Why Do Children Say *Did You Went?*: The Role of *Do*-Support[1]

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1. Introduction

One central area of language acquisition research involves functional categories such as tense and agreement. Some researchers have argued that functional categories are completely lacking in child grammar (Lebeaux 1988, Radford 1990). Others have argued that they are partially represented (Clahsen 1990, Ingham 1998). Still others have argued that they are fully represented (Poeppel and Wexler 1993). All of these researchers have characterized children's grammar primarily in terms of the omission of functional categories. The overproduction of functional categories has received relatively little attention. One such phenomenon, which has not yet been well accounted for, is tense-doubling errors. This study elucidates the contexts and reasons for the occurrence of doubling errors, a type of speech error observed in young English-speaking children. While tense and agreement are expressed only once in a grammatical sentence, in a doubling error, "tense and/or agreement is incorrectly expressed twice–once on the 'fronted' auxiliary and once on the main verb" (O'Grady 1997:166), as illustrated in (1) and (2) below (Children aged 1;10–2;6, in Hurford 1975):

(1) **What's that is?* (*Is* is expressed twice.)
(2) **What did you bought?* (Both *did* and *bought* carry past tense.)

Because doubling errors involve tense/agreement on both the auxiliary and the main verb, doubling errors can only be observed in environments that require both an auxiliary verb and a main verb. Therefore, *yes/no* questions, non-subject *wh*-questions, and negative sentences in current Standard English, which contain both an auxiliary verb and a main verb, are three possible environments in which to look for doubling errors.

A common characteristic shared by *yes*/*no* questions and non-subject *wh*-questions is Subject Auxiliary Inversion (SAI), which is employed in current Standard English as a way to distinguish between statements and questions.[2]

SAI involves movement: moving the auxiliary into a pre-subject position. Chomsky (1965, 1993) proposed that there are two operations in movement. The first involves copying the target element (the auxiliary verb in the case of inversion) into a surface structure position. The second operation then deletes it from the original deep structure position. This mechanism is shown in (3) (O'Grady 1997:164).[3]

(3) Inversion via copying and deletion:

Deep structure:		they	will	go
After copying:	will	they	will	go
After deletion:	will	they	∅	go

Because SAI involves the fronting of an auxiliary, the construction has to have an auxiliary and a main verb. Thus, constructions involving SAI are good candidates for doubling errors.

In fact, doubling errors in constructions involving SAI in young English-speaking children were examined by Stromswold (1990). She reported a frequency of doubling errors of 0.4 % in question structures involving an SAI.[4]

[1] This work was supported by Daiko Foundation research grant 5384.

[2] SAI was not a settled rule for creating interrogatives in Early Modern English (Radford 1997). Some varieties of English, such as Jamaican Creole (Radford 1997) and Hawai'i Creole English (Carr 1972; Kent Sakoda, personal communication), do not have SAI.

[3] Recent work in transformational grammar (e.g., Chomsky 1993, 1995) does indeed adopt this "copying and deletion" view of movement rules.

[4] The 0.4% which Stromswold (1990) provided is calculated from a conflation of all SAI environments without classifying types of the environments. By focusing on different types of SAI, we will get a clearer view of doubling errors. See § 3 for the three SAI environments.

2. Previous analyses of doubling errors

Previous studies have looked at two possible explanations for doubling errors: SAI and movement. Hurford (1975) attributed doubling errors to the child's version of the SAI rule. This rule says that tense is copied to the target position without deleting the original tense, as described in (4) (this is different from the adult version of the SAI rule (cf. 3)).

(4) SAI via copying without deletion:

Deep structure:		they	will	go
After copying:	will	they	will	go
——— no deletion ———				
Surface structure:	will	they	will	go

Hurford considered doubling errors not as errors but as patterns that are licensed by the child's grammar, and predicted doubling errors to occur in any sort of SAI environment, but not in other environments where SAI is not involved. I will refer to this as "the SAI hypothesis."

In contrast, Mayer et al. (1978) claimed that children incorrectly formulate some movement transformations as copying without deletion, as described in (5), and explained doubling errors as the result of this un-adult-like transformation. While considering doubling errors as licensed by the child's grammar, Mayer et al. predicted doubling errors to occur not only in environments involving SAI but also in those involving any sort of movement formulated as copying without deletion. I will refer to this as "the movement hypothesis."

(5) Movement via copying without deletion:

Deep structure:	they		not	are	going
After copying:	they	are	not	are	going
——— no deletion ———					
Surface structure:	they	are	not	are	going

While both of these hypotheses helped identify general environments where doubling errors occur, this paper will show that both the SAI hypothesis and the movement hypothesis are insufficient to accurately account for the distribution of doubling errors. As an alternate solution, I propose that the main factor underlying doubling errors is the need for *do*-insertion. I will refer to this as the "*do*-insertion hypothesis." Section 3 provides the details of the *do*-insertion hypothesis, the SAI hypothesis, and the movement hypothesis. Section 4 describes the methodology employed to evaluate the three hypotheses. Sections 5 and 6 present and discuss the results of this corpus study. Section 7 gives the conclusion.

3. The *do*-insertion hypothesis

3.1 Maratsos and Kuczaj 1978

Maratsos and Kuczaj 1978 is the first preliminary study to indicate that doubling errors occur more frequently in contexts that cannot be simply characterized by the involvement of SAI nor movement of a verbal element. Examining two English-speaking children's naturalistic data, Maratsos and Kuczaj reported that the frequency of occurrence of doubling errors is about 15% in questions that begin with *does* (*Does she eats it?)* and about 10% in questions that begin with *did* (*Did she went there?*). However, doubling errors are rarely found in questions beginning with *is* (@ *Is she is eating?*[5]), *are* (@ *Are you are eating?*), or with a modal (@ *Can you can finish?*). Maratsos and Kuczaj interpreted these facts as children using the incorrect verb form or applying past morpheme affixes redundantly for *did*-questions and *does*-questions, inserting a redundant auxiliary for repeated modal questions, and using a common grammatical sequence (eg. NP-*is*) for *is*-questions and *are*-questions.

Table 1 summarizes the results described by Maratsos and Kuczaj. While all of the five types of *yes*/*no* questions involve SAI and movement of a verbal element, doubling errors did not occur in all five types. (This fact motivated me to seek the characteristics of the environments of doubling errors.)

[5] @ means unattested or very rare.

Table 1. The doubling errors in various types of *yes/no* questions in two English-speaking children (D.C. and K.R., ages not specified in Maratsos and Kuczaj 1978).

Yes/no questions	D.C (%)	K.R (%)
***Does* NP V+3sg (*does* Q)**	**8/60 (13.3)**	**1/17 (5.9)**
***Did* NP Irr. past (*did* Q)**	**7/40 (17.5)**	**5/32 (15.6)**
Repeated *is* Q	0/56 (0)	1/38 (2.6)
Repeated *are* Q	0/15 (0)	0/19 (0)
Repeated Modal Q	0/0 (0)	0/0 (0)

3.2 Re-interpreting Maratsos and Kuczaj 1978

Note from Table 1 that doubling errors occur more frequently in *yes/no* questions that begin with an inflected form of *do*, but rarely in *yes/no* questions that begin with an inflected form of *be* or a modal; therefore, I reclassified these five categories of *yes/no* questions into three categories: *do-yes/no* questions (which begin with *do*), *be-yes/no* questions (which begin with *be*), and modal-*yes/no* questions (which begin with a modal). The reinterpreted results are shown in Table 2.

3.3 Three *yes*/*no* question types

Table 2 shows that doubling errors occur far more frequent-ly in *do-yes/no* questions than in other *yes/no* questions. Under the assumption of Chomsky 1991, the crucial defining characteristic of *do-yes/no* questions is that they involve *do*- insertion, unlike other *yes/no* questions (see Table 3). The detailed derivations of the three types of *yes*/*no* questions are described in the following subsections to clarify how each theory applies to the three types of *yes*/*no* questions.

Table 2. The interpretation of the doubling errors reported by Maratsos and Kuczaj (1978) in my classification of *yes/no* questions.

Yes/no questions	D.C (%)	K.R (%)
***Do-yes/no* question**	**15/100 (15.0)**	**6/49 (12.2)**
Be-yes/no question	0/71 (0)	1/57 (1.8)
Modal-*yes/no* question	0/0 (0)	0/0 (0)

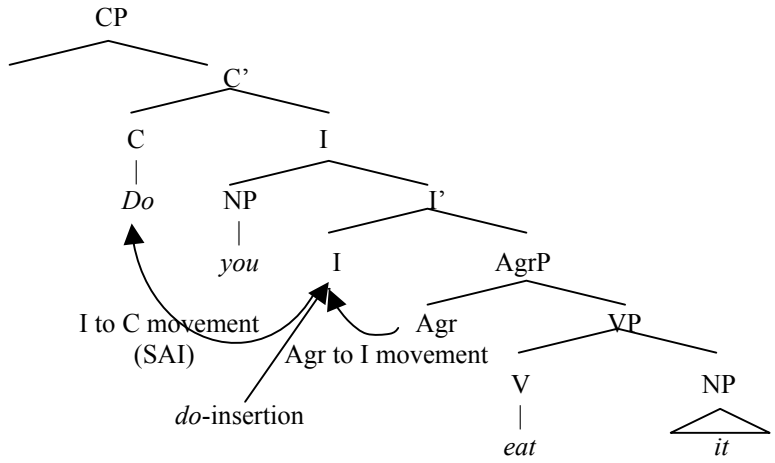
Table 3. The differences in the formation of *yes/no* questions.

Yes/no question types	Examples	Formation of *yes*/*no* questions
Do-yes/no question	*Do you eat it?*	Agr to I, ***do*-insertion into I**, I to C, shown in Figure 1.
Be-yes/no question	*Are you eating?*	V to Agr, Agr to I, I to C, shown in Figure 2.
Modal-*yes/no* question	*Will you eat it?*	Agr to I, I to C, shown in Figure 3.

3.3.1 *Do-yes*/*no* questions

To create *do-yes/no* questions, abstract Agr is moved to the I position, and according to Chomsky 1991, *do* is inserted in the I position. The inserted *do*, instead of the main verb *have*, is then moved to the C position (in the process of SAI). This process is shown in Figure 1.

Figure 1. The derivation of *do-yes/no* questions in the framework of Chomsky 1991.



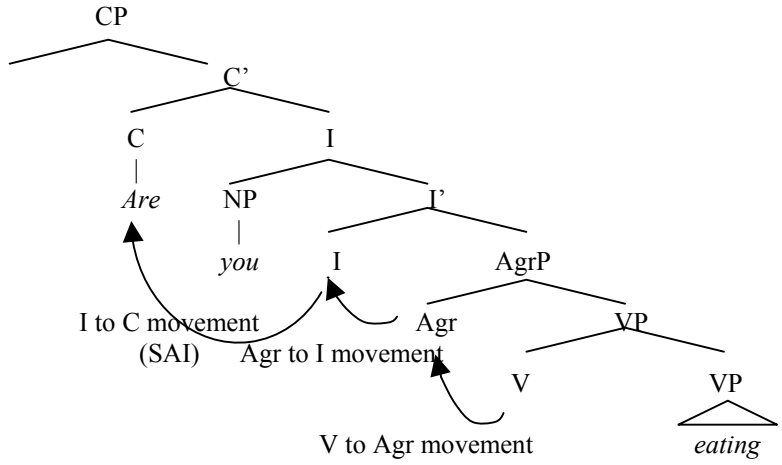
Thus *do-yes*/*no* questions involve *do*-insertion, SAI, and movement of the auxiliary verb. Therefore, all three hypotheses (the *do*-insertion hypothesis, the SAI hypothesis, and the movement hypothesis) predict doubling errors in *do-yes*/*no* questions.

3.3.2 *Be-yes*/*no* questions

On the other hand, the processes for creating *be-yes/no* questions and modal-*yes/no* questions do not involve any operation that inserts additional elements, because the *be*-verb and the modal can themselves to be inverted in current Standard English.

The *be*-verb and the modal are moved to the left of the subject. The process for creating *be-yes/no* questions is shown in Figure 2. The *be*-verb is moved from the V position to the C position (through the Agr position and the I position).

Figure 2. The derivation of *be-yes/no* questions in the framework of Chomsky 1991.

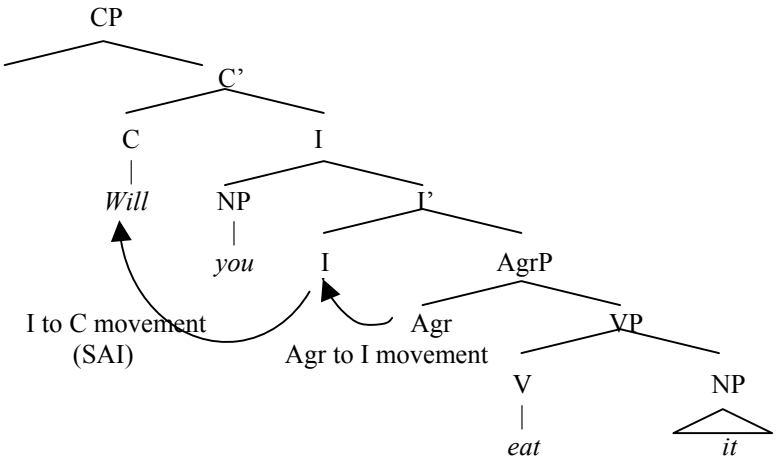


Be-yes/*no* questions involve SAI and movement of the auxiliary verb but no *do*-insertion. Therefore, the SAI hypothesis and the movement hypothesis predict doubling errors in *be-yes*/*no* questions, but the *do*-insertion hypothesis does not.

3.3.3 Modal-*yes*/*no* questions

The processes for creating modal-*yes/no* questions are shown in Figure 3. Abstract Agr is moved from the Agr position to the I position where, according to Chomsky 1991, the modal is base-generated. The Agr and modal are together moved to the C position in the process of SAI.

Figure 3. The derivation of modal-*yes/no* questions in the framework of Chomsky 1991.



Modal-*yes*/*no* questions involve SAI and movement of the auxiliary verb but no *do*-insertion. Therefore, the SAI hypothesis and the movement hypothesis predict doubling errors in modal-*yes*/*no* questions, but the *do*-insertion hypothesis does not.

In summary, there is a crucial difference among the three types of questions in their derivations: while *be-yes/no* questions and modal-*yes/no* questions do not involve any operation that inserts an element, *do-yes/no* questions involve the operation of *do*-insertion. Based on this defining characteristic and the results shown in Table 2, it is natural to assume that the occurrence of doubling errors is related to *do*-insertion.

3.3.4 Summary of predictions

The contrast among the predictions of the three hypotheses is summarized in Tables 4, 5, and 6, where shadowed boxes indicate cases in which high percentages of doubling errors are predicted by each hypothesis.

Table 4. The doubling error environment in *yes/no* questions predicted by the *do*-insertion hypothesis.

Yes/no question types	Examples	**the *do*-insertion hypothesis.**
Do	*Do you eat it?*	
Be	*Are you eating?*	
Modal	*Will you eat it?*	

Table 5. The doubling error environment in *yes/no* questions predicted by the SAI hypothesis.

Yes/no question types	Examples	**the SAI hypothesis**
Do	*Do you eat it?*	
Be	*Are you eating?*	
Modal	*Will you eat it?*	

Table 6. The doubling error environment in *yes/no* questions predicted by the movement hypothesis.

Yes/no question types	Examples	**the movement hypothesis**
Do	*Do you eat it?*	
Be	*Are you eating?*	
Modal	*Will you eat it?*	

Among the three hypotheses, only the prediction of the *do*-insertion hypothesis is consistent with Maratsos and Kuczaj's (1978) data shown in Table 2: doubling errors occur frequently only in *do-yes/no* questions. This indicates that the cause is not just SAI or movement in general (which are involved in creating all three types of questions). Rather, it is *do*-insertion that is peculiar to the process of creating *do-yes/no* questions among the three types of *yes/no* questions.

However, using aggregated data from Maratsos and Kuczaj 1978 without access to the original data is not very convincing. Furthermore, the authors did not provide the background information about the informants, such as ages or the dialect(s) of English involved. For the *do*-insertion hypothesis to be considered convincing, the results from Maratsos and Kuczaj 1978 need to be confirmed with a well-recognized large pool of data such as the CHILDES (Child Language Data Exchange System) data (MacWhinney 2000). Thus, one of the goals of this study is to examine a large pool of data, for which background information is available, to confirm this asymmetry found in Maratsos and Kuczaj's data. The second goal is to study a second environment (negative declaratives) not studied by Maratsos and Kuczaj, which will help us to differentiate among the three hypotheses. I turn to a description of negative declaratives in the following subsections.

3.4 Three negative declarative types

The examination of doubling errors in *yes*/*no* questions as discussed above will not allow us to isolate the effect of *do*-insertion from SAI and movement. *Do-yes/no* questions involve not only *do*-insertion but also SAI and movement. However, the examination of doubling errors in negative declaratives will allow us to isolate the effect of *do*-insertion from SAI, since *do*-negative declaratives involve only *do*-insertion and neither SAI nor movement.

Therefore, examining doubling errors in negative declaratives will allow us to factor out the effect of SAI and movement. Examining negative declaratives will also allow us to differentiate between the SAI hypothesis and the movement hypothesis. While the two hypotheses make the same prediction in *yes*/*no* questions, they predict differently for negative declaratives.

For this study, negative declaratives are classified into three types: *do*-negative declaratives (which have *do* to the left of the negative), *be*-negative declaratives (which have *be* to the left of the negative), and modal-negative declaratives (which have a modal to the left of the negative). Table 7 shows the derivation of the three types of negative declaratives. None of the three types of negative declaratives involve SAI, but all involve movement of an auxiliary to the I position. Only *do*-negative declaratives involve *do*-insertion.[6]

Table 7. The difference in the formation of negative declaratives.

Negative declarative types	Examples	Formation of negative declaratives
Do-negative declarative	*You do not eat it.*	Agr to I, ***do*-insertion into I** shown in Figure 4.
Be-negative declarative	*You are not eating.*	V to Agr, Agr to I shown in Figure 5.
Modal-negative declarative	*You will not eat it.*	Agr to I shown in Figure 6.

The detailed derivations of the three types of negative declaratives are described in the following subsections to clarify how each theory applies to the three types of negative declaratives.

3.4.1 *Do*-negative declaratives

To create *do*-negative declaratives, Agr is moved to the I position, and *do* is inserted into the I position. This process is shown in Figure 4.

[6] *Be*-negative declaratives involve V movement, whereas the other two involve Agr movement. This difference is not important to the purpose of this paper, and the results in §5 will show that there is no effect of verb type. Thus, although *be* and modal verbs belong to different verb types, they do not behave differently with respect to the occurrence of doubling errors.

Do-negative declaratives involve *do*-insertion but neither SAI nor movement of an auxiliary verb. Therefore, only the *do*-insertion hypothesis predicts doubling errors in this context.

3.4.2 *Be*-negative declaratives

In contrast, the formation of *be*-negative declaratives and modal negative declaratives does not involve any insertion operation. To create *be*- negative declaratives, the *be*-verb is moved from the V position to the I position via the Agr position. This is shown in Figure 5.

Be-negative declaratives involve movement of *be* but neither *do*-insertion nor SAI. Therefore, only the movement hypothesis predicts doubling errors in this construction.

3.4.3 Modal-negative declaratives

To create modal-negative declaratives, abstract Agr is moved from the Agr position to the I position. However, the modal is base-generated in the I position. This is shown in Figure 6.

Modal-negative declaratives involve neither *do*-insertion, SAI, nor movement of an overt verbal element. Therefore, none of the three hypotheses predicts doubling errors in this construction.

Figure 4. The derivation of *do*-negative declaratives in the framework of Chomsky 1991.

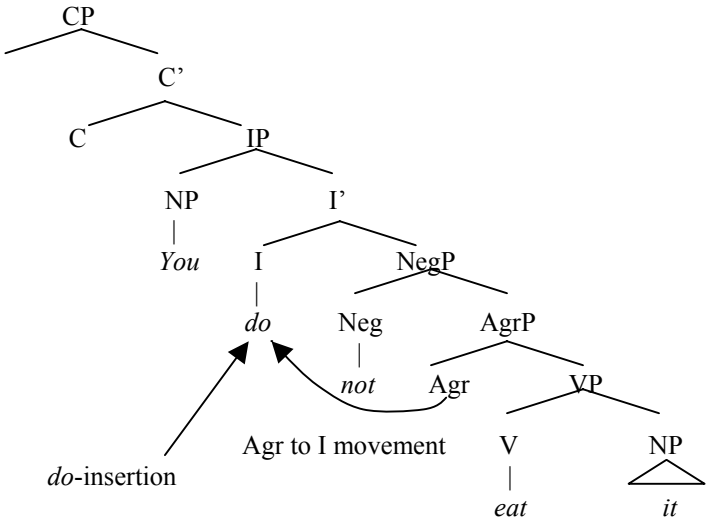


Figure 5. The derivation of *be*-negative declaratives in the framework of Chomsky 1991.

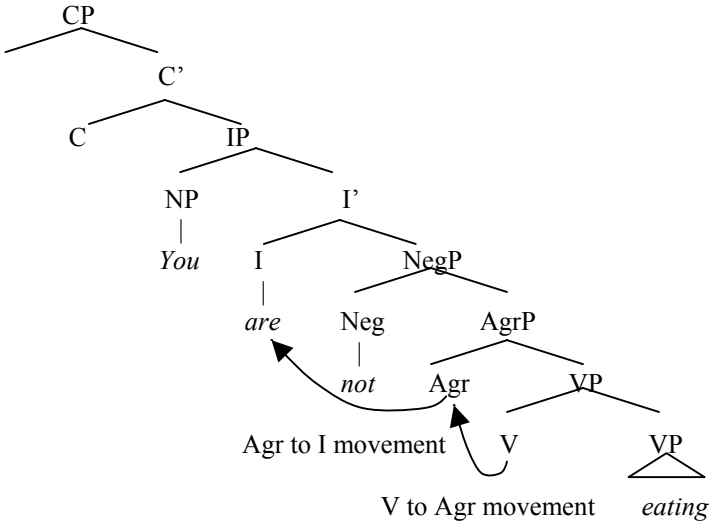
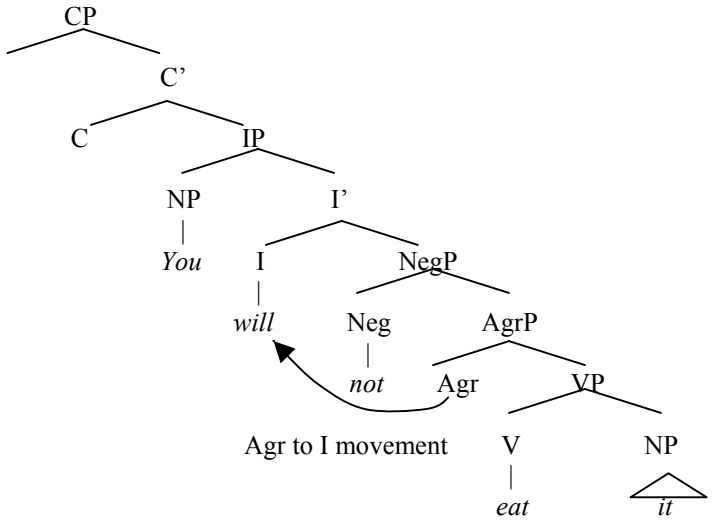


Figure 6. The derivation of modal-negative declaratives in the framework of Chomsky 1991.



3.4.4 Predictions

As shown above, none of the three types of negative declaratives involve SAI. Among the three types of negative declaratives, only *be*-negative declaratives involve movement of a verbal element (*be* is moved from the V position to the I position), and only *do*-negative declaratives involve the insertion of an element (*do*-insertion). This allows for clear distinctions in the predictions for each hypothesis: the *do*-insertion hypothesis predicts doubling errors only in *do*-negative declaratives, the SAI hypothesis predicts doubling errors in none of the three types of negative declaratives, and the movement hypothesis predicts doubling errors only in *be*-negative declaratives. The contrast among the predictions of the three hypotheses with respect to negative declaratives is shown in Tables 8, 9, and 10, where shadowed boxes indicate cases in which doubling errors are predicted by each hypothesis.

Table 8. The doubling error environment in negative declaratives predicted by the *do*-insertion hypothesis.

Negative declarative types	Examples	**the *do*-insertion hypothesis**
Do	*You do not eat it.*	
Be	*You are not eating.*	
Modal	*You will not eat it.*	

Table 9. The doubling error environment in negative declaratives predicted by the SAI hypothesis.

Negative declarative types	Examples	**the SAI hypothesis**
Do	*You do not eat it.*	
Be	*You are not eating.*	
Modal	*You will not eat it.*	

Table 10. The doubling error environment in negative declaratives predicted by the movement hypothesis.

Negative declarative types	Examples	**the movement hypothesis**
Do	*You do not eat it.*	
Be	*You are not eating.*	
Modal	*You will not eat it.*	

3.5 Summary of predictions

In sum, SAI is involved in all *yes/no* questions, but not in any negative declaratives. Movement of the verbal element is involved in all *yes/no* questions and *be*-negative declaratives. The involvement of *do*-insertion is restricted to *do-yes/no* questions and *do*-negative declaratives. That is, the SAI hypothesis predicts doubling errors in all *yes/no* questions, but not in any negative declaratives. The movement hypothesis predicts doubling errors in

all *yes/no* questions and *be*-negative declaratives. The *do*-insertion hypothesis predicts doubling errors only in *do-yes/no* questions and *do*-negative declaratives. These predictions are summarized in Tables 11, 12, and 13. Shadowed boxes indicate cases in which high percentages of doubling errors are predicted by each hypothesis.

Table 11. The doubling error environment predicted by the *do*-insertion hypothesis.

	Yes/no questions	Negative declaratives
Do	*Do you eat it?*	*You do not eat it.*
Be	*Are you eating?*	*You are not eating.*
Modal	*Will you eat it?*	*You will not eat it.*

Table 12. The doubling error environment predicted by the SAI hypothesis.

	Yes/no questions	Negative declaratives
Do	*Do you eat it?*	*You do not eat it.*
Be	*Are you eating?*	*You are not eating.*
Modal	*Will you eat it?*	*You will not eat it.*

Table 13. The doubling error environment predicted by the movement hypothesis.

	Yes/no questions	Negative declaratives
Do	*Do you eat it?*	*You do not eat it.*
Be	*Are you eating?*	*You are not eating.*
Modal	*Will you eat it?*	*You will not eat it.*

Maratsos and Kuczaj (1978) already reported that doubling errors were observed in *do*-negative declaratives but not in *be*-negative declaratives or modal negative declaratives, although no examples or quantitative results were provided.

No study on doubling errors has been conducted related to the *do*-insertion hypothesis, including corpus studies or experimental studies. One of the reasons for this might be that researchers have looked at SAI environments without classifying the question type in calculating the frequency of doubling errors. For example, Stromswold (1990) reported that young English-speaking children made doubling errors with a frequency of 0.4 % in the entire SAI environment. However, if the types of *yes/no* questions are classified and *do*-insertion contexts are distinguished from non-*do*-insertion contexts, the asymmetry that I showed above might have been found. Thus, the corpus study reported in this paper will fill this gap.

4. Methodology

The present study consists of corpus analyses of the distribution of doubling errors in *yes/no* questions and in negative declaratives. The analysis of distribution of doubling errors in *yes/no* questions aims to demonstrate the frequent occurrence of doubling errors in an environment involving movement of the verbal element, SAI, and *do*-insertion over an environment involving movement of the verbal element and SAI, but not *do*-insertion. On the other hand, the analysis of the distribution of doubling errors in negative declaratives serves to demonstrate the frequent occurrence of doubling errors in an environment involving movement of the verbal element and *do*-insertion over an environment involving movement of the verbal element but not *do*-insertion. Note that SAI is factored out in the second analysis.

The contrast among the predictions of the three hypotheses has already been shown in Tables 11, 12, and 13. The subjects were selected from CHILDES as representative of current Standard English-speaking children. The sample includes one male and two females, from ages 1;6 to 5;1: Adam (2;3–4;10), Eve (1;6–2;3), and Sarah (2;3–5;1) from Brown 1973. MLU is 1.829–4.973 for Adam, 1.524–3.437 for Eve, and 1.505–4.857 for Sarah. The MOR and COMBO programs were used for introducing codes into the transcripts and for selecting potential cases of doubling errors. Using CLAN (Child Language Analysis, MacWhinney 2000), all utterances in "V…?" and "…V… neg… " were selected and examined by hand. In this corpus study, doubling of the same tense and number was counted as a doubling error only when the doubling was exact, i.e., mismatched tense was not considered. This was done because none of the three hypotheses predicts mismatched tense errors. (Additionally, this type of error was generally rarely observed.) I restricted myself to 3rd person singular for present tense for non-*be*-contexts, since only Uninflected *do* and uninflected main verbs are excluded from the counting of doubling errors, since it is impossible

to distinguish whether these are finite or non-finite based on their forms in English. This form allows us to see tense and number-person agreement for non-*be*-contexts in English. However, I did not restrict the analysis to any person and number for past tense, since past tense can appear with any person and number. For *be*-contexts, I did not restrict the analysis to any person, number, and tense, since English *be* has enough rich inflectional morphology to show person, number, and tense information. Both regular and irregular verbs were included in the examination. Echo *yes*/*no* questions were excluded from the examination. Ambiguous utterances and unintelligible speech were also excluded.

5. Results

Table 14 shows that doubling errors occur in about 15% of *yes/no* questions that begin with *do* for all three children I investigated. However, they rarely occur in other types of *yes/no* questions, while all the three types of *yes*/*no* questions were produced by all the three children. The occurrence rate of doubling errors in Eve's *do-yes*/*no* questions is higher than other the two children (33.3% in contrast to 14.6% in Adam and 18.2% in Sarah). However, Eve's data are not very significant, since the total number of utterances is significantly smaller than that of the other two children. I also found that one of the three children (Sarah) made doubling errors at a frequency of 10.9% in *do*-negative declaratives, but not at all in other types of negative declaratives,[7] as shown in Table 15. The other two children did not produce doubling errors in any types of negative declaratives.

Table 14. Result from *yes/no* questions.

Yes/no questions	Adam	Eve	Sarah
Do	38/266 (14.6%)	1/3 (33.3%)	20/110 (18.2%)
Be	1/382 (0.0 %)	0/23 (0.0 %)	6/225 (2.7 %)
Modal	0/391 (0.0 %)	0/8 (0.0 %)	0/203 (0.0 %)

Table 15. Result from Sarah's negative declaratives.

Negative declaratives	Sarah
Do	19/174 (10.9 %)
Be	0/10 (0.0 %)
Modal	0/321 (0.0 %)

In sum, the asymmetry between *do*-contexts and non-*do*-contexts was confirmed in *yes*/*no* questions for all three children investigated in this study and in negative declaratives for one of the three children.[8]

6. General Discussion

6.1 Cross-linguistic markedness of *do*-insertion

Through the examination of *yes/no* questions, doubling errors were observed in about 15% of *yes/no* questions that begin with *do*, while they were rarely observed in other types of *yes/no* questions. The results support the *do*-insertion hypothesis over the SAI hypothesis and the movement hypothesis. Through the examination of negative declaratives, it was found that one of the three children (Sarah) made doubling errors at a frequency of 10.9% in *do*-negative declaratives, but not at all in other types of negative declaratives. This is strong evidence for the *do*-support hypothesis over the SAI hypothesis, since *do*-negative declaratives involve *do*-support but not SAI. This also undermines the movement hypothesis because there is no movement of a verbal element involved in *do*-negative declaratives.

This fine-grained analysis of a well-known phenomenon reveals that doubling errors occur almost exclusively in *do*-contexts. I argue that this general asymmetry between the frequency of doubling errors in *do*-contexts and non-*do*-contexts is due to the demands of *do*-support itself, not to an incorrectly internalized SAI rule or to an incorrectly

[7] Through the counting of doubling errors in *be*-contexts, it was observed that doubling errors are rare for both auxiliary *be* and main verb *be*.

[8] A complication here, noted by William O'Grady, is that doubling in *do* patterns involves repetition of just a morphological feature (e.g., past tense agreement), whereas doubling in other patterns involves repetition of an entire word. This introduces another factor into the comparison that will ultimately have to be taken into account.

formulated movement rule. This could be because *do*-support is a cross-linguistically marked process and a costly language-specific process.

Do-insertion is peculiar to current Standard English,[9] the only known SAI language among all the world's languages. Tsunoda (1991) reported that out of 130 languages investigated, only 12 languages (German, French, Swedish, Norwegian, Danish, Dutch, Spanish, Czech, Hungarian, Serbo-Croatian, Italian, and current Standard English) are Inversion languages. Inversion languages move the verbal element occurring to the right of the subject in a declarative sentence to the left of the subject to create an interrogative sentence. Inversion is geographically particular to Europe and genetically specific to the Germanic, Romance, and Slavic branches of the Indo-European language Family and the Ugric branch of the Uralic language family. Among the 12 Inversion languages, only current Standard English requires that the inverted element be an auxiliary. The other 11 languages can create interrogatives by inverting the main verb. Tsunoda's observation is summarized in Table 16.

TABLE 16. Summary of Tsunoda's observations (1991).

Languages	Inversion in creating interrogative	SAI in creating interrogative	*do*-insertion
Current Standard English	Yes	Yes	Yes
German, French, Swedish, Norwegian, Danish, Dutch, Spanish, Czech, Hungarian, Serbo-Croatian, Italian	Yes	No	No
Other 118 languages	No	No	No

That is, as a strategy for creating interrogatives, the process of inversion is cross-linguistically marked, and the constraint that the inverted element has to be an auxiliary is highly marked.

6.2 Cost of *do*-insertion

There is clearly a correlation between *do*-insertion and the constraint that the element to be inverted must be an auxiliary. Chomsky (1991) argues that this highly marked constraint triggers *do*-insertion. When there is no auxiliary to the right of the subject, *do* is inserted into this position as a "last resort" to accomplish inversion for interrogative formation. Consequently, the operation of inserting *do,* a by-product of this very marked constraint that the inverted element has to be an auxiliary, is also highly marked.

Assuming that a marked operation bears a greater cost,[10] *do*-insertion might be a type of operation that is costly enough to cause processing errors. The cross-linguistic evidence provided in §6.1 supports the notion that *do* is a marked language-specific operation. In the framework of the Minimalist Program, *do*-insertion is considered to be not a part of UG but a language-specific rule (Chomsky 1991). Chomsky also proposes that UG principles are "less costly" than language-specific principles. Thus, *do*-insertion is a language-specific process that bears a greater cost. I claim that the cost of *do*-insertion is the main factor underlying doubling errors,[11] while the operation involved in question formation (e.g. SAI) is a secondary factor.

7. Concluding remarks

This study evaluated the SAI hypothesis, the movement hypo-thesis, and the *do*-insertion hypothesis of the L1 acquisition phenomenon of doubling errors. The examination of *yes*/*no* questions and negative declaratives confirmed the predictions of the *do*-insertion hypothesis, but not those of the SAI hypothesis or the movement hypothesis.

[9] Bonnie Schwartz pointed out that Bernese German has optional *do*-insertion (personal communication). The investigation of acquisition of optional *do*-support would be a useful topic for further study.

[10] Here, "cost" is in terms of principles of economy, following Chomsky 1993.

[11] *Do* is semantically null and not interpretable at LF. Thus, the high cost related to *do*-insertion may come from the semantic nullness of *do*, not the insertion operation per se. However, in English, inserted elements are always semantically null, such as the expletives *it* and *there*. It is impossible to distinguish a "semantically null" hypothesis from an "insertion hypothesis."

An explanation for the non-occurrence of doubling errors in *do*-negative declaratives in Adam's speech could shed further light on this phenomenon, but this is beyond the scope of this paper.[12] The investigation of doubling errors in other *do*-contexts (*wh*-questions and emphatic *do*) is ongoing. Difficulty in acquiring *do* is also expected in second language acquisition. This is a fruitful topic for future research. Difficulty in acquiring expletives is also expected, since an expletive is considered to be an inserted element and to be semantically null, the same as *do* is in the late insertion model.

References

Brown, Roger. 1973. *A first language: The early stages*. Cambridge: Harvard University Press.

Carr, Elizabeth B. 1972. *Da kine talk: From pidgin to Standard English in Hawaii.* Honolulu: The University of Hawai'i Press.

Chomsky, Noam. 1965. *Aspects of the theory of syntax*. Cambridge: MIT Press.

——. 1991. Some notes on economy of derivation and representation. *Principles and parameters in comparative grammar*, ed. by Robert Freidin, 417–54. Cambridge: MIT Press. [Reprinted in Chomsky 1995:129–166]

——. 1993. A Minimalist Program for linguistic theory. *The view from building 20: Essays in linguistics in honor of Sylvain Bromberger,* ed. by Kenneth Hale and Samuel J. Keyser, 1–52. Cambridge: MIT Press. [Reprinted in Chomsky 1995:167–217.]

——. 1995. *The Minimalist Program*. Cambridge: MIT Press.

Clahsen, Harald. 1990. Constraints on parameter setting: A grammatical analysis of some acquisition stages in German child language. *Language Acquisition* 1:361–91.

HOLM, JOHN A. 1988. *Pidgins and creoles*. Cambridge: Cambridge University Press.

Hurford, James. 1975. A child and the English question formation rule. *Journal of Child Language* 2:299–301.

Ingham, Richard. 1998. Tense without agreement in early clause structure. *Language Acquisition* 7:51–81.

Lebeaux, David. 1988. Language acquisition and the form of the grammar. University of Massachusetts Ph.D. dissertation.

MacWhinney, Brian. 2000. *The CHILDES project: Tools for analyzing talk. 3rd ed.* Vol. 2: The Database. Mahwah, NJ: Lawrence Erlbaum Associates.

Maratsos, Micahel, and Stan Kuczaj II. 1978. Against the transformationalist account: A simpler analysis of auxiliary overmarkings. *Journal of Child Language* 5:337–45.

Mayer, Judith, Anne Erreich, and Virginia Valian. 1978. Transformations, basic operations, and language acquisition. *Cognition* 6:1–13.

O'Grady, William. 1997. *Syntactic development*. Chicago: The University of Chicago Press.

Poeppel, David, and Kenneth Wexler. 1993. The full competence hypothesis of clause structure in early German. *Language* 69:1–33.

Radford, Andrew. 1990. The syntax of nominal arguments in early child language. *Language Acquisition* 1: 195–223.

Radford, Andrew. 1997. *Syntactic theory and the structure of English: A Minimalist approach.* Cambridge: Cambridge University Press.

Stromswold, Karin. 1990. Learnability and the acquisition of auxiliaries. MIT Ph.D. dissertation.

Tsunoda, Tasaku. 1991. *Sekai no gengo to Nihongo: Gengo ruikeironkara mita Nihongo*. Tokyo: Kuroshio Shuppan.

[12] The non-occurrence of doubling errors in *do*-negative declaratives of Eve is not significant, since the total token of her *do*-negative declaratives is very small. This might be because Eve is very young.