Agreement Morphology and the Acquisition of Noun-Drop in Spanish

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Spanish exhibits a determiner phrase (DP)-internal phenomenon (*noun-drop* or *N-drop*) closely analogous to subject *pro*-drop. Where English has the near-vacuous nominal *one* in the DP *the blue one*, for example, Spanish lacks any overt nominal: *el azul*, literally 'the blue'. The availability of N-drop in a language has been linked by some authors to richness of the overt agreement morphology on adjectives, determiners, or both. The evidence from child language acquisition, however, runs counter to this view. In particular, a detailed case study of the longitudinal corpus of child Spanish data from Montes (1987) revealed that the child acquired the full Spanish system of DP-internal agreement morphology significantly earlier than she acquired N-drop. This finding indicates that rich agreement morphology is not in itself a sufficient condition for N-drop.

1. INTRODUCTION

Spanish, and to a lesser degree Italian, French, and Dutch, all exhibit a determiner phrase (DP)-internal phenomenon (*noun-drop* or *N-drop*) that is reminiscent of the well-known null subject (*pro*-drop) phenomenon of Italian and Spanish. Where English uses the nearly vacuous noun *one* in the DP *the blue one*, for example, a language of the Spanish type uses a DP of the form *el azul* 'the blue', which lacks an overt noun altogether. Many of the issues raised by the literature on the syntax and acquisition of null subjects arise in much the same form in the

domain of N-drop. In particular, alongside hypotheses relating the availability of null subjects in certain languages to the "richness" of subject agreement morphology on the verb, a widespread hypothesis (e.g., Barbiers (1991), Kester (1994), Muysken (1983)) relates the grammatical possibility of N-drop to the richness of overt agreement morphology within the DP. As in the null subject literature, however, a fully successful, cross-linguistic characterization of "rich morphology" has not yet been achieved.

In this project we approached the broad question of how syntax and morphology interact during language acquisition by investigating the specific case of N-drop. N-drop permits a test of several influential proposals concerning the nature and acquisition of syntactic knowledge. Chomsky (1993, 3–4) proposed that the syntactic component of the human language faculty is essentially invariant across languages and that language-particular syntactic properties follow from the morphosyntactic properties of individual words (including, in particular, functional heads). According to this view, however, the relevant morphosyntactic properties typically take the form of abstract features, which do not necessarily have any overt phonological expression. A related hypothesis, proposed by Borer (1984), connects language-particular properties of syntax to inflectional morphology that is phonologically overt.

Borer's (1984) proposal suggests that children's acquisition of syntax, in at least some cases, could take the form of learning language-particular characteristics of the morphology. This idea can be interpreted in two distinct ways, both of which have important acquisitional implications. First, the child's *procedure* for learning language-particular properties of syntax could take the form of analyzing overt morphology, provided that the morphology is a reliable indicator of syntactic characteristics. Second, the child's (and adult's) mental *representation* of language-particular aspects of syntax could take the form of knowledge about overt morphology if, as Chomsky (1993) proposed, points of syntactic variation are determined by information outside the computational component of syntax, in conjunction with a richly deductive set of universal principles.

A number of researchers investigating the acquisition of null subject phenomena (the most notable of whom are Hyams (1987) and Lillo-Martin (1991)) have been influenced by the idea that children's acquisition of at least certain aspects of syntax could take the form of learning the overt morphology of a language. Although null subjects are unlikely to represent a unitary phenomenon across languages (see Jaeggli and Safir (1989) and Lillo-Martin (1991)), in languages such as Italian and Hebrew there has nevertheless been a strong and persistent intuition that the availability of null subjects is closely related to the richness of overt subject-agreement morphology on the inflected verb.

A striking piece of evidence in support of this intuition comes from Borer's (1984) discussion of null subjects in Hebrew, where only certain verb forms exhibit overt subject agreement morphology and the distribution of null subjects corresponds rather closely to the environments with agreement. Thus, in (1a)

(Borer (1984, 208)), where the first-person singular past-tense verb is overtly inflected for person, number, and gender, the subject pronoun need not be overt.

(1) a. ('Ani) 'axalti 'et   ha-banana.
       (I)   ate   Acc the-banana
       'I ate the banana.'
    b. *('Ani) 'oxelet 'et   ha-banana.
        (I)   eat   Acc the-banana
       'I am eating the banana.'

In (1b), however, where the first-person singular present-tense verb carries gender and number marking but no overt person marking, a phonetically overt subject pronoun must appear. Thus, the mixed *pro*-drop/non-*pro*-drop pattern of Hebrew provides impressive evidence for a link between null subjects and agreement morphology.

   Yet attempts to reduce the cross-linguistic variation in availability of null subjects entirely to variation in agreement paradigms have been problematic. For example, McCloskey and Hale (1984) noted that Irish has two agreement paradigms, the richer of which licenses null subjects. Even this richer agreement paradigm, however, makes fewer person–number distinctions than the agreement paradigm of German, and German disallows null subjects.

   The difficulty in pinning down the relation between null subjects of the Italian type and paradigms of verbal agreement morphology in principle could be due to an emphasis on cross-linguistic comparison. Given that languages vary from one another in many respects, it is effectively impossible to find "minimal pairs" of languages that differ only in the richness of verbal agreement. Furthermore, if null subjects have multiple grammatical sources, as seems likely, there is little reason to expect that a single measure of "richness of agreement" will emerge from cross-linguistic comparisons.[1]

   An alternative approach is to investigate the issue acquisitionally. If we adopt the strong hypothesis that knowledge of the null subject properties of a language such as Italian is mentally represented directly as knowledge of the overt distinctions in the verbal agreement paradigm, then we predict that any given child learning Italian will begin producing null subjects at approximately the same point that the agreement paradigm is mastered. Unfortunately, two problems have plagued attempts to test this prediction. First, verbal agreement morphology in richly inflected languages tends to be predominantly correct as early as children begin talking (e.g., Hyams (1986) for Italian). Thus, determination of the age of acquisi-

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[1]Thus, as noted by a reviewer, the proper interpretation of McCloskey and Hale's (1984) observation about Irish and German depends on whether Irish subject drop is in fact the same type of phenomenon as subject drop in Romance languages. It is interesting that Breton has a form of subject drop similar to that found in Irish, and Anderson (1982) argued that in contrast to any of the Romance languages, Breton subject drop involves incorporation of a subject pronoun into the verb.

tion is extremely difficult. Second, children learning English, a non-null-subject language, omit subjects with considerable frequency (see Hyams (1986), and much subsequent literature).[2] Thus, the fact that a child is omitting subjects in spontaneous speech is not a reliable indicator that the null subject properties of the target language have been acquired.

N-drop provides a new domain in which to examine children's acquisition of syntax in relation to their acquisition of overt agreement morphology. As in the case of null subjects, there is a strong intuition that N-drop is related to richness of overt agreement morphology. Furthermore, as we discuss later, children learning English, which does not N-drop, seldom produce determiner–adjective sequences without a noun. Hence, an abrupt onset of high-frequency N-drop in spontaneous child Spanish plausibly indicates a change in the child's grammar and can be evaluated in relation to the child's use of agreement morphology.

2. N-DROP IN SPANISH

Spanish normally uses DPs that lack an overt noun, as illustrated in (2), whenever the content of the noun is recoverable from context. In this respect Spanish resembles, to varying degrees, Italian, French, Dutch, German, and Swedish (see, among others, Barbiers (1991), Bernstein (1993a; 1993b), Kester (1994; 1996a; 1996b), Muysken (1983), Sleeman (1993; 1996)). In contrast to (2), the direct English translation in (3) is ungrammatical without insertion of the *pro*-form *one*. Spanish in fact prohibits the English construction, as illustrated in (4).

(2) La   camisa   que quiero comprar es la   roja.
     the-FSg shirt-FSg that I-want to-buy   is the-FSg red-FSg
     'The shirt that I want to buy is the red (one).'

(3) *The shirt that I want to buy is the red.

(4) *la   roja   una   / *la   una   roja.
      the-FSg red-FSg one-FSg / the-FSg one-FSg red-FSg
     'the red one.'

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[2]Whether omission of subjects by children acquiring English is due to a nonadult grammar or to performance factors is a topic of debate. See Hyams and Wexler (1993) and Bloom (1993) for contrasting views.

Note that the Spanish DP in (5a), unlike its English counterpart (5b), contains overt (feminine singular) gender and number marking on the determiner and the adjective.

(5) a. la   camisa   roja
      the-FSg shirt-FSg red-FSg
  b. the red shirt

Following the work of Muysken (1983), some recent analyses of N-drop (e.g., Barbiers (1991), Kester (1994; 1996a; 1996b)) have ascribed a central role to the distinctions of number, gender, and case that are overtly expressed by the morphological agreement paradigms for determiners and adjectives. Kester (1996a), for example, proposed that in N-drop the nonlexical head of a noun phrase (NP), which she refers to as *pro*, has default features of [+human], [+generic], and [+plural]; thus even in English it is possible to find expressions such as *the rich* or *the homeless*, where the nonlexical head is human, generic, and plural. Any other features of *pro* must be "licensed by strong grammatical gender features, which is not possible in a language with weak inflectional morphology like English" (Kester, 1994, 13). Dutch, in contrast, permits cases of N-drop in which the nonlexical head is abstract (e.g., *het besprokene* 'the (thing) discussed', with a neuter singular determiner) or human and specific (e.g., *de besprokene* 'the (person) discussed', with a nonneuter singular determiner).[3]

Yet the idea that availability of N-drop follows from properties of overt agreement morphology (such as overt gender distinctions in the form of the determiner and adjective) is controversial. Bernstein (1993a; 1993b), for example, has proposed that Spanish N-drop with the indefinite article (e.g., *uno rojo* 'a red (one)') depends on a syntactically independent "word marker" that incorporates into the D and surfaces as a terminal vowel (-*o* or -*a*). The word marker head-governs, and thereby licenses, a null NP projection. On Bernstein's account, the word marker may exhibit gender agreement, but richness of overt agreement is not taken to play any role in the availability of N-drop. Thus, French N-drop in indefinite DPs (e.g., *un rouge* 'a red (one)') lacks the overt word marker (i.e., there is no extra vowel affixed to the indefinite article), and Bernstein treated this case as involving an "abstract" word marker that is phonologically null.[4] Hence, even though the availability of N-drop is perhaps one of the points of syntactic variation most likely to have a direct connection to variation in overt morphology, there is by no means a consensus among syntacticians that such an analysis is correct.

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[3]The view that N-drop is closely related to overt paradigms of agreement morphology can also be found in the diachronic literature on English. For example, Hewson (1972, 52) asserted that the use of the *pro*-form *one*, in place of N-drop, arose in Late Middle English as a result of the loss of declensional morphology on the English attributive adjective.

[4]For full details of the proposal, see Bernstein (1993a, chap. 3).

The question we addressed in this study is whether the availability of N-drop in Spanish, as opposed to English, follows *directly* from the morphological agreement paradigms for Spanish determiners and/or adjectives. If N-drop follows directly (i.e., if the rich agreement in Spanish is both necessary and *sufficient* for N-drop), then any child who has fully mastered the Spanish agreement system should also permit N-drop. If richness of agreement morphology is not a sufficient condition for N-drop, however, and N-drop in Spanish depends on independent properties of the language (e.g., an independent syntactic parameter, or an abstract syntactic feature of Spanish determiners), then we predict that at least some children will acquire N-drop significantly later than the agreement system. The hypothesis that agreement is necessary and sufficient would be disconfirmed, in other words, if any child passed through a stage in which he or she demonstrated full mastery of the agreement system within DP and nonetheless insisted on pronouncing an overt N in every DP.

Longitudinal corpora of spontaneous production permit a test of these predictions. The age at which a given child's grammar first includes N-drop will be identified by the age of first clear use of a determiner–adjective sequence, provided that the "first clear use" is followed soon afterward by regular use (cf. Stromswold (1996)). First clear use is an appropriate measure because N-drop is strongly preferred, in the Spanish of adults and older children, whenever it is permitted, and because (as will be seen later) erroneous use of N-drop in a non-N-drop language such as English is relatively infrequent. Moreover, nouns, determiners, and (with lower frequency) adjectives are well represented in spontaneous production data, and the presence of correct agreement morphology is readily checked.

In the next section we present case studies of two children acquiring Spanish. One child (María) begins to use N-drop approximately as early as overt gender and number marking on determiners and adjectives. The other child (Koki), however, uses the full Spanish system of DP-internal agreement morphology significantly earlier than N-drop.

3.   METHOD

Several longitudinal corpora of monolingual Spanish acquisition data are publicly available (as of 1999) through the CHILDES database (MacWhinney & Snow (1985; 1990)). Snyder (1995) analyzed the Linaza corpus (for the child Juan), but the results were difficult to interpret.[5] We chose to analyze two more recent longitudinal corpora of spontaneous speech. The first corpus comes from the child María (López-Ornat, Fernández, Gallo, and Mariscal (1994)), recorded in Madrid

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[5]Juan began producing clear examples of N-drop at the age of 2;8, when he was in the late stages of mastering the Spanish determiner system. In this respect his data are similar to María's (discussed

by her mother, with transcripts at approximately monthly intervals between the ages of 1;7 and 3;0 (6,619 lines of child speech) and with intermittent transcripts from 3;0 to 4;0 (1,333 additional lines of child speech). The second corpus comes from a child named Koki (Montes (1987; 1992)), recorded in Mexico by her mother, with transcripts at approximately 2-month intervals from 1;7 to 2;2 and at approximately 1-month intervals from 2;2 through 2;11 (for a total of 4,332 lines of child speech).[6]

Koki's and María's data were hand coded by fluent Spanish speakers. Beginning with the earliest transcripts, each use of a potentially attributive (DP-internal) adjective was identified and classified according to whether the DP contained (i) an overt D and (ii) an overt N. This procedure was continued through a point at which N-drop was well attested in the child's speech. Following the criteria of Stromswold (1996), we determined for each child the first clear use of N-drop. We then assessed the child's use of correct and incorrect agreement morphology with determiners and adjectives for the period up to the first use of N-drop.

In addition, we analyzed the longitudinal corpus of spontaneous speech from an English-learning child, Eve (Brown (1973), ages 1;6–2;3, with 9,282 lines of child speech), for frequency of (erroneous) N-omission and D-omission in DPs containing an attributive adjective. This analysis provides a baseline measure of N-omission where it is ungrammatical in the target language.

4.   RESULTS

4.1.   María

María exhibited early mastery, by age 2;1, of agreement marking for gender and number on both determiners and adjectives. Moreover, her first clear examples of N-drop occurred at approximately the same age as her first clear uses of attributive adjectives. N-drop was well attested in María's speech by the age of 2;3, and

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later). A difficulty in interpreting Juan's data, however, is that even as late as 2;8 he exhibited a fairly high rate of determiner omission. Hence, it is possible that N-drop was part of his grammar somewhat earlier and was obscured in his production by the absence of a determiner. Similarly, his real command of the determiner system, prior to 2;8, is difficult to assess. For further details and discussion, see Snyder (1995).

[6]Koki is the daughter of two linguists. The mother speaks Spanish natively, and the father speaks it as a second language. The parents sometimes speak to one another in English but consistently address Koki in Spanish. Koki lived in Poland from birth to age 0;6, Argentina from 0;6 to 1;0, the United States from 1;1 to 1;3, and Mexico from 1;4 onward. A check of Koki's lexicon revealed that out of 1,350 word types and 12,674 word tokens, only 10 types (32 tokens) were of English origin; all were nouns, and 8 of these were proper names (e.g., *Bert*, *Ernie*). In 4,332 lines of transcribed speech, Koki never produced a sentence of English. Thus, Koki appears to have been engaged in the monolingual acquisition of Spanish.

the utterance taken as the first clear use occurred at 2;1. The early uses of N-drop and overt nouns in DPs with attributive adjectives were as follows:[7,8]

[2;1: N-drop (First Clear Use)]
co(e) [= con el] malo, [. . .] 'with the bad (one)' [possibly referring to a dog that had escaped and frightened her]
[2;1: determiner noun adjective]
[. . .] co(n) el pepe malo, sabes 'with the bad joe, you know'
co(n) el pepe malo que s'ascapao [= se ha escapado], [. . .] 'with the bad joe that got loose'
[2;2: No relevant utterances]
[2;3: N-drop]
un bicho, voy a bu(s)ca(r) los gigantes 'a bug, I'm going to look for the giant (ones)' [looking at picture book]
ot(r)o neg(r)o y ot(r)o neg(r)o, los dos 'another black (one) and another black (one), the two'
ahora viene ot(r)a chiquitita 'now comes another tiny (one)'
uno más pequeño 'a smaller (one)'
mira, a unos pequeños 'look, some small (ones)'
[2;3: determiner noun adjective]
[. . .] en el coche grande 'in the big car'
[. . .] los patitos bonitos 'the pretty ducks'
[. . .] que he tomado un trago g(r)ande 'since I've drunk a big gulp'

In the period from 2;1 to 2;3, excluding unclear utterances and closed-class modifiers (specifically, the possessive pronouns and uses of *otro* '(an)other' as a determiner), María produced 7 masculine-singular attributive adjectives (*malo* [three uses], *neg(r)o*, *pequeño*, and *grande* [two uses]), 1 feminine-singular attributive adjective (*chiquitita*), and 3 masculine-plural attributive adjectives (*gigantes*, *pequeños*, and *bonitos*). In all 11 cases the gender and number marking is consistent with the determiner and the (overt or understood) noun.

Examination of María's speech at age 2;1 already provides clear evidence for knowledge of the gender and number marking on Spanish determiners. At 2;1

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[7]A reviewer noted that Spanish allows N-drop not only with adjectives but also with prepositional phrases headed by *de* 'of' and with relative clauses introduced by *que* 'that'. A check of María's corpus revealed that these forms of N-drop entered her speech only slightly later than adjectival N-drop. The first clear uses (soon followed by regular use) were *la de Pulgacito* 'the (one) about Pulgacito' at age 2;3 and *lo que no quieres* 'the (thing) that you do not want' at 2;4.

[8]At least two of the utterances produced by María merit special comment. First, the word *uno* in *uno más pequeño* (at age 2;3) is a special form of the indefinite masculine singular article that is required (instead of *un*) when N-drop has occurred. Thus, María correctly substituted *uno* for *un* in this example. Second, the word *otro* is ambiguous in Spanish between (at least) adjectival ('other') and determiner ('another') uses. In the example *ot(r)o neg(r)o y ot(r)o neg(r)o, los dos* ('another black (one) and another black (one), the two', at age 2;3), María presumably intends *otro* as a determiner.

TABLE 1
Number Marking on María's Determiners at Age 2;1

Produced	Required	
	Singular	Plural
Singular	50	2
Plural	0	11

Note.   Fisher exact test (two-tailed), $p < .001$.

TABLE 2
Gender Marking on María's Determiners at Age 2;1

Produced	Required	
	Masculine	Feminine
Masculine	25	0
Feminine	0	38

Note.   Fisher exact test (two-tailed), $p < .001$.

María's masculine-singular determiners (29 uses) include *el* 'the', *un* 'a', and *ese* 'that', as well as 3 nonadult forms with overextension of the regular masculine-singular ending *-o*: *uno* (for the adult form = *un*) 'a', *eso* (for the adult form = *ese*) 'that', and *e(s)to* (for the adult form = *este*) 'this'. Her feminine-singular determiners (37 uses) include *la* 'the', *una* 'a', *e(s)ta* 'this', and *mucha* 'much'. Masculine-plural determiners (4 uses) are *unos* 'some' and *los* 'the'; and the sole feminine-plural determiner (7 uses) is *las* 'the'.

Of the 77 determiner uses at 2;1, the correct adult form can be determined in all but 14 cases (8 unclear cases involving a masculine-singular determiner and 6 unclear cases involving a feminine-singular determiner). Of the 63 clear cases, 100% are correct in gender agreement, and all but 2 (96.8%) are correct in number agreement. As shown in Tables 1 and 2, the contingencies between the required gender and number marking and the gender and number marking actually produced are both robust and statistically significant. Hence, by the age of 2;1, when open-class attributive adjectives first appeared in María's speech, María already controlled the masculine–feminine distinction and the singular–plural distinction in the Spanish determiner system. The early attributive adjectives found from 2;1 to 2;3 were correctly marked for gender and number and were almost evenly divided between overt-noun environments (5 cases) and N-drop environments (6 cases).

4.2.   Eve

A possible concern about the data from María is that her (apparent) early uses of N-drop could result from performance-related omission of nouns rather than knowledge of the grammatical option of N-drop in adult Spanish. To evaluate the

possible role of performance-related omission of nouns, independent of grammatical N-drop, in María's data, we examined the longitudinal corpus for the English-learning child Eve, whose speech was sampled at approximately 2-week intervals between the ages of 1;6 and 2;3. Given that N-drop is ungrammatical in adult English, any N-omission observed in child English presumably reflects either performance-based word omission or the use of a nontarget grammar.

To measure the frequency of N-omission in the Eve corpus we chose color terms as representative of the child's early adjectives. We extracted all child utterances containing one of the adjectives *red*, *orange*, *yellow*, *green*, *blue*, *purple*, *black*, *white*, *gray/grey*, *pink*, or *brown* using the CLAN Combo program developed for the CHILDES database (MacWhinney (1995)). The resulting utterances were then hand searched for attributive (DP-internal) uses of the adjectives, which in practice involved a pre-adjectival determiner or a postadjectival noun (or both). For such utterances the transcript context was then checked, and imitations, routines, repetitions, and otherwise unclear utterances were excluded. The results are presented in Table 3, where uses of the adult-English *pro*-form *one* are indicated separately, in the two rightmost columns.

For present purposes, the most important finding is that N-omission was considerably less frequent than either the use of a full "D A N" sequence or the use of

TABLE 3
N-Omission and D-Omission in the Eve Corpus

Age	DAN	__AN	DA__	DA one	__A one
1;6a	0	0	0	0	0
1;6b	0	0	0	0	0
1;7a	0	0	0	0	0
1;7b	0	0	0	0	0
1;8	0	2	0	0	0
1;9a	1	4	0	1	4
1;9b	0	1	0	0	0
1;9c	0	2	0	0	0
1;10a	0	0	0	0	0
1;10b	2	2	0	0	0
1;11a	2	2	1	1	2
1;11b	0	0	0	0	0
1;12	4	5	0	4	2
2;0	10	3	3	9	3
2;1a	7	1	0	3	1
2;1b	1	0	0	0	0
2;2a	3	1	0	0	1
2;2b	2	3	3	2	1
2;3a	1	1	1	1	1
2;3b	4	1	2	2	0
Total	37	28	10	23	15

Note.   N = noun; D = determiner; A = adjective.

a D-less DP ("__ A N" sequence). Thus, the functional element (D) appears to be more susceptible to omission than the content word (N) in Eve's early DPs. The ratio of N-less DPs ("D A __" sequences) to full "D A N" DPs was 10:37. The frequency of N-omission from DPs containing at least a D and an attributive A was therefore only 21.3%. In María's corpus, during the period from 2;1 to 2;3, when open-class attributive adjectives were first entering her speech, the ratio of (apparent) N-drop ("D __ A" sequences) to full "D N A" DPs was already 6:5 (N-drop frequency of 54.5%). The probability of obtaining 6 or more cases of apparent N-drop (out of 11 relevant DPs) simply by chance, under the null hypothesis that María's early omission of Ns had the same source and frequency as Eve's, is less than .05: p $(x \geq 6 \mid p = .213, N = 11) = .016$ by modified sign test. Hence, María's early use of N-drop is significantly greater than would be expected by chance, when we take Eve's rate of N-omission as the baseline.

4.3. Koki

The main finding from the Koki corpus is that Koki mastered agreement marking for gender and number on determiners and adjectives well before she began using N-drop. Clear uses of open-class, attributive adjectives entered Koki's speech at age 2;2. By this age Koki had already demonstrated productive use of the determiners *el*, *un*, *otro*, *ese*, *este*, *mucho* (masculine singular, 41 uses in the transcripts from 1;7 to 2;2); *la*, *una*, *otra*, *esa*, *esta* (feminine singular, 42 uses); *los*, *muchos*, *otros* (masculine plural, 9 uses); and *las* (feminine plural, 3 uses). Of these 95 determiners, 92 (97%) agreed with the noun in both gender and number. As shown

TABLE 4
Number Marking on Koki's Determiners Between Ages 1;7 and 2;2

Produced	*Required*	
	Singular	*Plural*
Singular	81	2
Plural	1	11

Note.   Fisher exact test (two-tailed), $p < .001$.

TABLE 5
Gender Marking on Koki's Determiners Between Ages 1;7 and 2;2

Produced	*Required*	
	Masculine	*Feminine*
Masculine	50	0
Feminine	0	45

Note.   Fisher exact test (two-tailed), $p < .001$.

in Tables 4 and 5, the contingencies between the required gender and number marking and the gender and number marking actually produced are both robust and statistically significant. Also by the age of 2;2 Koki was making correct use of the (masculine and feminine) singular and (masculine and feminine) plural agreement morphology on adjectives, as well as the plural marker (*-s*) for nouns.

Yet Koki's first use of N-drop did not occur until the age of 2;6 and followed some seven uses of full determiner–noun–adjective (or determiner–adjective–noun) DPs in the transcripts for the period from 2;2 to 2;5:[9]

[2;1.29] e pob(r)e camita 'the poor (little) bed'
            (l)as medias coloradas 'the red stockings'
[2;4.18] (l)as medias [='meyas] <amarillos [*]> 'the yellow stockings'
            [gender mismatch]
[2;5.24] el oso chiquitito 'the little bear'
            el oso # grande 'the big bear'
            a (e)l osito chiquit(o) '(to) the little bear'
            el pelito [/] ve(r)de 'the green hair'

Among these early attributive uses of adjectives, only one clear error was noted in gender–number agreement between the adjective and the head noun: the gender mismatch in *(l)as medias [='meyas] <amarillos [*]>* 'the yellow stockings', at 2;4.

On the other hand, in the transcript where N-drop first appears (Transcript 9), N-drop predominates over full determiner–noun–adjective DPs by a ratio of at least 11:1. In fact, the ratio may be as high as 13:1, but we have chosen to exclude two possible cases of N-drop that were judged to be ambiguous. Uses of N-drop and overt nouns were as follows:[10]

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[9]Note that in *e pob(r)e camita* (age 2;1.29) Koki substitutes the form *e* for *la*. She appears to use *e* as a gender-neutral "protodeterminer" in some of her earliest speech (cf. among others López-Ornat (1997)). Also, notice that in one of her first N-drop examples *un azul* 'a blue (one)' (at age 2;6.10) Koki substitutes *un* for adult Spanish *uno*.

[10]Again, it is of interest to check when Koki began using nonadjectival N-drop with prepositional phrases headed by *de* 'of' and with relative clauses headed by *que* 'that'. The relative-clause construction entered Koki's speech at the same age (2;6.10) as adjectival N-drop. The first clear use was *esto que estaba pegado ahí* 'this (thing) that was stuck there'. (The form *esto* appears to correspond to the adult Spanish masculine-singular form *este*.) The onset of N-drop with *de* phrases is more difficult to determine. If we adopt the measure of "first clear use followed soon after by regular use" (cf. Stromswold (1996)), then the age of acquisition is 2;6.10, and the key utterance is *ése de éste* 'that (one) of / about this (one)'. Yet Koki produced one isolated use of this construction much earlier, at age 2;2.27: *ot(r)o del papá* 'another (one) of / about the father'. Koki was singing when she produced this utterance, which suggests that it could have been part of a memorized song. Following this occurrence there were no clear uses in her transcripts for more than 3 months. After the next use, *ése de éste*, the construction occurred at least once in every transcript. If we discount the isolated occurrence at 2;2, then the evidence from both Koki and María supports analyses in which adjectival and nonadjectival forms of Spanish N-drop have a common grammatical source, possibly related to characteristics of the Spanish determiner but independent of any property of the Spanish adjective.

[2;6.10: N-drop]
  el pequeño 'the small (one)' [2 distinct uses]
  la pequeña 'the small (one)' [4 distinct uses]
  esos bonitos 'those pretty (ones)'
  un azul 'a blue (one)'
  ot(r)o azul 'another blue (one)'
  el ot(r)o pegado 'the other stuck-on (one)' [2 distinct uses]
Not Counted:
  (ver) los # sacaditos 'the taken-out (ones)' [? *los* may be clitic or Det]
  la pequeño 'the small (one)' [? gender mismatch]
[2;6.10: determiner adjective noun]
  esas bonitas cortinas 'those pretty curtains'

Thus, in absolute terms, Koki's first clear use of N-drop occurred approximately 4 months later than the age at which she began producing clear DPs with overt determiners and attributive adjectives and at least 4 months after she had mastered the system of gender–number agreement on the Spanish determiner. To test whether this temporal gap could have been the result simply of sampling an infrequent construction, we performed a modified sign test using the 11:1 ratio observed at age 2;6 between N-drop and overt determiner–noun–adjective sequences. We thereby determined the probability of sampling seven full determiner–noun–adjective DPs before the first instance of N-drop simply by chance, under the null hypothesis that both constructions were grammatically possible by age 2;2 and had the same relative probability of production observed at age 2;6 (when both were clearly attested in Koki's speech). The resulting probability was substantially less than 1 in 1,000: p ($x = 7 \mid p = .083, N = 7$) < .001.

5. DISCUSSION

Our findings have clear implications for the psychological representation of grammatical knowledge: Most important, the availability of N-drop in Spanish *cannot* be represented purely as knowledge of a morphological agreement paradigm. Koki clearly mastered all potentially relevant morphological aspects of Spanish significantly earlier than she acquired N-drop.

Our findings likewise speak against any account in which overt morphology is the learner's principal source of evidence concerning N-drop. Moreover, the fact that Koki actually *added* words (i.e., overt nouns), where the adult language would normally omit them, speaks strongly against a performance account of her nonadult utterances and indicates instead that Koki was obeying the requirements of a grammar different from that of adult Spanish.

Nonetheless, our findings are compatible with certain weaker relations between N-drop and overt morphology. For example, Kester (1996a; 1996b) distinguished

between "licensing" and "identification" of the *pro* in N-drop (following Rizzi (1986) on licensing vs. identification of null pronominals in Italian). If one adopted Kester's distinction between licensing and identification (but diverging considerably in the details), one could consider an analysis for Spanish N-drop in which the nonlexical noun can be *identified* by overt agreement morphology but in which the *licensing* of this empty category depends on separate, more abstract properties.[11]

By distinguishing between licensing and identification we might also account for a discrepancy between our findings and the results of Lillo-Martin (1991) for American Sign Language (ASL). Children learning ASL have been observed to acquire certain types of null arguments in tandem with the spatial agreement system of the language, in contrast to what we have seen for Koki. Yet both the agreement system and the null arguments in question are acquired considerably later in ASL than is N-drop in Spanish. Thus, if children learning ASL master the language-particular requirements for licensing of null arguments relatively early, perhaps at approximately the age when Koki mastered N-drop, a delay in acquisition of the mechanisms for identification of null arguments would make identification the limiting factor. Null arguments would in this case be expected to appear in tandem with the agreement system, even though the agreement morphology is not by itself a sufficient condition for null arguments.

A prediction for Spanish N-drop, on this approach, is that only two of the three logically possible acquisitional orderings of agreement morphology and N-drop will in fact be attested: In particular, we should never encounter a child who entirely lacks the DP-internal agreement system of Spanish and yet uses the adult Spanish option of N-drop. On the other hand, the patterns exhibited by María and Koki are both expected. First, a child may acquire the abstract licensing component of N-drop either prior to, or concurrently with, the morphological agreement system (the identification component). In this case we expect to see N-drop as soon as the child starts producing both DP-internal agreement marking and attributive adjectives; María's data are consistent with this scenario. Alternatively, the child can acquire the morphological agreement system strictly prior to the abstract licensing component of N-drop. If the child starts producing both DP-internal agreement marking and attributive adjectives early enough (before the licensing component is acquired), a clear stage will be evident in which the child produces DPs with overt Ns and systematically refrains from N-drop. Koki's data are consistent with this second scenario.

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[11]Kester (1996a; 1996b), however, related both the identification and the licensing of the empty category in Dutch N-drop to (different) aspects of overt agreement morphology. She proposed that the Dutch adjectival suffix *-e* serves to license *pro*, which in turn can be identified by a lexical antecedent, by the ending *-n* [+human, +plural] or *-s* [+mass] on the adjective or by grammatical gender features (neuter vs. nonneuter) on the determiner. This move, if carried over to Spanish, would be problematic in light of the acquisitional evidence reported here for Koki. To make sense of Koki's pattern of acquisition, the licensing mechanism for Spanish N-drop would at least need to be logically independent of the DP-internal system of agreement morphology.

A question for future longitudinal studies of Spanish acquisition is whether these two scenarios indeed turn out to be the only ones attested. In addition to analyzing further corpora of spontaneous speech, experimental studies could be useful. Although techniques such as grammaticality judgment are generally too demanding for children in the relevant age range of 2 to 3 years (McDaniel and Cairns (1996, 248)), an elicited-production study might be feasible. The main prediction would be that some of the children exhibiting mastery of the morphological marking for gender and number would nonetheless refrain from producing N-drop, and would instead supply an overt N, in their elicited speech. These would be children who mastered the overt morphology before they acquired the abstract licensing component of N-drop. On the speculation that overt morphological agreement is a necessary (although not sufficient) condition for N-drop, a further prediction would be that children who fail to make appropriate morphological distinctions for gender and number would necessarily refrain from using N-drop.

6.   CONCLUSION

N-drop was among the likeliest candidates for a point of syntactic variation that could be tied directly to a morphological paradigm. Yet the results of our acquisitional investigation are compatible with only a more limited connection to overt morphology. Our results therefore favor a model of the human language faculty in which points of syntactic variation are not fully reducible to the overt inflectional and declensional morphology.

ACKNOWLEDGMENTS

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