Children's Acquisition of Variable Differential Object Marking in Spanish

M. Cole Callen and Karen Miller

Language is an inherently variable phenomenon. Much previous research in language development has focused on invariant linguistic structures. However, research in variationist sociolinguistics has shown that many patterns in language are both variable and systematic. While variable forms are studied widely in adult language, studies of variation in child language are still rare. As Hudson Kam (2015) explains, "understanding how human learners cope with deterministic and variable aspects of the language in their input is crucial if we are to understand the totality of humans' abilities to acquire language" (p. 906). Therefore, exploring children's acquisition of variable linguistic structures provides an important piece of the puzzle in language development research.

Here we present a study of children's acquisition of variable patterns of Spanish differential object marking (DOM) to demonstrate how to approach this area of research. Spanish DOM is characterized by the use of the multifunctional morpheme *a* to mark certain types of direct objects (DOs). The variable use of DOM in Spanish depends primarily on linguistic factors such as the animacy and specificity of the DO. Importantly, the use of DOM is not influenced by social constraints.[1] The examples in (1) demonstrate the variability of DOM in Spanish:

(1) a. Viste a tu tío ?
see.2SG.PST DOM your uncle
'Did you see your uncle?'

b. Viste el pece-cito ?
see.2SG.PST DEF fish-DIM
'Did you see the fishy?"

c. Viste a-l perr-ito ?
see.2SG.PST DOM-DEF dog-DIM
'Did you see the doggy?'

In (1a) we see that the differential object marker *a* occurs with the DO *tu tío* ('your uncle'), but we do not see the *a*-marker in (1b) with *pececito* ('fishy'). This difference emerges because DOM occurs preferentially with human-referent

* M. Cole Callen, Penn State, ccallen@psu.edu; Karen Miller, Penn State, kxm80@psu.edu.

[1] However, variation may exist among regional varieties of Spanish. See studies by Alfaraz (2011), Tippets (2011), and Balasch (2011).

 Proceedings of the 46th annual Boston University Conference on Language Development, ed. Ying Gong and Felix Kpogo, 76-89. Somerville, MA: Cascadilla Press.

objects. However, some animal-referent DOs do occur with the *a*-marker, such as *perrito* ('doggy') in (1c).

Variable phenomena such as Spanish DOM and many others across different languages are conditioned probabilistically by social and/or linguistic factors. From a developmental perspective, one fundamental question is how children learn the array of constraints on variable forms from their input. Before addressing this question in the case of DOM, we present an overview of previous studies on the acquisition of (socio)linguistic variation in Section 1. In Section 2, we discuss some important considerations for investigating variable forms in child language. Section 3 presents an overview of DOM in Spanish, and Section 4 provides the methodology and findings from a case study on children's use of DOM. We conclude in Section 5 by contextualizing our findings in those of previous studies on the acquisition of variation and providing suggestions for future directions.

1. Background on the acquisition of variation

1.1. Phonological variation in acquisition

Much of the early research on adult language variation focused on phonetic variables. It follows that the first studies of children's acquisition of linguistic variation also considered patterns of phonetic variation. Since the late 1980s, more and more research has become interested in how and when children learn the variety of constraints on (socio)linguistic variation. Labov (1989) examined the variable use of /ing/ vs. /in/ as well as variable final /t,d/ deletion in one family of English speakers from Pennsylvania. There were three children in the family: ages 2, 4, and 7. When the children's productions were compared to those of their parents, Labov found that the children acquire the social and stylistic constraints before the grammatical and articulatory constraints on these variable forms.

Roberts (1994, 1997), investigating the same variable phonological forms, found similar patterns in a group of 16 children between 3 and 4 years of age. Moreover, Roberts (1997) found evidence that these young children make use of both the stylistic and grammatical conditioning factors in their use of the /in/ vs. /ing/ variants, but only grammatical constraints influence their use of final /t,d/ deletion. Roberts' (1997) and Labov's (1989) findings suggest that the order of acquisition of specific variable constraints may depend on the linguistic phenomenon itself.

More recently, researchers have begun to assess the acquisition of variable phenomena outside of U.S. English-speaking contexts. For example, Chevrot et al. (2000) showed experimentally that French-speaking children from France (ages 6–7 and 10–12) learn the phonological constraints on variable post-consonantal word-final /R/ production before the social/stylistic constraints. Miller (2013a) investigated 10 Chilean Spanish-speaking children's use of variable final /s/-lenition. The author found that these children (ages 2;4–5;9) had learned the variable contexts of usage (both linguistic and stylistic) when compared to their caregivers.

Smith et al. (2007) studied the language-internal and language-external constraints of one phonological and one morphosyntactic variable in a dialect of rural Scottish English. Importantly, the authors compared data from 11 children (ages 2;10–3;6) to that of their caregivers. Smith et al. found that these young Scottish children had acquired the language-internal constraints on both variable forms, but stylistic variation in children's speech was only evident in their use of the phonological variable. This study shows that acquisition of variable forms occurs early (as had been suggested by Roberts & Labov, 1995). Smith et al's findings also highlight the crucial role of caregiver input in children's acquisition of both phonological and morphosyntactic variation (see also Smith et al., 2009; and Smith & Durham, 2019).

1.2. Acquisition of morphosyntactic variation

In the past decade and a half, researchers have become more interested in morphosyntactic variation in the developmental literature. These variable phenomena include both sociolinguistic and language-internal variation. In addition to Smith et al.'s (2007) study, other studies of nonstandard morphosyntactic variation have emerged. Data presented by Newkirk-Turner & Green (2016) show that children acquiring African American English show lower rates of 3sg *-s* in the younger age group (3 years), but higher rates in the older age groups (4–6 years). Their finding suggests that children become more variable overtime, and this difference may be attributed to the input, but caregiver input was not examined in their study (see also Green, 2019).

Miller (2013b) investigated non-agreeing *don't* in the longitudinal data of two children. The author showed that the two children differed in the input provided by their parents in that Sarah heard both *don't* and *doesn't* with 3sg subjects in her input, while Nina consistently heard *doesn't* with 3sg subjects from her caregivers. Miller's (2013b) study emphasizes the importance of considering variable forms in the input when investigating other developmental phenomena such as the Root Infinitive Stage (see also Newkirk-Turner & Green, 2016). While studies on the development of sociolinguistic morphosyntactic variation remain few in number, there is a growing interest in these phenomena.

Other recent studies have examined children's acquisition of linguistic variation that is constrained only by language-internal factors. Shin (2016) showed that children may not acquire all the constraints on variable subject pronoun use in Spanish until age 10 (see also Shin, 2021; Shin & Van Buren, 2016). Shin (2016) proposed that children's learning of the variable constraints depends on the frequency of conditioning contexts, such that a less frequent conditioning context may lead to later acquisition. In a study of variable verbal and nominal agreement in Brazilian Portuguese-speaking children (1;11–5;0), Gomes et al. (2011). found that, over time, children demonstrated gradual knowledge of the linguistic constraints on verbal agreement, but not those on nominal agreement. The authors contribute this finding to lower frequency of

conditioning contexts for nominal forms (Gomes et al., 2011, pp. 49–50). We return to the role of frequency in development in the discussion in Section 5.

Recently, Shin & Miller (2021) proposed a developmental trajectory for variable morphosyntax by reviewing previous literature. The trajectory proposed by the authors follows four stages. In Step 1 children learn the different variants of a variable phenomenon sequentially. Children use the variants in mutually exclusive contexts in Step 2; the contexts chosen by the child may depend on the distribution of the variants in the input from the caregivers. Step 3 is characterized by children extending their use of the variants in certain (frequent) overlapping contexts. Finally, in Step 4, children begin to generalize their use of the variants in other overlapping contexts. Shin & Miller's proposed pathway provides the opportunity for future research to test their hypotheses.

2. Considerations in studying children's acquisition of variation

What remains clear from the review of previous studies in Section 1 is that variation is complex because the developmental trajectory of a variable depends on linguistic, social, and input-based factors. Because of this complexity, we outline the four most important considerations for developmental research on linguistic variation below. These four considerations will be highlighted in the context of our present study (in Sections 4 and 5).

2.1. Consideration 1: corpus vs. experimental methods

For many variable forms, corpus-based data are the ideal. This holds especially true for socially constrained variation because such forms are difficult to elicit in laboratory settings. However, even in the case of language-internal variation, such as DOM, differences in usage patterns differ greatly between experimental elicitation results and naturalistic data. In an experimental task, Bautista-Maldonado & Montrul's (2019) study showed that Spanish-speaking adults from Mexico produced DOM at rates of 97.8% with definite, human DOs. However, Lizárraga Navarro & Mora-Bustos (2010) showed lower rates of DOM around 64.4% in their corpus of Mexican Spanish. Thus, naturalistic usage patterns differ from speakers' performances on experimental tasks.

Experimental methods can supplement corpus studies in many ways. For example, if a variable form is infrequent in corpus data, experimental tasks may be designed to create as naturalistic an environment as possible, while still being controlled to guarantee higher token counts of infrequent contexts. Thus, corpus and experimental data can work in tandem to provide a better understanding of children's use of variation.

2.2. Consideration 2: caregiver input data

Input data from children's caregivers is essential for our understanding of an individual child's language use. This is especially important considering that

individual variability has been found for sociolinguistic variation in adult speech. Labov (1989, p. 89) states, "To show how […] language-specific variation is transmitted, it will be helpful to examine variation within families […]." Miller's (2013b) study also highlights the importance of understanding the relationship between a child's own speech and that of their caregivers.

Data from children's caregivers would ideally come from child-directed speech during child-caregiver interactions. However, adult-to-adult interactions involving the caregiver could provide an informative alternative. Furthermore, including both adult-directed and child-directed speech can allow one to determine how caregivers may alter their use of variable forms when speaking to young children. In the context of experimental research, it would be beneficial to have caregivers complete the same tasks as children.

2.3. Consideration 3: age range

The age range of the selected sample of children may depend on the linguistic variable itself. Much linguistic variation seems to be acquired by age 5, if not earlier, regardless of whether the variation is constrained socially or linguistically (Smith et al., 2007; Miller, 2013a; Roberts, 1997; Requena, 2015; i.a.). However, children may still be in the process of learning certain variable forms beyond age 5, as is clear from Shin's (2016) study. Other studies suggest that children are approaching adult-like patterns around ages 5 and 6, although more extensive research is needed both at younger and older ages (e.g., Chevrot et al., 2000; Green, 2019; Gomes et al., 2011). Testing before and during school age may reveal importance differences because children's patterns of usage of stigmatized nonstandard forms may be targeted in prescriptive settings.

2.4. Consideration 4: social and stylistic constraints

Because some types of variation are constrained by social factors, such as gender, socioeconomic class, or dialect background of the speaker, balancing across these groups becomes an important consideration when sampling from a population of children. When stylistic variation plays a role, it is important to control for different contexts of speech style in both experimental and naturalistic settings (see, e.g., Chevrot et al., 2000). Even if not controlled a priori, coding of speech style is possible in corpus data (see, Smith & Durham, 2019, pp. 50–57).

3. Previous research on DOM

3.1. DOM in adult speech

Before presenting the results of the present study, we provide a brief overview of previous research on DOM in both adult speech and in acquisition. Differential object marking in Spanish is a complex phenomenon of case marking.

As mentioned in the introduction, DOM in Spanish makes use of the morpheme *a* in the accusative marking of certain types of direct objects. Researchers have approached DOM from a variety of theoretical perspectives. Most of this research converges on the conclusion that DOM tends to be constrained primarily by the animacy and the specificity of the DO (see Torrego, 1998; Aissen, 2003; Leonetti, 2004; von Heusinger & Kaiser, 2003; i.a.).[2] Specific, human DOs favor the occurrence DOM, and DOM is least likely to occur with nonspecific (see 2a) and inanimate DOs (see 2b). Many of these studies refer to the variability (or *optionality*) of DOM with certain DO types, especially with animal-referent nouns, but variability has not been the focus of most studies.

(2) a. Estaba busca-ndo Ø una pareja
COP.1SG/3SG.IPFV search-PROG indef.FEM partner
'He was looking for a partner.'

b. Puse Ø la carta en un sobre
put.1SG.PST DEF.FEM letter in INDEF envelope
'I put the letter in an envelope.'

Other researchers have incorporated DOM into variationist work using statistical methods (namely, variable rule analysis). For example, Tippets (2011) showed that specificity is a statistically significant predictor of the occurrence of DOM in three varieties of Spanish, while Balasch (2011) found that definiteness was a significant predictor of DOM in Venezuelan Spanish. Additionally, Alfaraz (2011) demonstrated that both definiteness and specificity play a role in the variable use of DOM in Cuban Spanish. Finally, Lizárraga Navarro & Mora-Bustos (2010) found that Mexican Spanish speakers mark human DOs significantly more often than non-human animate DOs. Based on these findings for adult speech, specificity and animacy will be the focus of this study.

3.2. DOM in child speech

There is little developmental literature on DOM in the acquisition of Spanish. Montrul & Sánchez-Walker's (2013) experimental study revealed that children produce adult-like DOM by age 6 at the latest. The authors suggest that DOM is likely acquired between ages 4 and 6 (see page 126 in that paper). Rodríguez-Mondoñedo (2008) investigated corpus data from monolingual children ages (0;9–3;0) and found marking rates of 82% with human, specific DOs (55 tokens in all). The children in a corpus study by Ticio & Avram (2015) produced rates of around 74.5% marking with animate DOs of different referential status (94 tokens in all). However, neither of these corpus studies included input data from the children's caregivers. Additionally, both corpus studies have low token counts.

[2] It is important to mention that researchers argue for definiteness, while others argue for discourse referentiality instead of specificity (see von Heusinger & Kaiser, 2003).

Callen & Miller (2021) provided the largest developmental corpus study of DOM to date. Callen & Miller's study includes the speech of 12 Mexican children (ages 2;7–5;2) and their caregivers. In total, their study included 292 child-produced tokens and 409 caregiver-produced tokens. The authors found that children seemed to learn the animacy constraint (i.e., human vs. animal) on DOM at the earliest ages included. However, they found that the children younger than 3 years old had not learned the specificity constraint on DOM, although the token counts for nonspecific DOs are quite low. The case study in Section 4 draws from a subset of Callen & Miller's (2021) data.

4. Case study of DOM in four Mexican children

4.1. Corpus data

The data extracted for this study come from the *Mexican Child-Caregiver Corpus*, which contains about 125 hours of recorded interactions between 25 children and their caregivers from Mexico City (Miller & Schmitt, 2012). A subset of 12 of these child-caregiver dyads are included in Callen & Miller's (2021) study on the acquisition of DOM. A further subset of four children was chosen for the present case study to assess individual patterns of development. Table 1 displays the metadata for each of these four children. We read all transcriptions of the interactions between child and caregiver (approx. 14 hours of data). Every instance of an animate DO was extracted for this dataset. We excluded inanimate DOs because they occurred categorically unmarked in this subset of the data. Additionally, only lexical nouns were included in the present dataset. This choice differs from Callen & Miller (2021) in which pronouns and proper nouns were also included. In total, data extraction yielded 203 tokens.

Table 1. Metadata for the children in the case study

Child Name	Age	Hours of data	No. of tokens	No. of caregiver tokens
Elizabeth	2;11	2.70	13	19
Lorena	2;11	4.00	13	21
Gasper	4;1	4.00	39	36
Sami	4;3	3.42	32	30

We chose these four children for two main reasons. First, these children represent two important age groups: below 3;0 and above 3;0. The children were separated into two age groups divided at age 3;0 based on previous claims regarding the acquisition of DOM in Spanish (see Rodríguez-Mondoñedo, 2008; Callen & Miller, 2021). Importantly, the two children in each age group are approximately the same ages (see Table 1). The second reason for choosing these four children is that they had the highest token counts of nonspecific DOs in their

respective age groups. Although the counts for each child remain low, they allow us to better assess (at least preliminarily) the individual developmental patterns.

All 203 tokens were coded for the linguistic factors of Animacy and Specificity. Regarding animacy, tokens were coded as either *human* or *animal*. Animal characters from movies, fairytales, and storybooks were all coded as *human* if they were able to speak in the context of the story. Additionally, we coded tokens as either *specific* or *nonspecific*. *Specific* NPs are unique to the discourse context and are not interchangeable with other entities; *nonspecific* NPs are those that "refer to any member of a class of entities" (Torres Cacoullos & Aarons, 2003: 307). With this coding in mind, the constraints of Animacy and Specificity will be assessed for each of the four children. Due to low token counts across individuals, the interaction between specificity and animacy will not be assessed in the present study.

4.2. Animacy patterns in child speech

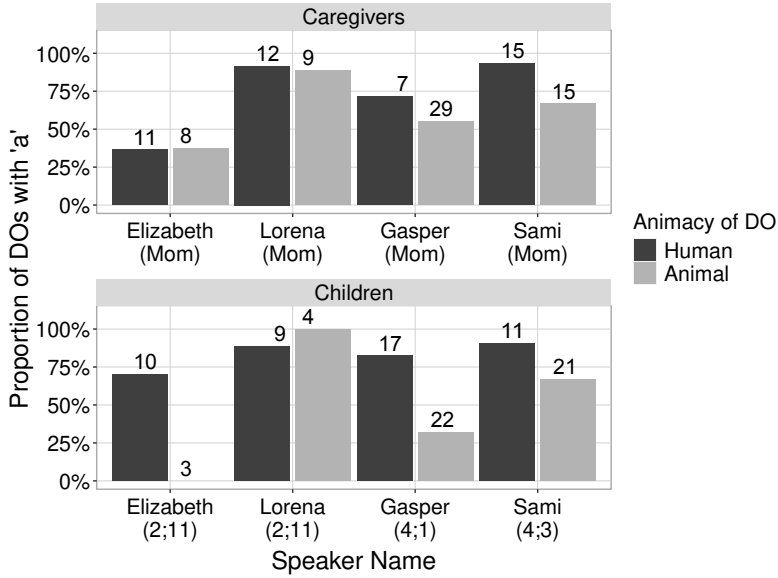
Because the animacy of a noun is one of the primary factors that influences the use of DOM (see Section 3.1 above), we will assess the conditioning of animacy on DOM in the four children and their caregivers. Figure 1 displays the animacy-based patterns of marking for each child and each caregiver.[3] Three of the four children appear to follow their caregivers' patterns of DOM. Both Gasper (4;1) and Sami (4;3) mark human DOs over 75% of the time. Both children also show relatively lower rates of marking with animal-referent DOs: Gasper produces 27.3% marking, and Sami produces DOM at a rate of 61.9%. Gasper's mother and Sami's mother demonstrate similar patterns. However, Gasper's mother only produces 7 human tokens total, 5 of which are marked (71.4%). Although Gasper seems to be using DOM at lower rates with animal DOs than his mother, the relative preference for DOM with human- over animal-referent DOs matches that of his caregiver.

The two younger children show divergent patterns of marking. Lorena (2;11) produces DOM 100% of the time with animal-referent nouns (4 tokens total), while Elizabeth (2;11) never marks animal DOs (3 tokens total). Despite low token counts for both children, it seems that Lorena's high rate of marking may be influenced by the input from her mother. Lorena's mother uses DOM with 8 of 9 animal DOs (approx. 89%). Elizabeth's categorical nonuse of DOM with animal-referent nouns reflects her own mother's low marking rates: 3/8 marked DOs (or 37.5%). With regard to the human-referent tokens, Lorena closely matches her mother's usage rates: 8/9 marked DOs (89%) from Lorena and 11/12 (91.7%) marked DOs from her mother. However, Elizabeth uses DOM at a higher rate (70%) than her mother (36.4%) when the DO is human. Thus, while Elizabeth's marking patterns do not align with those of her mother, the preference

[3] All figures were created using the *ggplot2* package (Wickham, 2016) in the R statistical software (R Core Team, 2021).

for marking with human-referent DOs converges with the rates of the other adults in this corpus (see Callen & Miller, 2021 for the larger group-level data).

From these animacy-related results, we see that most of the children match their caregivers' patterns of DOM to a great extent. However, these patterns are perhaps more robust in the two older children and their caregivers because they produced more instances of DOs compared to the younger children and their caregivers. Despite Elizabeth's younger age and her mother's non-conforming marking patterns, Elizabeth appears to be following the more general adult-like conditioning of DOM based on the animacy of the direct object. This finding illustrates that the animacy constraint may be acquired early on in development (i.e., before age 3;0).



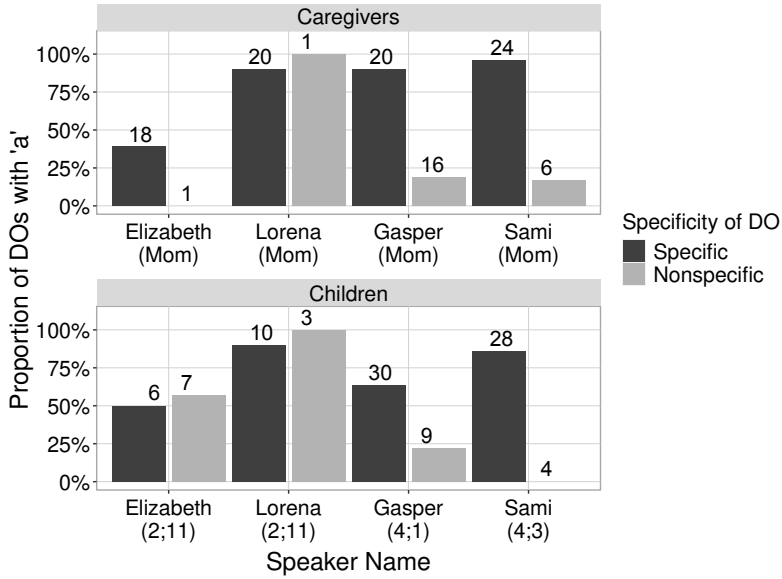
Note: Values above the bars indicate total token counts

Figure 1. Animacy marking patterns in children's and caregivers' speech

4.3. Specificity patterns in child speech

In addition to animacy, specificity also conditions the use of DOM in Spanish (see Section 3.1). Figure 2 illustrates each child's and each caregiver's pattern of marking according to the specificity of the DO. Importantly, we find low token counts for nonspecific DOs among the children (especially Sami and Lorena) as well as the caregivers (namely, Elizabeth's and Lorena's mothers). As with the animacy constraint, the two older children seem to be following more adult-like conditioning of specificity relative to the two younger children. Gasper produces 9 nonspecific DOs, of which only 2 are marked, yielding a rate of around 22.2%.

Sami never uses the *a*-marker with any of his four nonspecific tokens. Both Sami's and Gasper's mothers show comparable rates of marking with nonspecific DOs—16.7% and 18.8%, respectively. All four individuals show much higher rates of marking with specific nouns ranging between 63.3% from Gasper and 95.8% from Sami's mother. Therefore, in the speech of the two older children and their parents there emerges a clear preference for DOM with specific DOs as well as a dispreference for DOM with nonspecific DOs.



Note: Values above the bars indicate total token counts

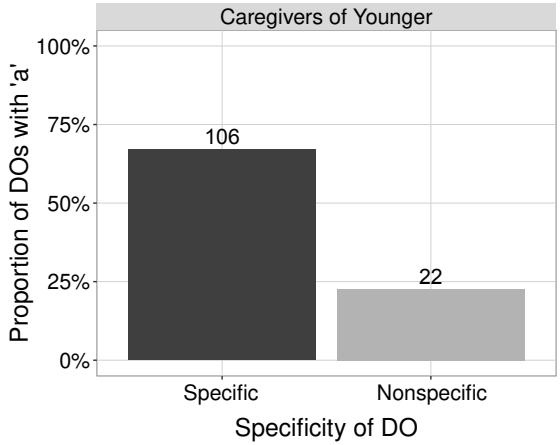
Figure 2. Specificity marking patterns in children's and caregivers' speech

In discussing the younger children's patterns of marking with specific and nonspecific DOs, we will compare their patterns to those of the group-level rates of use among all seven caregivers of the younger children from Callen & Miller (2021). These rates are displayed below in Figure 3.[4] Overall, the caregivers of the younger children produced DOM at a rate of 67% with specific DOs and 22.7% with nonspecific DOs. Thus, nonspecific nouns disprefer DOM and specific DOs prefer DOM, as in the older children and their caregivers. However, Elizabeth's and Lorena's data show non-conforming patterns. Elizabeth produces similar rates of DOM with both nonspecific and specific nouns—57.1% and 50%, respectively. Lorena's data also shows similar rates for both types of DOs: 100%

[4] The token counts and rates of marking in Figure 3 here differ from those presented in Callen & Miller's (2021) paper. This difference is due to the exclusion of pronouns and proper nouns from the data in the present study.

for nonspecific DOs and 90% for specific DOs. Therefore, neither of the two younger children demonstrates knowledge of a specificity constraint on DOM, although the token counts are low.

As an intermediate conclusion, it seems that children learn the animacy constraint on variable DOM before the specificity constraint. As Callen & Miller (2021) point out, this ordering of constraints in development could result from the lower frequency of nonspecific DOs relative to specific DOs (see discussion of Shin, 2016, 2021, below). These disparate rates of occurrence are evident from the data in Figures 2 and 3. Despite these frequency differences, it remains clear that the *animacy* constraint is acquired early on (before age 3;0).



Note: Values above the bars indicate total token counts

Figure 3. Specificity marking in the seven younger children's caregivers' speech from Callen & Miller (2021)

5. Discussion

Several important findings emerge from the case study presented above. First, children produce variable DOM in Spanish in an adult-like way by around age 4. Importantly, this is earlier than the age of 5;2 reported in Callen & Miller (2021), but later than the suggested age of 3;0 in Rodríguez-Mondoñedo (2008). The age range in this study (i.e., 4;1–4;3) falls within the 4–6 range proposed by Montrul & Sánchez-Walker (2013). This finding also aligns with previous research on the acquisition of other variable forms, such as in Roberts (1997), Smith et al. (2007), Requena (2015), and Miller (2013a). Therefore, it seems that the linguistic constraints on variable morphosyntactic forms can be acquired by age 4, although some forms may take longer.

Second, children under age 3 seem to produce the *a*-marker at comparable rates with both specific and nonspecific DOs. While this pattern does not align with the specificity patterns of marking in adult speech, these children still show

knowledge of the animacy constraint on DOM. The reason for the incomplete acquisition of the specificity constraint at this younger age may be attributed to two proposals. The first option comes from the Interface Hypothesis. Sorace (2011, p. 5) suggests that monolingual children show protracted development with structures at the syntax-discourse interface, but not at the syntax-semantics interface (see also Sorace et al., 2009). The use of DOM is constrained by both discourse-related (namely, specificity) and semantic properties (namely, animacy). While the younger children in our study exhibit early learning of the semantic constraint, the discourse constraint does not appear until later in development. Thus, it seems that even monolingual children take longer to acquire patterns at the syntax-discourse interface.

However, another proposal comes from research on the acquisition of variable forms. Shin (2021) found that the developmental trajectory of variable subject pronoun expression in bilingual children's speech did not support the Interface Hypothesis. Instead, the Frequency Hypothesis explained how these children were able to learn a more frequent, discourse-pragmatic constraint but not a less frequent, morphological constraint. Additionally, Shin (2016) showed that monolingual children learn the discourse-pragmatic constraint before the morphological one. In the case of specificity and DOM, frequency and linguistic domain cannot be disentangled because specificity is discourse-related and nonspecific DOs are infrequent in the input. Given this complexity, we believe that both frequency effects and interfaces may play a role in the acquisition of variable forms that are constrained by discourse-related factors.

Finally, our case study demonstrates both the importance and the difficulty of comparing child and caregiver usage of variable linguistic forms. In the case of more frequent constraints, like animacy for DOM, we can see that children are either following more general adult-like patterns or the patterns of their own caregivers. However, for less frequent contexts, like that of nonspecific DOs, usage patterns are difficult to assess at the individual level. For this reason, larger datasets either from individual children or a larger sample of children are needed to assess the acquisition of variable forms in infrequent conditioning contexts.

Research on the acquisition of variable linguistic forms is a growing area. Further research is needed to address the roles of frequency of conditioning contexts and constraint type in linguistic development. Moreover, it remains unclear whether any fundamental difference exists between linguistic and social constraints in children's acquisition of variable patterns. Future studies should address these questions using data from both linguistic corpora and experimental tasks. Findings from these studies will contribute to a more comprehensive understanding of children's linguistic development.

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Proceedings of the 46th annual Boston University Conference on Language Development

edited by Ying Gong
and Felix Kpogo

Cascadilla Press Somerville, MA 2022

ISSN 1080-692X
ISBN 978-1-57473-077-7 (2 volume set, paperback)

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