'stem') or have *-s* (i.e., are incorrect).

Table 8. Frequency of Verbs with 'I' Subject

stem	irregular past	*-ed*	*-s*
1349	325	47	3

As can be seen from the table, the use of *-s* in first person singular contexts is almost zero (3 forms with *-s*, and 1,349 bare forms). This 0% contrasts with the 43% use of *-s* that we have already discussed in third singular contexts. Moreover, it's clear that children *can* add inflection to the verb when the subject is first singular *I*. This can be seen from the numbers for the regular and irregular past tense.

Looking just at *have*, we see the following distribution of *have* versus *has* with an *I* subject.

Table 9. Frequency of Have/Has *with 'I' Subject*

have	*has/haves*
108	0

Again, the almost zero use of *has* with first singular subjects and the almost zero use of *s* with first singular subjects with other main verbs shows that the children know agreement; they simply almost never use finite forms with the wrong subjects. Thus we cannot think of *have* with third singular subjects as being a case of incorrect agreement, of the wrong finite form being used. Rather, as we have already argued, and as fits in with the general properties of the optional-infinitive stage, *have* with third singular subjects is an infinitival form.

4.2. *Use of Inflection*

It remains to be shown that the majority of the non-inflected utterances did not come from periods in the children's corpora when the majority of the utterances are not inflected. In other words, it could be the case that negation has no bearing on inflection, and all the relevant examples are drawn from transcripts in which verbs are simply more likely to be left uninflected. In particular, we should analyze separately the data of children from an age which is even more squarely within the optional-infinitive ages. In general, children before 2;6 in English very often omit third singular *-s*, so we will analyze the data separately for files from before and after age 2;6.

Table 10. Use of Inflection/Negation by Group

	younger children 1;6–2;6		older children 2;7–4:1	
	aff	neg	aff	neg
–inflection	596	31	186	16
+inflection	307	3	287	2
% +inf	34	9	61	11

It is clear from these tables that even children younger than 2;6 show a major difference in the amount of tense inflection on the verb in affirmative and medial negative sentences. (34% versus 9%). In fact, the example we earlier discussed from Peter 15 which has inflection on the preposition is one of the 3 cases of inflected verbs after medial negation for children younger than 2;6. Removing this case as a performance error yields 2 inflected forms out of 34 for the medial negation sentences. This means that children under 2;6 only inflect the verb in medial negation sentences 6% of the time. Thus, for the crucial instance of the *young* children, the proportion of inflected medial negation sentences

is extremely close to zero. It seems quite reasonable to take this small number as performance errors. Furthermore, the older children show the same pattern.

The optional-infinitive hypothesis makes another prediction regarding the appearance of tense. As discussed in Section 2, the auxiliary *do* is assumed to be inserted in a sentence with *not* only so that a TNS feature can be checked off. As we showed earlier, *do* insertion is necessary in a sentence with *not* if and only if the sentence has TNS. Therefore, we would expect the occurrence of (the appropriate tensed form of) *do* in negated sentences to coincide with the occurrence of inflection in affirmatives. In other words, the child's propensity to add inflection in affirmatives ought to be more or less the same as his propensity to add inflection in negated sentences.

Note that this prediction is quite distinct from other ideas concerning *do*. For example, it might be thought (as it often has been thought) that medial-NEG sentences occurred because the child did not **know** *do* and that this lack of knowledge of *do* accounted for medial-NEG sentences.[22] Under such an analysis we would expect medial-NEG sentences to only occur at a time when *do* was not used at all. The optional-infinitive hypothesis, on the other hand, predicts that *do* insertion is linked to the use of TNS. To check the hypothesis, we compared the use of *do* in *not* contexts with the use of TNS in general.

The criteria for including items in Table 11 were as follows:

In the *don't-V* column, any form of *do* as an auxiliary was included, including *do not*, *does, doesn't*, *don't*, *didn't*, *does not* and *did not* as long as the context was third person singular. No form of *do* as a main verb was included. Examples of *don't-V* entries include:

(16)	a.	*that didn't went down*	Peter 17
	b.	*he don't want some money*	Adam 19
	c.	*Taki* [?] *doesn't want to*	Naomi 81

The *not-V* (medial-NEG) sentences were those containing *no* or *not*, either before or after a subject, or with no subject at all and without *do* or any other auxiliary verb, e.g., *Saifi no knock on the door*. Irregular past tense verbs as well as regular past tense verbs were counted as *-ed* verbs. Only bare stem verbs, and those ending with *-s* or *-ed* were included. Verbs with *-ing* were not included.

The percentages in Table 11 following were calculated only using the 'bare' sentences, meaning that no inflection whatsoever appeared in the sentences.

The prediction is that the two ratios will be roughly similar in a particular group. This is more or less borne out. The absolute ratios tend to follow each other from low in the early years to high in later years, with no more than a 13

Table 11. Frequency and Proportion of Bare Negatives, Do-*Support and Tense*

	grand		young		old	
	not-V	*don't*-V	*not*-V	*don't*-V	*not*-V	*don't*-V
bare	49	64	34	22	16	43
-s	5	2	3	0	2	2
-ed	0	5	0	0	0	5

	grand	young	old
proportion of *do* used in required negative contexts	.56	.37	.73
proportion of inflected verbs in affirmative sentences (from Tables 5 and 7)	.43	.34	.61

point gap. This is suggestive of the fact that *do*-support and inflectional morphology are related to TNS in the same way.

It is important to note that by counting only those instances of *do*-support from files with bare negation, a bias has been introduced which lowers the ratio of *do*-support to bare negation. Of all files containing negation, only the files containing bare negation were studied. Since there is not a great number of negated sentences in any transcript, bare negation sentences are over-represented in our comparison against the *do*-support sentences (which come from the same files). The more appropriate (and ambitious) tabulation would be to count *do*-support sentences in all transcripts, thereby driving their percentages up. We did not do that analysis because the main point of this paper was to study the interaction of medial negation and inflection; thus we only coded the data from files containing examples of medial negation.

Thus, we would like to stress what we have just pointed out; namely, it might turn out on fuller analysis that *do* is used much more often in required negative contexts than *-s* is used in required affirmative contexts.[23] If this turns out to be true, it actually could be understood in the following manner. In English, there are two negative morphemes, *not* and *n't*. The second is an affix; that is, it requires that it be attached to a host verb. Suppose children knew both *not* and *n't* and know their properties, namely that *n't* is an affix and *not* is not an affix. Thus, the children will know that *n't* requires a verb to host it. All this is just to assume that children know these elementary properties of English.

Now assume one thing further; namely, that children in production *prefer* to use *n't*. This is a natural assumption, as *n't* is the more colloquial form. *Not* is often more formal, used in more special contexts. On this assumption, children will select *n't* much more often than they will select *not*. Once the child has selected *n't* in production, she will have to use a verb to attach it to, since she knows that *n't* is an affix. Thus since there is no other auxiliary, the properties of English will force the use of *do*. Thus it follows that *do* will be used very often in negative contexts, rather than medial negation.

It is important that we have had to think of a reason that *do* is used *more* often than expected, compared to the use of obligatory TENSE. This means that we cannot explain the existence of medial-NEG sentences by saying that there is a problem with knowledge of *do* or of *do*-insertion. This result provides yet further evidence for the optional-infinitive stage in English; *do* is omitted optionally where required because TENSE is omitted optionally where required. There is no medial-NEG stage in the sense that *do* is *always* omitted; there is no hint of such a phenomenon in the data, rather the contrary. *Do*-omission is clearly optional, just like *-s* omission and other manifestations of the optional-infinitive stage.

Of course, as pointed out in the original discussion of the optional-infinitive stage in Wexler (1992, 1994), the younger the child in general, the smaller the proportion of tensed root verbs. The possibility was even noted that if a child was young enough, the proportion of tensed verbs might go to zero. In such a case, where TENSE was almost completely missing, we would expect *do* to be almost completely missing in negative sentences. Any indication that there was a particular problem with *do* might have been due to the fact that TENSE (and thus *do*) shows up only a small percentage of time in the youngest files.

4.3. *Appropriate Use of Tensed Forms*

Do children make correct use of tense? The optional-infinitives hypothesis maintains that while infinitive forms may be used optionally in places where tensed forms are used in adult speech, children do indeed have knowledge of tense, and will not use a tensed form incorrectly. Is this borne out in the data? Such a count can be done only by determining the implied time of action referred to by the sentences. Naturally, this is rather subjective in nature, especially when the coder was not present during the recording. Following standard practice, we have attempted as best we could to determine the time that the child was intending to refer to by her utterance. Given the mentioned

limitations, these counts are meant to provide a rough idea of whether the assumption of knowledge of tense is supported even in this regard.

The following counts were conducted by examining the utterances surrounding the target sentence in order to determine whether the child was referring to past, present, or future events. Ambiguous contexts were excluded from the counts.

Statements concerning on-going activities were always interpreted as being in the present tense. Statements concerning what seemed to indicate future time or a desired state of affairs were interpreted as future. Statements concerning past events or events referred to by adults as past events were so interpreted. The counts resulted in the following table, in which an entry reflects the number of utterances with a particular morphological form (*-inf* means 'bare stem'):

Table 12. Time of Reference by Inflection

	present	past	future
-inf	771	128	39
-s	418	14	5
-ed	10	168	0

The first thing to note about this table is that *tensed* forms are used almost completely correctly; (a) present tense *-s* is used 418 (96%) times to indicate present and only 19 times to indicate past or future and (b) past tense *-ed* is used 168 (94%) times to mean past and only 10 times to mean present, and never to mean future. Thus the overwhelming number of uses of a tensed (finite) verb corresponds to the correct use of tense.

The use of the bare stem, on the other hand, shows a wider variation in meaning. Although 771 (82%) instances of the bare stem refer to present tense, 128 refer to the past and 39 refer to the future. Thus there is a considerably larger percentage of non-present contexts for –inf verbs (18%) than for *-s* verbs (4%). Note that although the difference between 4% and 18% may not appear to be very large, we essentially predict a 0% use of non-present contexts for *-s* verbs, and this is very close to what we found; essentially we consider the 4% to be performance errors, as was the less than 10% use of finite tense in medial neg contexts. The only 18% non-present contexts for –inf verbs may reflect a stronger tendency to use past morphology for past contexts; at any rate, there is no reason we would expect a larger percentage.

To be statistically precise, we should ask whether the –inf distribution is

really a different distribution than what we find for *-s*? We collapsed past and future into nonpresent (Table 13) and examined –inf and *-s* with a test of χ^2.

Table 13. Inflection by Temporal Context

	present	nonpresent
-inf	771	167
-s	418	19

The result was highly significant ($\chi^2 = 46.15$, 1 *df*, $p < .0001$). This means that the number of present context sentences containing verbs inflected with *-s* is disproportionately large compared to the number of similar sentences with uninflected verbs. Another way of looking at this would be to say that nonpresent-context sentences were less likely to contain *-s*. Thus, we are lead to conclude that the bare stem is less restricted than *-s* in its use in present/nonpresent contexts.

This is exactly what the optional-infinitive hypothesis would expect. The use of the nonfinite form, the optional-infinitive hypothesis assumes, indicates that the child is filling in the tense specifications from context, just as the nonfinite form in adult language has its tense specifications filled in by a higher tense. Since context often specifies a present tense, we would expect many of these. But, when needed, the nonfinite form may refer to past and future events.

Thus contextual, interpretive evidence supports the optional-infinitive hypothesis. (See Behrens 1993 for similar results in optional infinitive German.) Hypotheses which say that the 'bare stem' use of the verb with third singular subjects reflects only the 'dropping' of *-s*, or an allophonic variant of the form with *-s* (for example Hypothesis II above) would suggest that the bare stem (i.e., –inf) form would be used in the same contexts in which verb + *-s* is used. But the table above shows this is quite clearly not the case; *-s* is used only 3% of the time to refer to the past, whereas the bare stem is used 13% of the time to refer to the past. Similarly, *-s* is used less than 1% of the time to refer to the future, whereas the bare stem is used about 3% of the time to so refer. Even more strikingly, from Table 12 we can calculate that whereas 41% of past contexts contain a ⟨–inf⟩ verb, only 4.5% of past contexts contain an *-s* verb.

Clearly the bare stem can be used to refer to a wide variety of temporal interpretations, whereas the finite forms are much more fixed. These contextual results support the hypothesis of the optional-infinitive stage.

5. Elicitation Study

We also did an elicitation study, attempting to induce children to produce negated sentences, to see if they produced medial-NEG sentences, and what form of the verb was used in such sentences. One reason we did this was because there were a limited number of medial-NEG sentences in the CHILDES corpus. Presumably this is because children who would produce medial-NEG sentences would be younger children, who use tense less often, but younger children also use negation less often. Thus we attempted to induce young children to use negation.

There was a second reason we decided to do an elicitation experiment, namely to help to eliminate another hypothesis. Suppose somebody believed in one of the versions of the "no functional categories" view, perhaps in Hypothesis II. Although this hypothesis by itself cannot explain why medial-NEG sentences don't show TENSE, if an auxiliary hypothesis were added, the phenomenon could be explained. In particular, suppose one assumed that processing difficulties caused by the addition of an extra element (negation) caused a morpheme (TENSE) to be omitted.[24] Then, even if one assumed that bare stem verbs and verbs with s were simply allophonic variants of the other, (except that the forms with *-s* had third singular markings, i.e., Hypothesis II) the extra assumption about processing difficulty could explain why TNS was omitted when negation appeared.

Of course, this is a very complicated hypothesis, assuming both that children don't know the meaning of *-s* as present TNS and that the occurrence of morphemes causes other morphemes to be omitted. And even the auxiliary processing hypothesis could not explain the standard crosslinguistic optional-infinitive results, since the nonfinite morpheme still counts as a morpheme, and the surface-style 'processing-load' hypothesis would have to say why a finite morpheme should take up more room in 'memory' than a nonfinite morpheme. Nevertheless, we attempted to obtain more direct evidence that the auxiliary 'processing' hypothesis together with the 'no functional categories' hypothesis could not explain the data.

To do this, we could take advantage of the existence in English of adverbs, including negative adverbs like *never*, which do not require *do*-support, and do not interfere with the placement of inflection on the verb. If any extra element in the sentence interfered with the production of TENSE on the verb, then *never* should interfere as much as *not*. If this were the case, we would see no distinction between adverbs and negation. If children treat *go* and *goes* as allophonic

variants, then *he never goes* and *he not goes* would have the same status; the proportion of tensed verbs after *never* should be equal to the proportion of tensed verbs after *not*; tense would be dispreferred in each case by the auxiliary processing hypothesis. That is, the addition of the negative element would make tense less likely.

Notice that in the optional-infinitive view, the infrequency of inflection after a verb in a negated sentence follows from the status of NEG as a functional head. But adjoined elements like adverbs are not potential barriers to raised elements. In children's speech, the optional-infinitive hypothesis expects an inflected verb after an adverb as often as when the verb is not preceded by an adverb; at any rate, the optional-infinitive hypothesis expects more inflected verbs after an adverb than after a NEG head (as indicated by the existence of *not* in the utterance). The optional-infinitive hypothesis predicts that only one of the following six forms, *he not goes,* is ungrammatical for optional-infinitive children:

Table 14. Predictions

[main verb]	*He go*
[main verb] + *s*	*He goes*
[main verb]	*He never go*
[main verb] + *s*	*He never goes*
[main verb]	*He not go*
*[main verb] + *s*	*He not goes*

In order to observe the use of adverbs by very young children, an elicitation study was devised. Testing was done at local day-care centers with the aid of a farm playset and a Sesame Street playset. Each child took turns playing with one, and was asked questions about ongoing activities. A fixed battery of questions was impossible to employ due to the rather limited attention span of children of this age. All questions are given in the context of free play. The questions were of the forms:

(16) a. *Does the cow always go in the barn, or does she never go?*
b. *Does the cow go in the barn or does she not go in the barn?*

That is, type (16a) uses an adverb which does not interfere with tense on the verb, whereas type (16b) uses *not*, which requires *do*-support. The two types alternated in precedence.

They were also asked questions of the form:

(17) a. *Do you think he always goes or do you think he never goes?*
b. *Do you think that he goes, or don't you think that he goes?*

so they could hear questions with inflection on the main verb.

At the outset of testing, none of the children could answer the adverb questions. Typical responses are, "He does go," or just "Yeah," and "No." Of twenty-seven children evaluated,[25] only four were both successful with the full range of question types and also produced medial-NEG sentences. Other children either were too undeveloped to answer the questions fully enough or were so developed that they always used *do*-support. The four children are aged 2;1, 2;1 to 2;2, 2;3 and 2;8 to 2;9. The 2;8 child was a little delayed and his data fit with the others.

Sample Questions/Answers

EXP: *Do you think that he always sleeps in the yard, or do you think that he never sleeps in the yard?*
SUB: *Never sleeps in yard.*

EXP: *Does this cow go up there, or does this cow not go up there?*
SUB: *Not go up there.*

EXP: *Does that farmer go in, or don't you think the farmer goes in?*
SUB: *He not go in.*

EXP: *Do you think that chicken always plays in there, or do you think that chicken never plays in there?*
SUB: *Always play there.*

The following tables show, for these four children, the number and percentage of inflected and non-inflected tense-determinable verbs, for 3 different types of produced sentences; affirmative sentences, medial-NEG sentences with an adverb (e.g., *never* or *always*) which does not require *do*-support, and with *not*. By 'affirmative' sentences we mean sentences without an adverb or *not*; of course, some of the adverb sentences are affirmative, if the adverb is other than *never*; however, almost all the adverbs that children used were *never*.

Tables 15 show the three different kinds of sentences studied, and the frequency with which the main verb was inflected. The number on the left is the percentage of total utterances in that condition, and the number on the right reflects the raw count.

The tables differ in the following way: The first, 'grand total', shows all the utterances that the child made. The second table, 'responses to questions', shows only the utterances that the child made when asked a direct question, of the kind

Table 15. Sentence Type by Type of Inflection

	grand total					
	affirmative		adverb		*not*	
INFL	38%	60	28%	20	9%	4
not INFL	62%	98	72%	51	91%	42

	responses to questions					
	affirmative		adverb		*not*	
INFL	59%	23	26%	17	12%	4
not INFL	41%	16	74%	49	88%	29

	irrelevant or spontaneous					
	affirmative		adverb		*not*	
INFL	31%	37	60%	3	0%	0
not INFL	69%	82	40%	2	100%	13

we mentioned above. The third table, 'irrelevant or spontaneous', includes only the utterances that the child made that were *not* elicited directly by a question from the experimenter. Thus the entries in the first table are the sum of the corresponding entries in the second and third tables.

Looking at the grand totals, notice the difference in inflection between the negated sentences and the affirmative and adverb sentences. That is, the verb is inflected only 9% of the time when *not* is used, whereas it is inflected 28% of the time when an adverb is used and 38% of the time when neither *not* nor an adverb is used. The fact that the use of *not* pushes the use of inflection (TENSE) toward zero, while this is not true for adverbial (e.g., *never*) use, supports the optional-infinitive hypothesis and is not consistent with Hypothesis II supplemented by the auxiliary 'processing load' hypothesis. Moreover, the results in general are quite consistent with the results from the CHILDES natural production study; *not* in medial-NEG sentences pushes the use of tense toward zero (9%) whereas this is not true for sentences without *not*. Thus the optional-infinitive hypothesis is supported.

In fact, if we look at the third table, the 'irrelevant or spontaneous'

utterances, we find an even more striking result. Here the use of inflection with sentences with no adverbs or *not* is 31%, with adverbs it is 60% (though there are only five such sentences overall) and with *not* it is 0% (out of 13 tokens overall). The reason there are fewer negatives in this table, of course, is that these represented the ones which were not elicited. Nevertheless, the difference between 0% for *not* and 31% inflection without *not* is quite striking and supportive of the optional-infinitive hypothesis. This is a particularly interesting condition because there was no question given to the child which could have influenced the response, a point which we will address shortly.

The second table, including only 'responses to questions,' also shows a major difference between *not* (12%) and affirmatives (59%) with respect to the incidence of inflection; the use of inflection for adverbs, however, falls in between the other 2 numbers (26%). The use of inflection is in the predicted direction; more inflection is used with adverbs such as *never* than with *not*. If processing difficulty of a surface form were accounting for these facts, then, if anything adverbs like *never* should cause *more* difficulty and show a lower rate of inflection; after all, *never* has two syllables rather than one; moreover, it is less common than *not*. All in all, the optional-infinitive hypothesis seems to be supported, although it would be good to have further studies, with more subjects, to see whether the difference between non-adverbial (affirmative) and adverbial sentences is reliable and whether there is any effect at all on inflection of having an adverb in the sentence.[26]

We have put into Table 16 the same data, broken down for each of the four children. These tables correspond to the *grand totals* section of Table 15; that is, they include all the children's utterances. Since there is not a large amount of data for each child, for simplicity, we have only given the grand totals for each child. The data in Table 16 show that the basic pattern that we have described above holds for each child; namely, there is a good deal more tense marking in an affirmative sentence than when there is a *not* in the sentence.[27]

While the results in Tables 15 and 16 show that the trend is in the predicted direction, there is a possible source of confounding with the question/answer paradigm. Since we are dealing with very young children, in an experimental setting, we should consider whether any kind of imitative response to the experimenter's question could make the responses come out in favor of the optional-infinitive hypothesis. Table 17 lists children's responses using inflected verbs depending on whether the child used the same inflection that the experimenter used in his question (copied infl), or whether the child used the opposite inflection. A child's utterance could also be classified as 'irrelevant,' a response

Table 16. Grand Totals for Each Child

	child 1 (2:1)		
	affirmative	adverb	*not*
INFL	17	3	2
not INFL	21	8	12

	child 2 (2;8–2;9)		
	affirmative	adverb	*not*
INFL	10	7	2
not INFL	10	14	11

	child 3 (2;1–2;2)		
	affirmative	adverb	*not*
INFL	17	4	0
not INFL	34	15	3

	child 4 (2;3)		
	affirmative	adverb	*not*
INFL	9	4	0
not INFL	3	8	1

which disregarded the content of the experimenter's preceding utterance. These responses are listed for each type of sentence (affirmative, adverb, or *not*) that the child produced.

In all cases, the children are more likely to answer using inflection if inflection had been used in the question. For example, if the question is, "Does he always go, or does he never go?" the child is more likely to answer "Never go" or "Always go," rather than "Never goes."

Note that this result is not surprising for the affirmatives and the adverbs. The optional-infinitive hypothesis is that sometimes verbs appear in finite form and sometimes infinitival. Nothing is said about when one form will be chosen over the other, except in certain syntactic contexts (e.g., after *not,* as we have

Table 17. Frequency of Children's Inflection as a Function of Stimulus Inflection

	affirmative	adverb	*not*
copied INFL	46	46	24
counter INFL	29	18	14
irrelevant	83	7	8

been discussing). So we shouldn't be surprised to observe that children use inflection in a preceding question as a cue; both forms are possible and they are using the preceding question to influence their response. What we do not expect is for this cue to be used in the negated (*not*) sentences.

But consider the cases of *counter*–inflection (Table 18). Remember that the children do produce a sizable percentage of counter–inflection. The environments in which such utterances occur provide insight. The tables indicate whether inflection (*-s*) appears or does not (Ø) appear in the 'stimulus' (i.e., experimenter's question) and whether inflection appears or does not appear in the children's response, for each type of child sentence, affirmative, adverb or *not*. For example, in the first, 'grand total' table, we see that when the child's sentence contains an adverb, there are 17 utterances in which the experimenter used an *-s* and the child did not use an *-s* and 16 utterances when the experimenter used an *-s* and the child used an *-s*. On the other hand, for sentences which contained an adverb, when the experimenter's question did not use an *-s*, the child's sentence failed to use an *-s* 30 times, and *did* use an *-s* only once.

Look at the second table, 'responses to questions'. For the affirmatives, a strong copying bias is evident when the experimenter used inflection. There are 15, or about 68%. For the adverb condition, there are 14, or about 48%. Now look at the *not* condition. Here there are only 4, or 25%. This reduction suggests that some grammatical knowledge is being tapped.

Unfortunately, there seems to be a bias against adding inflection where none was given (bottom row, each right hand cell). No comparison between sentence types can be made here.

Let us return to our predictions: Inflection ought to be optional for affirmatives and affirmatives with adverbs; 38–28% were so inflected. For the negated sentences, we predict no examples of inflection, and we have four (9%). Given that there is a copying bias, it is remarkable that only 9% of the *not* sentences showed inflection. Note that the random *-s-* hypothesis has no way of accounting for this split.

Table 18. Questions and Answers, Compared by Inflection

	grand total					
stimulus	affirmative		adverb		*not*	
	Ø	*-s*	Ø	*-s*	Ø	*-s*
-s	20	20	17	16	14	4
Ø	26	9	30	1	20	0

	responses to questions					
	affirmative		adverb		*not*	
	Ø	*-s*	Ø	*-s*	Ø	*-s*
-s	7	15	16	14	12	4
Ø	6	3	30	1	16	0

	irrelevant					
	affirmative		adverb		*not*	
	Ø	*-s*	Ø	*-s*	Ø	*-s*
-s	13	5	1	2	2	0
Ø	20	6	0	0	4	0

6. Conclusion

In this paper we have tested the hypothesis that young English children are in the optional-infinitive stage, and that this accounts for the optional lack of finite inflection on verbs, in particular for the lack of *-s* in third singular present tense. The evidence that we have adduced includes:

(a) Tense inflection is optionally missing from main verbs.
(b) Tense inflection is optionally missing from possessive *have*.
(c) Agreement is correct with main verbs; that is, *-s* is never used with first person singular subjects.
(d) Agreement is correct with possessive *have*; that is, *has* is never used with first person singular subjects.

(e) In medial-NEG sentences (i.e., with missing *do*), the verb does not show TENSE.

(f) TENSE is used far more often in affirmative sentences than in medial-NEG sentences.

(g) Present (*-s*) and past (*-ed)* morphemes refer almost exclusively to present or past events, respectively, but bare stems (the nonfinite forms of the optional-infinitive stage) refer to past, present or future events.

(h) Adverbs like *never* behave differently from *not* (in the elicitation experiment, where they were studied). Namely, they do not interfere with the use of TENSE on the verbs, as *not* does in medial-NEG sentences.

(i) At the age when children use medial-NEG sentences they also use sentences with *do*-support, in fact more than they use TENSE in general. Thus, medial-NEG sentences cannot be explained by lack of knowledge of *do*, or of *do*-support. Rather, medial-NEG sentences are the result of the optional-infinitive stage.

Any hypothesis concerning early inflectional development in English (or more generally) must deal with these phenomena. The evidence concerning the optional-infinitive stage in English that we have presented amply confirms Wexler's (1992, 1994) hypothesis that English shows the optional-infinitive stage. Moreover, we can now see the optional-infinitive stage as explaining and integrating a broad range of phenomena in early English morphological development.[28] At the beginning of this paper we talked about the possibility that inflectional development in general and English inflectional development in particular, were now subject to a more integrated and explanatory treatment. We believe that the data have provided support for such a position. We also believe that the success of research based on crosslinguistic analysis in explaining in a more integrated fashion data from a very well studied language shows that the promise of comparative language acquisition studies can be realized; there is much to learn about a particular language from analyses based on other languages. Of course, a major task that lies ahead is a better understanding of what is the underlying basis and cause of the optional-infinitive stage, why it exists in some languages and not others, and why it has the particular properties that it has. But that is a task for another day.

Appendix A. Cases of Tense-Determinable Medial Negation

Abe028
it not works Mom [#] *it not works*

Adam01
xxx TV not go

Adam03
oh no xxx do suitcase
no no xxx have one
oh no xxx happen

Adam04
no # fit
no it [?] *fit*

Adam13
dis not fit

Adam19
dat one not bump dat one # no
yeah # he not have hair
no dat blast off
dat no blast+off

Adam27
Mommy # de water not spill

Adam29
an(d) de man can see his # not # have a bump

Adam43
not come to play # but she plays

Apr02
Saifi no knock on the door

Eve01
man no [?] *taste it*
man no taste it?

Eve08
not Fraser read it
no # Fraser read it

Eve13
not go go in the bushes

Eve14
Fraser not see him

Naom71
no [#] *this go* [#] *this is broken*

Naom81
this one [#] *no blow bubbles*

Nath01
no ba [#] *no have de microphone*
no nathaniel has a microphone a microphone

Nina01
no fit

Nina07
no. no. no lamb have it
no. no lamb have a chair either
no. no Nina stand up there

Nina09
no hop Mommy kangaroo. you Linda kangaroo
no talk Mommy. no talk Mommy

Nina10
here. no dog stay in the room

Nina11
no Leila have a turn

Nina18
no fit [a box]

Peter08
no goes in there [#] *no*

Peter10
no [#] *no fit in that*

Peter11
Jenny [#] *no* [#] *no* [#] *no have that*

Peter13
no Jenny bug

Peter15
the horse not stand up
but the horse not stand upsən

Peter16
it not spill. put it in here. it not spill

Peter17
no the chair not go in here
no goes here

Sar030
no # op(en) a door

Sar040
he no bite ya

Sar046
tha(t) no(t) hurt

Sar091
has no hair

Shem01
now, no go here

Shem07
no go 'way the(re)

Shem13
not go in the water

Shem15
an' not work
wadio not work

Appendix B. Transcripts and Ages

file	age	file	age
Abe028	2;8	Apr02	2;1
Adam01	2;3	Eve01	1;6
Adam03	2;4	Eve05	1;8
Adam04	2;4	Eve08	1;9
Adam13	2;9	Eve13	2;0
Adam15	2;10	Eve14	2;0
Adam19	2;11	Naom71	2;9
Adam27	3;3	Naom81	3;2
Adam29	3;4	Nath01	2;5
Adam40	3;11	Nina01	1;11
Adam43	4;1	Nina07	2;0
Peter10	2;3	Nina09	2;1
Peter11	2;3	Nina10	2;1
Peter13	2;5	Nina11	2;1
Peter15	2;6	Nina18	2;3

Peter08	2;1	Sarah046	3;1
Peter09	2;2	Sarah091	4;1
Peter16	2;7	Shem01	2;2
Peter17	2;8	Shem07	2;4
Peter18	2;9	Shem13	2;5
Sarah030	2;9	Shem15	2;6
Sarah040	3;0		

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Notes

1. In fact, it appears as if the nonfinite forms occur in English even later than 2;7, perhaps even later than 3;0. See Rice, Wexler & Cleave (1995) for some quantitative data from both naturalistic production and elicitation tasks.
2. There is a possible variant to this way of stating the theory/generalization; namely, one could assume that TENSE exists in every root representation in the optinal-infinitive stage, but the values of +/– past are optionally missing, thus allowing infinitival verbs. If the TENSE projection is actually missing, it explains why the infinitival morphemes (English *to,*; French *à, de;* German *zu*, etc.), are not produced in the optional-infinitive stage along with the nonfinitc verbs. Since these morphemes are usually taken to reside in the head of (nonfinite) TENSE, a missing TENSE head will be incompatible with the existence of these morphemes. See Wexler (1995, in press) for discussion. See also Bromberg & Wexler (1995) and Rhee & Wexler (1995).
3. Most analyses, as in Chomsky (1992) assume the 'lexicalist' approach exemplified by (b), that is, that the whole word is drawn from the lexicon, but this is not necessary; it depends on assumptions about how morphology works. We will not refer to the issue any further, since the particular analyses will not depend on which assumption is correct.
4. The examples in (5) are from Pollock (1984).
5. We do not wish to suggest that Hypotheses I and II have necessarily been proposed, although Hypothesis III has (Aldridge 1989). We are simply trying to lay out the logic of what might account for the *he go/he goes* alternation.
6. Of course, it is possible that there is a stage with no functional categories *before* the optional-infinitive stage. Radford (1994) appears to accept the existence of Wexler's (1991, 1992, 1994) optional-infinitive stage, as a transitional stage, though without

referring to those papers. It is difficult, however, to tell whether such a no functional category stage actually exists. The data supporting the no-functional-category stage (e.g., Radford 1990) are given as examples of children's utterances, but no quantitative evidence is given, so we do not know, for example, whether the children studied produce only verbs without tense inflection, or whether they sometimes produce inflected verbs. In studies which *do* provide quantitative evidence, it has proven difficult to show that there really is an early stage with *no* tense-marking. Wexler (1991, 1992, 1994) suggested that this might be the case, but left the question open empirically.

7. We base our discussion of Aldridge (1989) on the presentation of it in Radford (1994).

8. Since we do not have Aldridge (1989) available to us, we do not know if she takes into account the fact that *cry/cries* occur with different subject agreement features. Radford (1994) proposes (and rejects) an analysis in which *cry* does not have agreement or TENSE, but only *finite* features, so that it can be used with any kind of subject, but it is not clear that this is Aldridge's position.

9. Evidence for this is provided in Section 4. For further evidence, see Rice, Wexler & Cleave (1995).

10. Of course, one could try a theory in which agreement was not represented in a functional category, as Iatridou (1990) and Chomsky (1995) suggest. But the 'no functional categories' theories seem to want agreement not known to the child. At any rate, we will offer evidence that children in English in the optional-infinitive stage know more than agreement; that is the point of this paper.

11. We are illustrating derivations with TNS higher then AGR, following an older tradition (e.g., Pollock 1989). The same points could be made with AGR higher than TNS; the exact syntactic analysis is not what is important here, but the general point, which will follow in all analyses.

12. The question of why *do* must be inserted in English negatives is actively under discussion in minimalist theory, and there are a number of proposals, which vary in a number of ways, including whether or not the verb raises at LF if it does not raise on the surface, the role of distributed morphology, and of adjacency, etc. We have given just one simple formulation, for concreteness. We do not wish to be committed to this view of negation in English nor to claim that any of the current versions hold this view. The point we will make about distributional correlations holds no matter which account of *do*-insertion is correct. Wexler (1995, see also Bromberg & Wexler 1995) argues that TNS is completely missing from Optional Infinitives. Sentences such as (11) thus do not require or allow a verb to have TNS features.

13. See Pollock (1989) for discussion on why main verbs fail to do this.

14. And that is why *do* is not inserted in infinitival clauses in adult English:
    (i) *I want her to not like me.*
    (ii) **I want her to do not like me.*

15. Actually, the 'no functional categories' hypothesis, if made precise, would probably predict that *do* must be omitted, contradicting the empirical results that follow, which show that *do* is only optionally omitted, as predicted by the optional-infinitive hypothesis. For the 'no functional categories' hypothesis to predict that *do* may be optionally omitted, it would presumably have to say that *does* and *e*, the empty verb, are 'morphological variants' of each other, an assumption that might be difficult to coherently make.

16. Or any of the other variants, which are even more problematic empirically, e.g., Hypothesis I or III. So far as we can determine, earlier nonlinguistic descriptions, (e.g., Brown 1973) do not make any predictions at all, since they have no way of talking about the correlation between distribution and morphology. For example, they can talk about third singular German *-t* increasing in third singular contexts, but they do not have a way of describing its complementary distribution with the infinitival form, and that, moreover, the verb winds up in a diffent position. The insufficient descriptive categories of Brown (1973) and the traditions based on it are hardly surprising since much of the relevant grammatical theory was not yet developed (e.g., verb movement, etc.).

17.

Brown corpora:	Adam, Eve, Sarah	Sachs corpus:	Naomi
L. Bloom corpus:	Peter	Clark corpus:	Shem
Suppes corpus:	Nina	Higginson corpus:	April
Kuczaj corpus:	Abe	Snow corpus:	Nathaniel

18. We decided to try to find as many bare negation examples as possible; that is why we included children up until 4;1. Obviously most of the cases came from younger children (see Appendix A for the entire list). Since our main point was to compare the optional-infinitive account of bare verbs to other accounts, examples from all these ages might be taken as relevant. At any rate, since our results were so strong and categorical (i.e., there were almost no inflected bare negative verbs), the same results will hold if we cut off the data at some younger age, say 3;0 or 3;6.

19. There were only a very few examples in which negation preceded the subject, and we will not discuss this issue further. Pierce (1989) suggested that examples with negation preceding the subject showed a very early stage in which the subject did not raise out of the VP. We will not discuss the issue any further; the important point for us is that the optional-infinitive hypothesis predicts that if *do* is omitted, the verb will not be tensed, whether the subject has raised out of VP or not.

20. Two examples were 'haves,' an overregularization, similar to those noted in the past tense.

21. Also, *you* subjects could often be used in commands, and we did not want our results to be favored by the child's knowledge of imperatives.

22. For example, Sano & Hyams (1994) suggest that lack of knowldge of *do*-support is responsible for medial-NEG sentences.

23. This result, that *do*-insertion is used more often in required (*not*) contexts than TENSE is used in required contexts, appears also to be emerging from ongoing unpublished research in normal and SLI children by one of the authors (Wexler) together with Mabel Rice.

24. This is exactly in the spirit of P. Bloom (1990), following L. Bloom (1970). In particular, P. Bloom argues that there is a 'processing bottleneck', in particular a length limitation on children's utterances, which forces elements of the grammar to be omitted in production. See Hyams & Wexler (1993) for arguments against this position.

25. Ages range from 2;0 to 2;10.

26. We predicted that the proportion of TNS following *never* and other adverbs would not be zero, but would rather be equal to the proportion of TNS following affirmative sentences. The numbers come out someplace in the middle, as we have pointed out. Thus, in the grand totals, the proportion of TNS following adverbs is 28%, which is distinctly more than the 9% following *not*, but less than the 38% in affirmative sentences. The important thing is that, in the grand totals, the adverbs behave more like affirmative sentences than like *not*. More studies will be needed to determine whether there *is* an effect of adverbs, as opposed to the pure affirmative sentences. For example, there might be some kind of *semantic* reason that a negative adverb like *never* seems to require TNS more often than when no adverb appears in the sentence. (Harald Clahsen, p.c.).

27. Children 3 and 4 only have three and one utterances with *not*, respectively. Thus, for them, the inference is a bit weaker, though of course they conform to the pattern.

28. We have not discussed in this paper other manifestations of the optional-infinitive stage in English, for example, Wexler's analysis of sentences with auxiliary (progressive) and copula *be* omitted as resulting from the optional-infinitive stage. He proposes that *be* is required essentially only to bind TENSE. Thus, when TENSE is omitted from the representation of a sentence, *be* is also omitted. Such further evidence only strenghens and broadens the case for the optional-infinitive stage in English.

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