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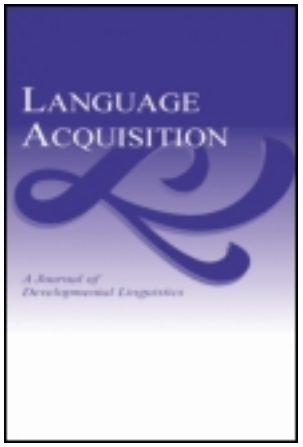

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Variable Input: What Sarah Reveals About Nonagreeing Don't and Theories of Root Infinitives

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Variable Input: What Sarah Reveals About Nonagreeing *Don't* and Theories of Root Infinitives

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Two recent proposals link the use of nonagreeing *don't* to the Root Infinitive (RI) Stage. Guasti & Rizzi (2002) argue for a misset parameter involving how agreement is spelled out. Schütze (2010) proposes that Infl is underspecified in child language and that *do* surfaces to support the contracted clitic/affix *n't*. Both proposals obtain partial support from the Sarah corpus (Brown 1973), yet neither proposal drew on Sarah's parents' use of nonstandard, nonagreeing *don't* as a possible explanation for Sarah's production. In this article I argue that much of the nonagreeing *don't* produced by Sarah is not part of the RI Stage. Once Sarah's data are removed from the analysis, the remaining data support Schütze's proposal.

1. INTRODUCTION

The Root Infinitive (RI) Stage in child language has received an incredible amount of attention over the years, and research on this topic has spanned a variety of languages (Hoekstra & Hyams 1998; Wexler 1994, 1998, 2000, 2011; Wijnen, Kempen & Gillis 2001). Traditionally, the RI Stage has referred to the use of uninflected lexical verbs in early child production, as illustrated in (1) (Schütze & Wexler 1996; Wexler 1998, 2000).

(1) He want to see through the window. (Nina28; 2;05)

However, more recently, an extension has been made to include English-speaking children's use of nonagreeing *don't*, as in (2b), which has been reported to alternate freely with agreeing *doesn't,* as in (2a).

(2) a. It doesn't work. (Nina25; 2;05)
b. He don't have clothes on. (Nina28; 2;05)

In a recent article, Schütze (2010) evaluates two proposals, both of which link the use of nonagreeing *don't* in child language to the RI Stage. The two proposals are the Spell-out Account (Guasti & Rizzi 2002) and his own Underspecification Hypothesis (Schütze 2010). Schütze presents data from the CHILDES corpora (MacWhinney 2000) showing empirical support for

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both proposals. In an effort to settle on one of the two proposals, he argues in favor of the Underspecification Hypothesis, suggesting that it is more parsimonious, "with fewer separate stipulations and non-adult mechanisms" (267).

Both proposals found empirical support from the Sarah corpus (Brown 1973), among other corpora. Sarah produced roughly one-third of all of the nonagreeing *don't* tokens that were found in the children they examined. One interesting fact about the Sarah corpus is that Sarah's parents produced nonagreeing *don't* variably in their own speech. While this was observed by Schütze (2010), it was not pursued as a possible explanation of Sarah's use of nonagreeing *don't*.[1] Can we assume that all of the tokens of nonagreeing *don't* produced by Sarah are part of the RI Stage? Or, do they represent acquisition of the sociolinguistic variation present in her input?

For the most part, acquisition research has not focused on the acquisition of sociolinguistic variation (but see Roberts 1997; Smith, Durham & Fortune 2007, 2009), and the study of whether variable input affects the acquisition of the target grammar is almost nonexistent (but see Miller 2012; Miller & Schmitt 2012). Sociolinguistic variation is the use of alternative forms in the same linguistic environment to express the same meaning. The use of the forms (in this case *don't* and *doesn't* with 3SG subjects) varies both across individuals and within individual speakers depending on extralinguistic factors, such as SES, speech style, and gender. The alternation of *don't* and *doesn't* with 3SG subjects in the adult speech means that the input to children contains variable omissions of the 3SG marker –s on the auxiliary *do*.

The child exposed to variable input must learn the internal and external factors constraining the omission of 3SG –s on *do*. This means that early in development the learner may not have knowledge of these factors when deciding whether *do* agrees with the subject or not. In other words, until the child has learned the variable rules constraining omission of agreeement, the input for agreement marking on *do* may appear inconsistent. As such, when grammatical morphology is produced variably, it could affect acquisition, as has been shown in past work (Miller 2012; Miller & Schmitt 2012). While previous work has examined input properties on the acquisition of root infinitives (Freudenthal, Pine & Gobet 2004; Legate & Yang 2007; Theakston, Lieven & Tomasello 2003; Wijnen, Kempen & Gillis 2001), the effect of variable input on the acquisition of root infinitives and nonagreeing *don't* has not been examined.

The goal of the present article is to call attention to the study of variable input on the acquisition of language by showing that it can provide insight on current debates in the field (like, for example, the representation of root infinitives in child grammar) and also inform our understanding of language acquisition processes more generally. This article sets out to address two questions:

(i) Is Sarah's use of nonagreeing *don't* part of the RI Stage, and what does that mean for theories of root infinitives and nonagreeing *don't*?
(ii) Does variable usage of nonagreeing *don't* in the input affect acquisition of agreement marking on auxiliary *do*?

[1] Schütze notes that Sarah's parents used nonagreeing *don't* in their own speech and asked how this might bear on the interpretation of the results. He concludes in a later footnote that Sarah's unique input did not appear to have made her an outlier among the group of children in terms of her production of nonagreeing *don't,* and he suggests that nonagreeing *don't* may have a different analysis in her grammar from what it has in her mother's grammar. These conclusions lead him to include the Sarah corpus in his analysis. Also, as noted by Schütze, Guasti & Rizzi (2002) make no mention of the use of nonagreeing *don't* in the input to Sarah.

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The article is set up as follows: In Section 2 I will provide a brief overview of the corpus data used in Guasti & Rizzi (G&R; 2002) and Schütze (2010) and make a case for only comparing Sarah's production data to Nina's production data of nonagreeing *don't*. In Section 3 I will walk through the predictions made by the two proposals and argue that the Underspecification Account receives more empirical support if the variability in Sarah's input is taken into consideration. In addition, I will introduce a third account based on Radford (1992) to explain some of Sarah's usage of the auxiliary *do*. Finally, Section 4 will provide a discussion of the results and a conclusion.

2. THE CORPORA: DIFFERENCES IN THE INPUT

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Nonagreeing *don't* is found in the speech of many American English speakers, and generally it is more prevalent in working-class speakers than in middle-class speakers (Blanton 1974; Cheshire 1982; Dillard 1985; Feagin 1979; Gramley & Patzold 1992; Oetting & McDonald 2001; Wolfram & Schilling-Estes 1998; Wolfram & Christian 1976). Guasti and Rizzi (2002) and Schütze (2010) investigated the production of nonagreeing *don't* in the following English-speaking children from the CHILDES database (MacWhinney 2000): Adam, Sarah, Eve (Brown 1973), Nina (Suppes 1974), Peter (Bloom 1970), Shem (Clark 1982), and Ross (MacWhinney 2000). All of the children, except Sarah, were reported to have come from middle-class homes, and an examination of the adult speech in the transcriptions indicates that their parents did not use nonagreeing *don't* in any of the recordings. Socioeconomic status was reported in the CHILDES Manual (MacWhinney 2000) for all children except Nina. Nina's socioeconomic status was confirmed through e-mail communication with Patrick Suppes, who also noted that Nina was of Caucasian birth and that her mother served as a graduate research assistant for him with the sole purpose of recording her conversations with Nina. Sarah, on the other hand, came from a working-class home, and both of her parents produced nonagreeing *don't* variably in the recordings.

Even though nonagreeing *don't* was not found in parent speech (except for Sarah), many of the children produced nonagreeing *don't* in their own speech. The only children who never produced nonagreeing *don't* are Eve and Shem. They were removed from the previous analyses in Schütze, and Guasti & Rizzi, and I will also not consider them any further in the present article. Table 1 reports the overall usage of nonagreeing *don't* in child speech.

TABLE 1
Don't and *Doesn't* with 3SG Subjects for the Five Children Investigated in Previous Studies

Child (files)	don't+*3SG*	doesn't+*3SG*
Adam (11–33)	60% (12/20)	40% (8/20)
Nina (12–51)	50% (65/130)	50% (65/130)
Sarah (50–137)	42% (40/95)	58% (55/95)
Peter (15–18)	26% (7/27)	74% (20/27)
Ross (24–50)	22% (20/92)	78% (72/92)
Totals	40% (144/364)	60% (220/364)

Source: Adapted from Guasti & Rizzi (2002).

While all five of the children produced nonagreeing *don't*, some children did so more often than others. Moreover, while some children, like Adam, produced a high percentage of nonagreeing *don't*, this must be interpreted with caution, given the few overall tokens for him. In fact, I will not include Adam, Peter, or Ross[2] in the analysis mainly because they produce relatively few tokens of nonagreeing *don't* overall when compared to Sarah and Nina but also because their input for nonagreeing *don't* is not as clear. Ross produces other nonstandard forms in his own speech (one token of *ain't* at 4;01 years of age, and his younger brother Marky also produces this form), and personal correspondence with both Ross and Brian MacWhinney indicates that Ross was exposed to nonstandard varieties of English through his best friend's family and through his classmates at school at about 3;05 years of age and thereafter. Adam is African American, and so it is not completely clear whether he was exposed to African American English (AAE) forms through friends or family. The CHILDES manual reports that he was only exposed to standard forms of English; however, Schütze (2004) notes that Adam shows a high rate of finite *be* omission, which he suggests may be linked to exposure to forms of AAE. This, in addition to the small amount of tokens for him, makes comparing him to Nina and Sarah more problematic.

The two children who produced the highest number of nonagreeing *don't* were Nina (65 tokens) and Sarah (40 tokens). Their data account for 73% (105/144) of all of the empirical data used to support the Underspecification Hypothesis and the Spell-out Account. While Sarah and Nina showed similar proportions of nonagreeing *don't* in their speech, the input to these two children was very different. Sarah's mother showed variable production of nonagreeing *don't*, producing it 30% (42/142) of the time with 3SG subjects. Sarah's father also showed variable use of nonagreeing *don't*, producing it 54% (7/13) of the time with 3SG subjects. Sarah's father has fewer overall tokens because he was not present in all of the recordings.[3] On the other hand, Nina's mother always used agreeing *doesn't* with 3SG subjects. There is little data for Nina's father, so he will not be included in this analysis (although he produces no tokens of nonagreeing *don't*). The proportion of nonagreeing *don't* in Sarah's and Nina's parents is shown in Table 2.

3. TWO PROPOSALS FOR NONAGREEING *DON'T*

In this section I will outline the two proposals for nonagreeing *don't* that were discussed in Schütze (2010). These are the Underspecification Hypothesis (Schütze 2010) and the Spell-out Account (Guasti & Rizzi 2002). In addition, I will present an earlier account by Radford

[2]Guasti & Rizzi (2002) report that Ross's last occurrence of nonagreeing *don't* occurred at 6;03 in file 50. I believe this is a misprint. Ross was 4;03, not 6;03, in file 50, and he does not produce any nonagreeing *don't* in file 50. Instead, his last occurrence was at 6;11.19 (File 83b2).

[3]These numbers differ from Schütze (2010) because he carried out a different analysis of the data. While I included only Sarah's mother and father in the analysis and also included all 3SG pronouns and all 3SG full NPs that occurred with *don't*, Schütze reports that he carried out automated searches on utterances by all people other than the target child, suggesting that he may have also included the utterances of the university researchers present during the recordings, and his automated searches looked for sequences of the form "{he/she/it} {don't/doesn't}" which excludes structures with inversion (e.g., *doesn't it get snarls when it is long?*; Sarah's Mother File128), utterances where some element intervenes between the pronoun and the auxiliary (e.g., *she usually doesn't give up*; Sarah's Mother File135), the pronoun *that* (e.g., *that doesn't come out*; Sarah's Mother File61), and full NPs (e.g., *Poor Inky doesn't have any teeth*; Sarah's Mother File59).

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TABLE 2
Percentage of Nonagreeing *Don't* in the Input and in Child Production

	Input from Parents		*Child Production*	
	don't+*3SG*	doesn't+*3SG*	don't+*3SG*	doesn't+*3SG*
Sarah	32% (49/155)	68% (106/155)	42% (40/95)	58% (55/95)
Nina	0% (0/94)	100% (94/94)	50% (65/130)	50% (65/130)

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(1992), which was not discussed in the previous articles. I will call Radford's account the Miscategorization Account, and I include it because it makes predictions for children who are exposed to nonagreeing *don't* in the input.

Guasti & Rizzi (2002) link production of nonagreeing *don't* by English-speaking children to a nonadult spell-out system. In particular, they propose a principle of Universal Grammar that requires that features checked before spell-out be expressed in the morphology, while those that are not checked in the overt syntax may or may not be expressed morphologically, depending on language-specific rules. Because the latter depends on language-specific rules, rules that children must learn over time, it is here that we should expect to find nonadult patterns in child production. As such, G&R focus on movement of the auxiliary *do*, whether or not it has raised through Agr, to account for child production of nonagreeing *don't*. Interrogative *do* raises through Agr on its way to C before spell-out, so interrogative *do* should always agree with the subject. Negative *do* does not need to raise as far as Agr in the overt syntax, and so morphological agreement is a matter of a language-specific morphological rule (see Guasti & Rizzi 2002 for more details). This proposal predicts that children will produce declarative sentences like (3a), (3b), and (3e) because in these sentences the auxiliary does not raise all the way to Agr overtly and, for that reason, overt morphological marking is optional in the child grammar. Moreover, they predict that children will only produce interrogatives with agreement marking as in (3c), but not without agreement marking as in (3d), because overt raising of the auxiliary to Agr in interrogatives requires morphological marking within this proposal.

(3) a. He don't want a Band-aid on. (Nina29; 2;05)
b. He doesn't want to ride. (Nina33; 2;09)
c. What does this go on? (Nina54; 3;03)
d. What do this go on?
e. She do too.

Schütze (2010) presents an alternative account whereby he relates the use of nonagreeing *don't* to an underspecified Infl and the clitic/affixal nature of negative *n't*. The Underspecification Hypothesis proposes that when there is a negative head below Infl, Infl is blocked from lowering onto V and *do*-support arises to host the Infl affix. However, even when Infl is underspecified in early child grammar, *do*-support is still needed in only those cases where there is a negative clitic *n't*, which is also in need of a host. As such, the Underspecification Hypothesis predicts the same data as the Spell-out Account but for different reasons. The Spell-out Account predicts nonagreeing *don't* in child language because the auxiliary does not raise to Agr in the overt

syntax while the Underspecification Hypothesis predicts nonagreeing *don't* because Infl is underspecified and the clitic *n't* needs a host. One difference between the two proposals is that the Underspecification Hypothesis, but not the Spell-out Account, predicts that sentences like (3e) should not occur, as there is no clitic *n't*. The Underspecification Hypothesis posits an adult-like spell-out system but a non-adult-like syntax for Infl.

A third account suggested by Radford (1992) focuses specifically on children who are exposed to nonagreeing *don't* in the input. Radford noticed that children sometimes produce sentences like (3d) and (3e) and suggested that the absence of the third person –s inflection on *do* in these utterances indicates that some children may have miscategorized *do* as a nonagreeing modal and that this may be induced by the occurrence of the agreementless third person negative form *don't* in nonstandard varieties of English (e.g., *She don't love me no more*). Because *do* patterns with nonagreeing modals like *will* and *can* in most ways, except that *do* requires agreement marking, he suggests that nonagreeing *don't* in the input may cause children to use *do* in much the same way as they use *will* and *can.* In support of this idea, Radford reports the child utterance below in response to his mother's earlier statement.

(4) Mother: She don't live up this street anymore.
Child: She do!

Radford's account makes different predictions for children exposed to nonagreeing *don't* in the input. First, it does not predict a necessary overlap between the RI Stage and use of nonagreeing *don't*, although an overlap is not inconsistent with his proposal. In addition, if children like Sarah are treating *do* as a nonagreeing auxiliary, the prediction is that they will produce sentences like (3d) and (3e), while children like Nina will not.

In summary, these three proposals make different predictions. These predictions are listed below and will form the basis of this article. The goal of the article is to determine what portion of Sarah's data Radford's Account can explain, so that we can then examine whether the remaining data support more readily the Underspecification Hypothesis or the Spell-out Account.

Guasti & Rizzi (2002)

- An overlap between the RI stage and the use of nonagreeing *don't*.
- Production of nonagreeing *do* in declarative sentences even when there is no negative clitic in need of a host (e.g., *He do too!*). But, no nonagreeing *do* in interrogative sentences (e.g., *Don't he want to eat? Do she like it?*).
- An absence of nonnominative subjects with nonagreeing *don't* (e.g., *Her don't have it*), since Agr is fully specified and responsible for case assignment.

Schütze (2010)

- An overlap between the RI stage and the use of nonagreeing *don't*.
- Absence of nonagreeing *do* in all sentences where there is no negative clitic *n't* in need of a host (e.g., *Do she like it? He do too!*).
- Production of nonnominative subjects with nonagreeing *don't* (e.g., *Her don't have it*), since Agr (or Infl) is underspecified.

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Radford (1992)

- No necessary overlap between the RI Stage and nonagreeing *don't*.
- Production of nonagreeing *do* in declarative and interrogative sentences (e.g., *Do she like it? He do too!*) since the child has miscategorized *do* as a nonagreeing auxiliary.
- No correlation is expected between nonnominative subjects and nonagreeing *don't*.

3.1. Overlap between the RI Stage and Nonagreeing *Don't*

Both the Underspecification Hypothesis and the Spell-out Account link the use of nonagreeing *don't* to the RI Stage. For Guasti & Rizzi, English lexical and functional verbs do not raise through Agr before spell-out. As such, morphological expression of agreement on lexical verbs and the auxiliary *do* in (noninterrogative sentences) is a language-specific rule that will take time to acquire. For Schütze, an underspecified Infl means that neither lexical verbs nor the auxiliary *do* will be inflected for agreement. It follows then that both proposals predict that the use of nonagreeing *don't* and uninflected lexical verbs should occur at the same time in development.

To this end, in order to examine whether an overlap exists between the RI Stage and nonagreeing *don't* in Sarah's and Nina's speech, two analyses were carried out. First, to examine the usage of nonagreeing *don't*, I carried out automated CLAN KWAL (MacWhinney 2000) searches on the *tiers[4] for all tokens of *don't* and *doesn't* and then went through by hand and found only those tokens that contained 3SG subjects. In addition, to examine the production of uninflected lexical verbs, I carried out automated CLAN KWAL searches for all 3SG pronouns *he, she*, and *it* on the *tiers and then went through by hand and found all sentences where these pronouns occurred in subject position. Searches for full NPs occurring with uninflected lexical verbs was not carried out, as it is expected by all three proposals that full NPs should not pattern differently than pronouns with respect to verbal agreement.

When counting the number of uninflected lexical verbs in Sarah's and Nina's speech, the following were not included: (1) verbs that had the same form in the present and past tense (e.g., *hit, put*), (2) verbs involving a temporal adverb indicating that the child intended to produce a past-tense form (e.g., *yesterday she eat it*), (3) copulas and auxiliaries (e.g., *he be the mother*; Sarah40), and (4) questions, as I analyzed this as a case of auxiliary omission (e.g., *he go night-night?*; File17). In addition, there were four tokens produced by Sarah in File 30 where she appeared to be singing a Beatles song "She Loves You Yeah, Yeah, Yeah" (e.g., *He love me yeah, yeah*; File30) that were not included in the count. The proportion of uninflected lexical verbs was calculated by dividing the number of tokens of uninflected lexical verbs with 3SG subject pronouns by the number of uninflected + inflected lexical verbs with 3SG subject pronouns. The proportion of nonagreeing *don't* was calculated by dividing the number of tokens of nonagreeing *don't* by the number of all *don't* and *doesn't* tokens produced with 3SG subjects.

Figures 1 and 2 show the proportion of nonagreeing *don't* and uninflected lexical verbs in Nina's and Sarah's speech across development (raw numbers are presented in Appendices A and B). Figures 1 and 2 show that for both children, the proportion of uninflected lexical verbs decreases as the children age. However, this is not true for nonagreeing *don't.* Instead, while Nina

[4]For details on the CLAN program and transcriptions see MacWhinney (2000).

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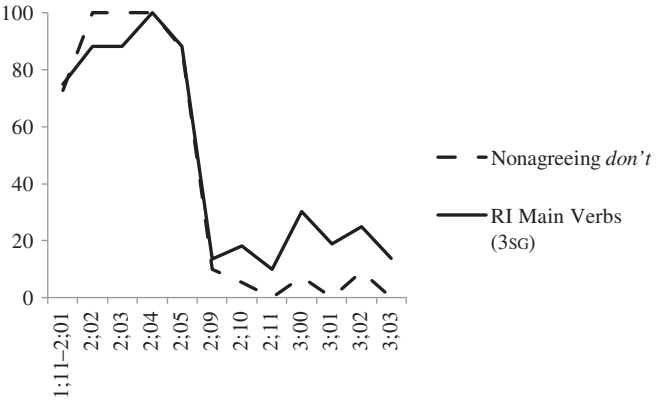

FIGURE 1 Proportion of nonagreeing *don't* and uninflected lexical verbs in Nina's production.

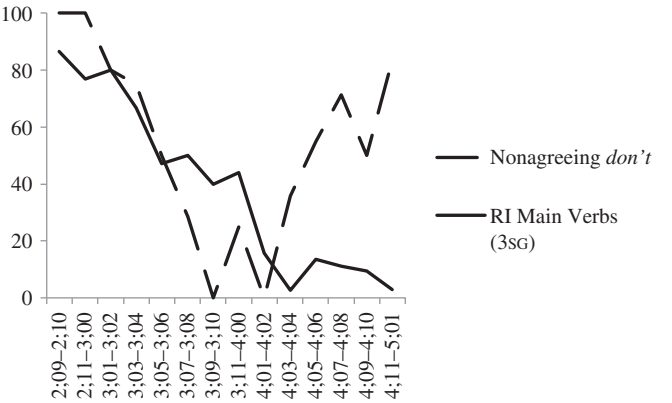

FIGURE 2 Proportion of nonagreeing *don't* and uninflected lexical verbs in Sarah's production.

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shows a decrease with age, Sarah shows first a decrease and then later an increase in her use of nonagreeing *don't*.

For clarity I have divided up into stages both Nina's and Sarah's production of nonagreeing *don't* and uninflected lexical verbs. This is shown in Appendices A and B. The results indicate two stages for Nina, a stage where she produces both uninflected lexical verbs and nonagreeing *don't* (Stage I) at a very high rate, followed by a period where both forms drops dramatically in her speech (Stage II). Nina produces her first token of nonagreeing *don't* at 2;01 (File 12), and she continues to use nonagreeing *don't* almost exclusively until 2;05 years of age. There is a break in the recordings for Nina from age 2;06 to 2;08, and at 2;09 years of age we see a substantial drop is Nina's use of *don't* with 3SG subjects and a drop in her production of uninflected lexical verbs, although the latter never completely drop to zero. For Nina, the results indicate very clearly an overlap in the use of uninflected lexical verbs and nonagreeing *don't*.

Similar to Nina, there appears to be an initial link between Sarah's production of uninflected lexical verbs and her production of nonagreeing *don't*. Sarah produces her first token of nonagreeing *don't* at 2;09 years of age (File 42), and, from the beginning until 3;08 years of age, her production of nonagreeing *don't* and her production of uninflected lexical verbs is high (Stage I and II). Stage II is different from Stage I in that Stage I shows almost exclusive use of nonagreeing *don't*, while Stage II appears to be a period of transition where both agreeing *doesn't* and nonagreeing *don't* are used at about the same rates. This is also true for inflected and uninflected lexical verbs. Next, from 3;09–4;02 (Stage III), the proportion of nonagreeing *don't* produced by Sarah decreases to almost zero, showing an almost exclusive use of *doesn't*, and there is also a decrease in uninflected lexical verbs. Finally, from ages 4;03–5;01 (Stage IV), Sarah's use of nonagreeing *don't* increases substantially again, although her use of uninflected lexical verbs remains low. During this last stage, Sarah uses both nonagreeing *don't* and agreeing *doesn't* variably, producing 28 tokens of nonagreeing *don't* during this last period. Only Stages I and II show an overlap between Sarah's use of nonagreeing *don't* and uninflected lexical verbs.

The main difference between the two children is that, while Nina produces nonagreeing *don't* only during the time where she produces high levels of uninflected lexical verbs, Sarah continues to use nonagreeing *don't* long after her use of uninflected lexical verbs decreases, up until the last files when she is 5 years of age. This difference is the first indication that Sarah's later use (Stages III and IV) of nonagreeing *don't* is not related to the RI Stage and should not be used as evidence for or against the Underspecification Hypothesis or the Spell-out Account, although her early production (Stages I and II) of nonagreeing *don't* may be used in support of the two proposals.

A follow-up question is whether Sarah's later variable use of nonagreeing *don't* and agreeing *doesn't* shows any adult-like patterns. In Sarah's father's speech, there is some evidence for the use of nonagreeing *don't* in constructions involving negative concord, as shown in (5a).

(5) a. She don't have no pennies.
b. She doesn't have no pennies.

While Sarah's mother never uses the auxiliary *do* in constructions with negative concord, Sarah's father produces negative concord exclusively with nonagreeing *don't* (as in 5a) and never with *doesn't* (as in 5b), although the tokens are few (only three tokens of nonagreeing *don't*) as he was not present in all of the recording sessions. Like her father, Sarah's production also seems to show a relation between the use of negative concord and nonagreeing *don't.* In particular, in constructions involving negative concord, 3SG subjects, and the auxiliary *do*, Sarah used *don't* in 7 out of 10 sentences from 4;05 on. Some examples of Sarah's use of nonagreeing *don't* and negative concord are provided in (6). On the other hand, Nina produces no utterances with nonagreeing *don't* and negative concord.

(6) a. She don't get no one to play with. (Sarah147; 4;10)
b. It don't have no wings! (Sarah117; 4;07)

While the data are small and must be interpreted with caution, it appears that Sarah may show a bias for using *don't*, rather than *doesn't,* in constructions involving negative concord.

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3.2. The Use of Nonagreeing *Do* without a Negative Clitic

The Spell-out Account makes the prediction that children should produce noninterrogative sentences with 3SG subjects and nonagreeing *do*, regardless of whether there is a negative clitic *n't* or not. This is because Guasti & Rizzi's proposal explains child use of nonagreeing *don't* in terms of whether *do* raises through Agr before spell-out or not. When *do* does not raise, as with noninterrogative constructions, children should have the option of producing forms like (7a–c) where *do* occurs without agreement. Importantly, however, they should never produce interrogatives without agreement on *do* like (8). The Underspecification account, on the other hand, predicts that none of the sentences in (7) or (8) should occur, since when Infl is underspecified, *do* is only inserted to host *n't*. Radford's Miscategorization account predicts, not only sentences like those in (7) but also interrogatives with nonagreeing *do*, as in (8).

(7) a. He do like it.
b. He do too!
c. He do not like it.

(8) Do he like it?

Schütze notes that overall children produce very few utterances like (7), neither with *do* or *does*. Nevertheless, he examines a subset of the corpus and reports that Sarah produces utterances like those in (7) with both agreeing *does* (3 tokens) and nonagreeing *do* (2 tokens), while Nina virtually never produces utterances like those in (7) with nonagreeing *do* (1 token at age 2;02) but instead consistently uses agreeing *does* (28 tokens). Schütze compares statistically children's production of utterances like (7) and reports that only Nina's data, but not Sarah's data, are predicted by the Underspecification Hypothesis.[5]

How can we account for Sarah's data? There are two possibilities. One is that Sarah's data support the Spell-out Account. This is what Schütze concluded, but this leaves us with empirical evidence for two opposing proposals; in other words, Sarah's data support the Spell-out Account and Nina's data support the Underspecification Hypothesis. An alternative explanation is to hypothesize that Sarah's production is related to the nature of her input, in particular, the nonagreeing *don't* produced by her parents. Radford puts forth such a proposal by suggesting that children who produce utterances with nonagreeing *do* like those in (7) and (8) may have miscategorized *do* as a nonagreeing auxiliary as a consequence of the use of nonstandard nonagreeing *don't* in the input. Radford's proposal predicts that only children like Sarah, but not Nina, should produce these forms. In addition to the sentences like (7), Sarah, but not Nina, also produced two sentences like (8) at age 4;05 years of age (Files 107 and 111). Neither the Underspecification Hypothesis nor the Spell-out Account predicts a difference between the two children, nor do they predict sentences like (8). Therefore, Radford's account can more readily explain the

[5]It is important to note that when counting tokens of sentences like those in (7), Schütze analyzed only a subset of the data because he followed the counting procedures used in G&R. It is possible there are more tokens than reported. In order to determine this, I carried automated CLAN KWAL searches for all tokens of *do* and then went through by hand and found those tokens containing a 3SG subject. The results showed a slight increase in the number of utterances like (7) with nonagreeing *do* for Sarah (four additional tokens). However, there was no increase for Nina. This means that Sarah produced six tokens of nonagreeing *do* like that illustrated in (7).

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differences found between these two children with respect to the sentences like those in (7) and (8).

Further support for the proposal that only children exposed to nonagreeing *don't* will produce sentences like those in (8) may come from Miller (2012). Miller carried out an elicitation task with 3-year-old American English–speaking children, some of whom were exposed to nonagreeing *don't* and others who were exposed only to agreeing *doesn't*. The study revealed that children exposed to nonagreeing *don't* in their input produce interrogatives with nonagreeing *do*, as in (8), about 40% of the time. Oetting & McDonald (2001) also report nonagreeing *do* in the speech of 4–6-year-old working-class American English–speaking children. These findings are consistent with Radford's proposal and also with Sarah's and Nina's production in naturalistic speech, and they suggest that children overapply the use of nonagreeing *don't* to other linguistic contexts without negation. It may be that elicitation tasks can provide stronger support than corpus studies because in naturalistic speech children may avoid forms they have not fully acquired.

The Miscategorization account, while informative, cannot be completely accurate. If children like Sarah miscategorize *do* as a nonagreeing auxiliary, they should never produce agreeing *does*. For this reason, the Miscategorization account may be too strong. Instead, I would like to suggest that children exposed to variable input for nonagreeing *don't* produce nonagreeing *don't* variably in their own speech, and, in addition, they also extend that variability for agreement marking on the auxiliary to contexts without negation, producing utterances like *She does too* and *She do too* variably as well. This may indicate that children initially are maintaining two grammars, one with agreement on the auxiliary and one where the auxiliary does not have agreement.

If Sarah's production of nonagreeing *do* in sentences like (7) and (8) and her later production of nonagreeing *don't* (during Stages III and IV) can be explained by the presence of nonagreeing *don't* in her input, then these data can be ruled out as evidence for either the Spell-out Account or the Underspecification Hypothesis. As such, we can now examine these two proposals by examining the extent to which the remaining data are consistent with the predictions that they make.

3.3. Omission of *Do*

Under the Underspecification Hypothesis, the auxiliary *do* only surfaces during the RI Stage to host the negative clitic *n't*. This makes the prediction, as pointed out by Schütze (2010), that when there is no negative clitic in need of a host, as in nonnegative interrogatives, the auxiliary *do* will be omitted. The Spell-out Account does not predict omissions. In order to examine this, I carried out automated CLAN KWAL searches for the interrogative marker "?" and then went through by hand and found any questions that contained or could contain (in the case of omissions) the auxiliary *do*/*does*. Coding for omissions is difficult because when there is an omission, the omitted form could also be a modal or the auxiliary *do* in the past tense (i.e., *did*), as illustrated in (9).

(9) a. Justin have a doll? (Nina, 2;02; File13)
'Did/Can/Will/Does Justin have a doll?'
b. Why that go in here? (Nina, 2;02; File15)
'Why did/can/will/does that go in here?'
c. It hurt? (Sarah, 2;10; File32)

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'Did/Will/Does it hurt?'
d. How it work? (Sarah, 3;05; File61)
'How will/did/does it work?'

In order to have an objective system for counting omissions and also to keep the counting procedures systematic for both children, all interrogatives containing an omission where the auxiliary *do*/*does* could *possibly* occur were counted in this analysis. These include examples as in (9) for auxiliary *does*, as well as those shown in (10) for the auxiliary *do*.

(10) a. You need a Kleenex? (Sarah, 2;08; File24)
'Did/Will/Do you need a Kleenex?'
b. How you get them down? (Sarah, 3;05; File63)
'How did/will/can/do you get them down?'
c. You want some sugar in it? (Nina, 3;03; File54)
'Did/Will/Do you want some sugar in it?'
d. You know what this is? (Nina, 3;02; File53)
'Did/Do you know what this is?'

Schütze (2010) notes that the coding of omissions is problematic and because of this he does not carry out a full count in his article. However, I believe that it is a worthwhile endeavor because the Underspecification Hypothesis predicts that omissions of the auxiliary *do* should overlap with the RI Stage. For this reason, the proportion of omissions should decrease once children begin to acquire agreement marking on *do*. The results are shown in Tables 3 and 4 for Nina and Sarah respectively. As in the previous tables, I've divided their production up into stages in order to make patterns more visible to the reader.

TABLE 3
Number of Omissions of the Auxiliary *Do* in Interrogatives in Nina's Speech

	Omission of do	*Production of* do	*Omission of* does	*Production of* does
Stage I				
2;01–2;02	0	0	22	1
2;03	1	4	10	0
2;04	24	0	0	0
2;05	27	1	0	1
Total	52	5	32	2
Stage II				
2;09	9	6	0	14
2;10	7	17	0	5
2;11	4	14	0	10
3;00	2	12	0	6
3;01	0	8	0	13
3;02	2	8	0	3
3;03	1	5	0	11
Total	25	70	0	62

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TABLE 4
Number of Omissions of the Auxiliary *Do* in Interrogatives in Sarah's Speech

	Omission of do	*Production of* do	*Omission of* does	*Production of* does
Stage I				
2;09–2;10	8	0	6	0
2;11–3;00	14	0	0	0
3;01–3;02	6	0	0	0
3;03–3;04	22	0	7	1
Total	50	0	13	1
Stage II				
3;05–3;06	28	1	3	1
3;07–3;08	20	3	4	6
Total	48	4	7	7
Stages III & IV				
3;09–3;10	9	11	2	0
3;11–4;00	8	14	1	0
4;01–4;02	26	18	10	42
4;03–4;04	31	20	6	9
4;05–4;06	63	17	6	17
4;07–4;08	30	26	2	14
4;09–4;10	13	7	0	9
4;11–5;01	25	30	0	21
Total	205	143	27	112

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For Nina, the results show that up until age 2;05 (the age when her use of nonagreeing *don't* and uninflected lexical verbs decrease substantially), *do* and *does* are virtually absent in interrogatives. This is exactly what Schütze predicts. When there is no negative clitic *n't* in need of a host and Infl is underspecified during the RI Stage, children do not produce the auxiliary *do*. After 2;09 years of age, Nina produces *does* 100% of the time in questions with 3SG subjects that require the auxiliary. In other words, after 2;09, Nina does not produce forms like those shown in (9) any longer. With respect to *do*, while there is a decrease in the amount of omissions after 2;09, she still variably omits *do* and does so in a way that is consistent with the adult grammar (see Fitzpatrick 2006, who provides an analysis of the variable omission of *do* in interrogatives by adult speakers of American English). For Nina, the omission of *do*/*does* occurs during the RI Stage.

For Sarah, *do* and *does* are virtually absent (or omitted) up through 3;04 years of age (Stage I). This is the same Stage in which Sarah shows a high proportion of nonagreeing *don't* and uninflected lexical verbs. From 3;05–3;08 years of age, the age when Sarah begins to produce agreement marking variably on the auxiliary and lexical verbs, Sarah also shows variable production of interrogative *does,* omitting *does* 40% of the time in questions. Stages I and II for Sarah are completely consistent with the Underspecification Hypothesis.[6]

[6]It should be noted that although it looks like Sarah continues to omit the auxiliary *does* after 3;09, 18 of Sarah's 22 tokens of omissions between 4;01–4;06 years of age involve repetitions of the question, "What does this/that spell?," as illustrated in (i).

3.4. Nonnominative Subjects with Nonagreeing *Don't*

The final context where we should find differences between the two proposals is with respect to the use of nonnominative subjects with uninflected lexical verbs and nonagreeing *don't*. Under the assumption that agreement is responsible for case assignment (Schütze), an underspecified Infl should make it possible for children to produce nonnominative subjects with nonagreeing *don't,* while this would not be possible under the Spell-out Account, which holds that Infl is fully specified. The data reveal that both Sarah and Nina produce nonnominative subjects with lexical verbs that are not inflected, as in (11a), yet only Nina, but not Sarah, produces them with nonagreeing *don't* (11b).

(11) a. Her make pancakes. (Sarah31; 2;09)
b. Her don't have a paw. (Nina29; 2;05)

Table 5 shows the distribution of nonnominative subjects occurring with uninflected lexical verbs and nonagreeing *don't* during and after the stage in which they show a high proportion of uninflected lexical verbs. This would be Sarah's Stages I and II and Nina's Stage I. For simplicity, I will refer to these stages as the RI Stage.

Both children only produce nonnominative subjects with uninflected lexical verbs during the RI Stage. Moreover, Nina also produces nonnominative subjects with nonagreeing *don't* only during the RI Stage. These finding support the Underspecification Hypothesis but not the Spell-out Account.[7] Moreover, the finding that Sarah does not use nonnominative subjects with nonagreeing *don't* is not unexpected if over half of her tokens of nonagreeing *don't* represent adult-like forms (29 out of 46 tokens) and not underspecified forms. In the end, only 17 of Sarah's tokens of nonagreeing *don't* and 65 of Nina's tokens represent the RI Stage.

4. CONCLUSION

This article set out to address the following two questions:

(i) Is Sarah's use of nonagreeing *don't* part of the RI Stage, and what does that mean for theories of root infinitives and nonagreeing *don't*?
(ii) Does variable usage of nonagreeing *don't* in the input affect acquisition of agreement marking on auxiliary *do*?

(i) a. what dis [: this] spell ?
b. what dat [: that] spell ?
c. what this spell then ?
d. what all that spell ?

If these repeated sentences are treated as only 1 token, then Sarah would have only 6 tokens of *does* omission during Stages III and IV instead of 27 tokens.

[7]Guasti & Rizzi (2002) argue that the cases of nonnominative subjects with nonagreeing *don't* could be interpreted as involving truncated structures above T (and therefore including *do*), but under Agr (and therefore excluding nominative marking on the subject).

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TABLE 5
Percentage of Nonnominative Subjects in Nina's and Sarah's Speech

	RI Stage		*Post-RI Stage*	
	Lexical V him/her eat	*Nonagreeing* don't him/her don't	*Lexical V* him/her eat	*Nonagreeing* don't him/her don't
Nina	100% (65/65)	100% (14/14)	0% (0/65)	0% (0/14)
Sarah	100% (11/11)	0% (0/0)	0% (0/11)	0% (0/0)

Note. The denominator represents all tokens of nonnominative subjects with uninflected lexical verbs or nonnominative subjects with nonagreeing *don't*.

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In order to address the first question, Sarah's production of the auxiliary *do* was compared to Nina's production. Nina produces high proportions of both nonagreeing *don't* and uninflected lexical verbs during the same period (Nina's Stage I), indicating that the two are closely linked. On the other hand, Sarah's use of nonagreeing *don't* and uninflected lexical verbs patterns together only until 3;08 years of age. After that, from 4;03–5;01 (Sarah's Stage IV), Sarah shows a high proportion of nonagreeing *don't*, but her use of uninflected lexical verbs decreases dramatically. During Stages III and IV Sarah produces 29 tokens of nonagreeing *don't.* I argue that these tokens, produced after 3;08 years of age (29 of the 46 tokens), are related to the use of nonagreeing *don't* in Sarah's input and should not have been included as support for either the Underspecification Hypothesis or the Spell-out Account.

The remaining data (i.e., Sarah's Stages I and II data and Nina's data) show support for the Underspecification Hypothesis over the Spell-out Account. During the RI Stage both Nina and Sarah use nonnominative subjects with uninflected lexical verbs, and Nina also uses nonnominative subjects with nonagreeing *don't*. Moreover, both children show a high proportion of omissions of interrogative *does* only during the stage in which they also show a high proportion of uninflected lexical verbs and nonagreeing *don't*. As such, both the use of nonnominative subjects and the pattern of omissions of interrogative *does* in Sarah and Nina's speech support the Underspecification Hypothesis.

The second question asks whether the use of nonagreeing *don't* in the input affects acquisition of the auxiliary *do*. As far as I know, Radford (1992) has been the only one to suggest this (but also see Miller 2012 for further empirical support). Radford suggests that children exposed to nonagreeing *don't* (like Sarah) should behave differently than children like Nina in their production of *do*. In particular, his account makes the prediction that only Sarah, but not Nina, should produce nonagreeing auxiliary *do* in emphatics, VP-ellipsis, and interrogatives. Neither the Underspecification Hypothesis nor the Spell-out Account[8] predicts this difference between Sarah and Nina. The finding that Sarah, but not Nina, overapplies nonagreeing *don't*

[8]A reviewer asked how Sarah's parents' variable usage of nonagreeing *don't* could be accounted for and suggested the Spell-out Account as one possible explanation for adult behavior (and also child behavior). It is beyond the scope of this article to provide a proposal about the variable usage of nonagreeing *don't* in the adult speech. Instead, the goal of this article was to examine how variable input affects acquisition in children. Nevertheless, as far as I can tell, the Spell-out Account is unable to explain the social factors constraining variable usage in adult speech or explain Sarah's usage of nonagreeing *do* in interrogatives. Furthermore, adult speakers who use nonagreeing *don't* in declaratives also

to other linguistic contexts without negation (i.e., Sarah produces nonagreeing *do* in emphatics and interrogatives) suggests, as Radford predicts, that nonagreeing *don't* in the input affects acquisition of the auxiliary *do*.

Nevertheless, regardless of the variable input to which Sarah was exposed, the results indicate that acquisition paths appear to remain more or less the same until the end of the RI Stage, although timing may be different. Both children start out producing nonagreeing *don't* and uninflected lexical verbs almost categorically (Stage I for both children). This stage is followed by a period where Sarah alternates between uninflected and inflected forms at about the same rate (Sarah's Stage II).[9] Nina does not show a period of optionality, which I believe is related to the fact that there is a gap (of about 4 months) in the recordings during the time a period of optionality would occur. After these initial stages, both children show a shift in behavior where they begin to show a much higher proportion of inflected lexical verbs and also of agreeing *doesn't* (Sarah's Stage III, Nina's Stage II), using agreeing *doesn't* almost categorically. During this period, both children also show a substantial decrease in their omission of interrogative *does*. It is important to note that Sarah's categorical use of agreeing *doesn't* during Stage III indicates a period of overapplication as categorical use is not consistent with her input (i.e., her parents produce *don't* and *doesn't* variably with 3SG subjects). It is only later, during Stage IV, that Sarah begins to show acquisition of the variable usage of nonagreeing *don't.* This finding of overapplication is consistent with recent research on variable input (Miller & Schmitt 2012) and on inconsistent input (i.e., inconsistent input is like that produced by L2-speaking parents to their children; Hudson Kam & Newport 2005, 2009; Singleton & Newport 2004), which has shown that children tend to systematize input data that is noisy or inconsistent.

In conclusion, I have argued that a subset of Sarah's data should not be included as support for or against the Underspecification Hypothesis or the Spell-out Account and that the remaining data supports the Underspecification Hypothesis over the Spell-out Account. By attributing Sarah's later usage of nonagreeing *don't* to the input to which she was exposed and not to the RI Stage, we are able to provide empirical evidence for the Underspecification Hypothesis, which was not previously possible. By taking input type into consideration, it was possible to gain a better understanding of the underlying representation of root infinitives in children.

It is important to remain cautious in our interpretation of the results presented here because there is very little research on the effect of variable input on acquisition, and findings may differ depending on the level of variability in the input (e.g., frequency of forms and number of overt variants) and the grammatical morphology to be acquired (e.g., agreement marking, plural marking, etc.). Nevertheless, the data presented here support the idea that variable input affects acquisition of grammatical morphology and that learners exposed to different input types (variable vs. consistent) may still pass through similar stages in acquisition.

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use them in negative interrogatives (e.g., *Don't it matter?*). This is true of Sarah's parents as well. Nonagreeing *don't* in interrogatives would be inconsistent with the Spell-out Account.

[9]Sarah's Stage II seems to represent true optionality. I looked for patterns to determine whether verb type, subject NP type (full NP, *he, she*, or *it*), or mother's own speech (i.e., whether the mother had recently used nonagreeing *don't*) predicted the use of nonagreeing *don't* in Sarah's speech, and none of these factors appeared to have an impact.

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APPENDIX A
Sarah's Production of Nonagreeing *Don't* and Uninflected Lexical Verbs

	Nonagreeing don't	*Agreeing* doesn't	*Uninflected Lexical Verbs (3SG)*	*Inflected Lexical Verbs (3SG)*
Stage I				
2;05–2;06	0	0	19	1
2;07–2;08	0	0	24	1
2;09–2;10	1	0	26	4
2;11–3;00	2	0	30	9
3;01–3;02	4	1	36	9
3;03–3;04	3	1	18	9
Total	10	2	153	33
Stage II				
3;05–3;06	5	5	8	9
3;07–3;08	2	5	14	14
Total	7	10	22	23
Stage III				
3;09–3;10	0	4	4	6
3;11–4;00	1	3	11	14
4;01–4;02	0	22	5	27
Total	1	29	20	47
Stage IV				
4;03–4;04	5	9	1	37
4;05–4;06	11	9	5	32
4;07–4;08	5	2	3	24
4;09–4;10	2	2	3	29
4;11–5;01	5	1	1	34
Total	28	23	13	156

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APPENDIX B
Nina's Production of Nonagreeing *Don't* and Uninflected Lexical Verbs

	Nonagreeing don't	*Agreeing* doesn't	*Uninflected Lexical Verbs (3SG)*	*Inflected Lexical Verbs (3SG)*
Stage I				
1;11–2;01	8	3	6	2
2;02	9	0	30	4
2;03	22	0	15	2
2;04	3	0	11	0
2;05	35	5	53	7
Total	77	8	115	15
Stage II				
2;09	1	9	5	32
2;10	1	18	10	45
2;11	0	8	2	20
3;00	1	13	10	23
3;01	0	13	7	30
3;02	1	10	4	12
3;03	0	14	5	31
Total	4	85	43	193

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