LSHSS

Research Article

Assessing Plural Morphology in Children Acquiring /S/-Leniting Dialects of Spanish

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Purpose: To examine the production of plural morphology in children acquiring a dialect of Spanish with syllable-final /s/ lenition with the goal of comparing how plural marker omissions in the speech of these children compare with plural marker omissions in children with language impairment acquiring other varieties of Spanish.
Method: Three production tasks were administered to children. A repetition task was used to examine children's production of the plural marker in plural noun phrases, and 2 Berko-style tasks evaluated children's production of the plural marker in bare nouns. Behavior on these tasks was compared with plural marker comprehension for each individual child.
Results: There was a correlation between children's comprehension of the plural marker and their production of the plural marker on plural noun phrases in the repetition task but not between comprehension and production of the plural marker on bare nouns in the Berko-style tasks.
Conclusions: Assessments of plural morphology as a clinical marker of language impairment in Spanish-speaking children may be problematic, especially in children acquiring dialects of Spanish with /s/ lenition, such as those originating in Chile, the Dominican Republic, Cuba, Puerto Rico, and Central America. Instead, for children acquiring /s/-leniting dialects of Spanish, assessments of the plural marker in noun phrases produced within a sentence frame may be a better indicator of acquisition than traditional Berko-style tasks that elicit bare nouns.

Key Words: Spanish, dialects, plural marking, /s/ lenition, production, comprehension

In recent years there has been an increase in the number of studies that examine language disorders in children acquiring nonmainstream dialects (Goldstein, 2007; Goldstein & Iglesias, 2001; Oetting & McDonald, 2001, 2002; Oetting & NewKirk, 2008; Seymour, Roeper, & de Villiers, 2003). The American Speech-Language-Hearing Association's Multicultural Issues Board (2004) highlighted the importance of understanding sociolinguistic features of children acquiring various dialects because—as Oetting and McDonald (2001) pointed out—"some patterns of nonmainstream dialects, on the surface, can look very similar to those that characterize a language impairment" (p. 208). This creates the potential for overdiagnosis (or underdiagnosis) of language disorders in children and has led to the development of alternative assessment measures to differentiate a *dialect difference* from a *language disorder* (Craig & Washington, 2000; Oetting, 2005; Seymour et al., 2003; Seymour, Bland-Stewart, & Green, 1998).

The focus of these previous studies has been on extending research to different dialects of English. Comparatively speaking, acquisition research on other languages like Spanish is scarce, and only a few studies have examined the impact of sociolinguistic variation on the assessment of language disorders in Spanish-speaking children. This latter work has focused primarily on how phonological variation affects the acquisition of phonemes in different dialects of Spanish (Goldstein, 2007; Goldstein & Iglesias, 1996, 2001). Particular attention has been given to how the phonological process of Spanish /s/ lenition affects acquisition of the phoneme /s/; however, the investigation of how phonological variation affects the acquisition of grammatical morphology has received less attention. Nevertheless, recent studies have proposed that because /s/ lenition causes the Spanish plural marker /*–s*/ to be variably omitted, the input for acquiring plural morphology in /s/-leniting dialects may be more complex, and therefore differences in acquisition patterns may arise (Miller, 2007; Miller & Schmitt, 2010, 2012). Although professionals recognize the problems of overdiagnosing (and underdiagnosing) children with language impairment (LI) who are acquiring different dialects of a language, the task of understanding acquisition of grammatical morphology in different dialects of Spanish remains

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largely unmet. Although the current article focuses on the acquisition of Spanish plural morphology, it should be noted that a variety of other studies have investigated acquisition of other grammatical morphemes in Spanish-speaking children with LI. These include, but are not limited to, tense morphology (Grinstead et al., 2013), gender agreement (Eng & O'Connor, 2000), subject–verb agreement morphology (Bedore & Leonard, 2001; Restrepo & Kruth, 2000), and indefinite and definite determiners (Bedore & Leonard, 2001; Gutierrez-Clellen, Restrepo, Bedore, Peña, & Anderson, 2000).

The bulk of the available data on acquisition of plural morphology in Spanish-speaking children are based primarily on Berko-style elicitation tasks that elicit bare nouns in isolation (as illustrated in Example (1); Bedore & Leonard, 2001; Grinstead, Cantú-Sánchez, & Flores-Ávalos, 2008; Kernan & Blount, 1966; Perez-Pereira, 1989) or on corpus studies of spontaneous speech (Bedore & Leonard, 2005; Marrero & Aguirre, 2003; Restrepo & Kruth, 2000).

(1) Experimenter: Este es un gato [experimenter shows a picture of one cat]
This is-3SG a-SG cat-SG
This is a cat

Ahora hay dos [experimenter shows a picture of two cats]
Now EXST two
Now there are two

Hay dos _____?
EXST two _____?
There are two _____?

Child: gatos
cat-PL
cats[1]

Studies on the production of plural marking in Spanish-speaking children with LI have yielded conflicting results. Bedore and Leonard (2001) showed differences between children with LI and typically developing children using an elicitation task, but their later work examining spontaneous speech showed no such differences (Bedore & Leonard, 2001, 2005; Grinstead et al., 2008). To examine more carefully the possible role of methodology on children's production behavior, in the present research I compared production patterns in two different tasks: (a) a Berko-style elicitation task and (b) a repetition task. One difficulty in assessing plural morphology production in /s/-leniting dialects of Spanish is determining whether an omission is due to the /s/-lenition process or to not having yet acquired plural morphology. To address this issue, all children in the present research were tested both on comprehension and production of the plural marker. A comprehension measure provides a way to determine whether the ability to associate the plural marker to a more-than-one interpretation correlates with production patterns. In this research, I set out to address the following questions:

1. How does /s/ lenition affect children's acquisition of plural morphology?
2. Do children acquiring dialects of Spanish with /s/ lenition show levels of plural marker omissions similar to those of Spanish-speaking children with LI living in the United States (as reported in Bedore & Leonard, 2001)?
3. What sort of production task correlates more closely with children's comprehension of plural morphology?

This article is organized as follows. First, a general overview of Spanish /s/ lenition is presented, followed by a review of previous research on the acquisition of plural morphology. Next, I describe two experimental studies in which I compared elicitation tasks to children's comprehension of the plural marker. The goal was to determine which sort of elicitation task more strongly correlates with children's comprehension of the plural marker. The article concludes with a discussion of the results framed within the three research questions presented above.

Spanish /S/ Lenition

Spanish /s/ lenition is a phonological process that has traditionally been described as resulting in an aspiration [h] or an omission of all syllable-final /s/. The /s/-lenition process is found in most dialects of Spanish, including the varieties spoken in southern Spain, the Canary Islands, and throughout Latin America, with the exception of the Mexican highlands and the Andean regions of South America (Alba, 2000, 2004; Brown & Torres Cacoullos, 2002; Cepeda, 1995; Erker, 2010; File-Muriel & Brown, 2011; Hammond, 1980; Lipski, 1985; Miller, 2007, 2013; Poplack, 1980). In most studies lenition of final /s/ is described as resulting in an aspiration [h] or an omission, and it has been shown to affect both morphological /–s/ (e.g., *gatos* "cats" → [gatos], [gatoh], [gato]) and nonmorphological /s/ (e.g., *bus* "bus" → [bus], [buh], [bu]). This means that in dialects of Spanish with /s/ lenition the nominal plural marker is omitted at varying degrees in the input to children, whereas in dialects of Spanish without /s/ lenition the plural marker (i.e., all final /s/) is consistently produced as an alveolar fricative and is never omitted.

In dialects of Spanish with /s/ lenition, the variable distribution of the variant forms—[s], [h], and omissions—is conditioned by various linguistic (e.g., grammatical category, phonological context) and sociolinguistic factors (e.g., social class, gender, speech style; Alba, 2000, 2004; Brown & Torres Cacoullos, 2002; Cepeda, 1995; Erker, 2010; File-Muriel & Brown, 2011; Hammond, 1980; Lipski, 1985; Miller, 2007, 2013; Poplack, 1980). In particular, working-class speakers omit the final /s/ more often than other social class groups, males omit it more than females, and speakers omit it more often in informal contexts (e.g. casual speech) than in formal contexts (e.g., reading). In addition, adult speakers tend to omit the final /s/ more often when it is a plural maker (e.g., *gatos* [cat-PL]) than when it is non-morphological (e.g., *bus* [bus]), and word position also affects omissions.

[1]SG = singular; EXST = existential; PL = plural.

Word-final /s/ shows higher omission rates than word-medial /s/ (e.g., *mo̲s̲ca* [fly]). At the same time, phrase-final position (e.g., "*Compraron uva̲s̲*" ["They bought grapes"]) shows an increase in the full variant [s], which is consistent with Lipski's (1984) note that "Phrase-final position will typically be more resistant [to lenition], since it gives the final consonant prominence in the speech chain" (p. 34). This means that phrase-final position is predicted to show both an increase in omissions (because it is word final) and an increase in the full variant [s]. Aspirations are less common in the phrase-final position. The effect of word position on /s/ omissions will be important to consider in the discussion of Berko-style elicitation tasks later in this article.

Recent work indicates that Spanish-speaking children begin to acquire the variable rules of /s/ lenition by the beginning of their third birthday, although at this age children are not completely adultlike in their usage (Miller, 2007, 2013). Early in development children produce more omissions than their caregivers do, and throughout the early years (age 2–5) children produce fewer tokens of aspiration. Moreover, the effect of style shifting on /s/ lenition in children does not appear to be as strong as it is in adults (Miller, 2013).

Acquisition of Plural Morphology

In Spanish, the plural marker /*–s*/ has two allomorphs—[*–s*] and [*–es*]—and all elements in the noun phrase agree in number (e.g., *la niña chilena* [the-SG Chilean-SG girl-SG], *las niñas chilenas* [the-PL Chilean-PL girl-PL]). The [*–s*] allomorph attaches to nouns, articles, and adjectives that end with an unstressed vowel (e.g., *gato* [cat-SG] → *gatos* [cat-PL]). Because most Spanish words end in the unstressed vowels [a] or [o], [*–s*] is the most frequent plural allomorph. The [*–es*] allomorph attaches to all nouns that end with a consonant or stressed vowel (e.g., *lápiz* [pencil-SG] → *lápices* [pencil-PL]). In Spanish dialects with /s/ lenition the plural marker is aspirated [h] or omitted not just on plural nouns but also on articles, as well as adjectives at various levels of frequency. Therefore, the evidence for agreement marking in the noun phrase is also weakened.

Spanish-speaking children acquiring dialects of Spanish without /s/ lenition (Madrileño Spanish) begin producing the plural marker on plural nouns around age 1;9 (years; months) and begin producing number agreement in the noun phrase (i.e., producing the plural marker on both the noun and the article) by age 2;0 (Marrero & Aguirre, 2003). Very few studies have examined Spanish-speaking children's comprehension of plural morphology. However, Munn, Miller, and Schmitt (2006) found that by age 3—the youngest age they tested—Mexican Spanish-speaking children associated the plural marker on plural nouns to a more-than-one interpretation in comprehension tasks. Similar findings have been reported for English-speaking children (Kouider, Halberda, Wood, & Carey, 2006). An important question related to these findings is whether there is a production–comprehension asymmetry in the acquisition of plural morphology or whether the lag in comprehension of the plural marker occurs for methodological reasons. One possibility—consistent with the former idea—is that children learn the syntactic distribution of the plural marker before they learn its semantic representation; therefore, the ability to infer number from the plural marker in comprehension tasks may be difficult for children early on. This idea is consistent with studies indicating that children may produce forms that they do not yet fully comprehend (Brandt-Kobele & Hohle, 2010; Hendriks & Koster, 2010; van Hout, Harrigan, & de Villiers, 2010).

The production of plural morphology has been investigated as a possible clinical marker of LI in Spanish-speaking children. Bedore and Leonard (2001) found that Mexican Spanish-speaking children with LI living in the United States omitted the plural marker on plural nouns in a Berko-style elicitation task at very high levels, averaging about 56% omissions (Bedore & Leonard, 2001). However, in spontaneous speech these same children correctly marked plural nouns with a plural marker around 93% of the time (Bedore & Leonard, 2005), indicating that differences in methodology may affect children's usage. One benefit of elicitation tasks is that they provide a way of inferring not only what children know about a particular linguistic form but also what they do not know. In other words, in spontaneous speech children may avoid forms that they do not know. Nevertheless, other studies using similar sorts of elicitation tasks have also shown differing results. Grinstead et al. (2008) used a Berko-style elicitation task to elicit bare plural nouns from Spanish-speaking children with LI and found that they produced the plural marker /*–s*/ 98% of the time and /*–es*/ 70% of the time. Merino (1983a) used a repetition task (see Merino, 1983b, and the references therein) in which she elicited plural nouns within larger sentence frames (e.g., "*Los pájaros cantan*" ["The-PL bird-PL sing-3PL"]) and found that Spanish-speaking children with LI produced the plural marker /*–s*/ 89% of the time and /*–es*/ 68% of the time. In both studies, the children with LI differed significantly from typically developing children on their production of plural morphology; however, the children with LI still reached higher levels of performance than the children from Bedore and Leonard's (2001) study.

One factor that was not considered in previous work was the input type to which children were exposed. In various studies (Miller, 2007), I found that children exposed to a variable input for plural morphology—an input in which adult speakers sometimes produce and sometimes omit the plural marker because of the phonological process of syllable final /s/ lenition—tend to produce the plural marker variably early in development but in comprehension tasks do not associate the plural marker to a more-than-one interpretation until around age 4 to 5 years. This suggests that differences in input type (variable input vs. nonvariable input) can result in a timing difference in acquisition. In particular, children exposed to a variable input may take longer to acquire the plural marker compared to children exposed to a nonvariable input.

The timing difference caused by variable input can be accounted for within Yang's (2002) variational learning

model (VLM). The VLM views language acquisition as a probabilistic competition process among hypotheses about the emerging language. These hypotheses are innate and represent the linguistic features (or clustering of features—parameters) that are possible in human language. Yang framed his model within generative linguistics and thus argued that these hypotheses are made available by Universal Grammar (see Yang, 2002, and the references therein). Because plural morphology is not found in all languages (English has plural morphology; Chinese does not), the child—in the course of language acquisition—must determine whether his or her language has plural morphology. For the acquisition of plural morphology, one could propose two hypotheses: (a) the language has plural morphology (e.g., English) versus (b) the language does not have plural morphology (e.g., Chinese).

The VLM proposes that the learner associates probabilities with the innate hypotheses during the course of language acquisition. When a learner hears an input token, it probabilistically selects a hypothesis to analyze the token. If the token is parsed successfully, the selected grammar is rewarded, and its probability goes up. If the hypothesis fails to parse the input token, its probability is lowered. The model gradually eliminates any hypothesis that is compatible with only a portion of the input data. The VLM predicts that children exposed to an input in which a grammatical form is variably omitted will take longer to acquire the linguistic feature associated with that form (e.g., plural morphology). This is because the child receives evidence both for (e.g., production of the plural marker) and against (e.g., omission of the plural marker) that feature, in other words, an input that is consistent with both hypotheses.

The finding that children exposed to /s/ lenition take longer to comprehend plural morphology also indicates that sociolinguistic processes occurring at one linguistic level (e.g., at the phonological level) can affect children's acquisition at another linguistic level (e.g., at the morphological level). Adding to this, Miller and Schmitt (2012) found that children exposed to /s/-leniting dialects of Spanish produced very few indefinite plural noun phrases (e.g., *unas niñas* [some-PL girl-PL]), preferring instead bare plural noun phrases (e.g., *niñas* [girl-PL]). In their study, Miller and Schmitt elicited plural noun phrases from two groups of Spanish-speaking children: (a) children acquiring /s/-leniting dialects and (b) children acquiring non-/s/-leniting dialects. The results showed that children acquiring /s/-leniting dialects of Spanish produced virtually no plural indefinite noun phrases. Only 6% (8/140 experimental trials) of all plural noun phrases produced by these children were plural indefinite noun phrases; instead, these children overwhelmingly preferred to describe plural sets using bare plural or bare singular noun phrases. On the other hand, children acquiring non-/s/-leniting dialects showed a strong preference for plural indefinite noun phrases, producing them 80% of the time (68/85 trials). To explain this difference, we hypothesized that if children took longer to acquire the plural marker /–*s*/ (because of the variable input due to /s/ lenition), they would not initially produce indefinite plural noun phrases to signal plurality because the plural indefinite article (i.e., *unos*/*unas*) is identical to the singular indefinite article (and the Spanish numeral 1—*uno*/*una*), except for the presence of the plural marker. In other words, if children ignore the plural marker, the indefinite plural article becomes identical to the Spanish numeral 1.

Although Miller and Schmitt (2012) found a link between /s/ lenition and the acquisition of indefinite noun phrases in Spanish-speaking children, the connection between these two processes is much less direct than, for example, between /s/ lenition and the acquisition of the phoneme /s/. This highlights the importance of investigating the impact of phonological variation not only on the acquisition of phonemes (see Goldstein & Iglesias, 1996) but also on the acquisition of other areas of the language, especially given that production of indefinite articles in children with LI has been the focus of recent studies (Hansson, Nettelbladt, & Leonard, 2003; Polite, Leonard, & Roberts, 2011), including studies involving Spanish-speaking children with LI in which omission rates of plural indefinite articles were calculated (Bedore & Leonard, 2001). The prediction for children of /s/-leniting dialects is that they should omit the indefinite article (i.e., produce bare plural nouns) at very high levels.

Only a few studies have taken Spanish /s/ lenition into account when investigating language acquisition in Spanish-speaking children. In the literature on child language disorders, this work has focused exclusively on the acquisition of the phoneme /s/ (Goldstein & Iglesias, 1996, 2001). In the present research, I took a step in a slightly different direction by asking how /s/ lenition might affect acquisition of grammatical morphology.

Study 1

Method

Participants. Study 1 built on data analyzed in my 2007 study, in which I found that many children acquiring a dialect of Spanish with /s/ lenition did not comprehend the plural marker until age 5 years. In that study, an act-out task with 70 Chilean children showed that about half of those children had difficulty associating indefinite plural noun phrases—like *unas bolitas* [some-PL marbles-PL]—to a more-than-one interpretation in comprehension. Mexican children acquiring a dialect of Spanish without /s/ lenition who were of the same age and social class had no difficulty with the task.

The act-out task was simple. Children were presented with sets of six small objects (e.g., six marbles, six miniature spiders) and were asked to place sets of the objects into a box. In the target conditions, children were required to put "some" [*unas, algunas*] and "one" [*una, alguna*] of the objects into the box, and in the control conditions the children were asked to place "all" [*todas*], "few" [*pocas*], or "many" [*muchas*] of the objects into the box. There were four trials for each condition, and the plural marker was always pronounced as the full form [-s] by the research assistant. A subset of children in the Miller (2007) study were tested on the plural marker when it was pronounced as [h], but this did not affect performance, and these children were not included in

the present study. Hence, the task tested plural–singular indefinite noun phrase minimal pairs (e.g., *unas bolitas* [some-PL marble-PL] vs. *una bolita* [a/one-SG marble-SG]) in which the child had to rely only on the plural marker [-s] for determining plural versus singular.

In the present study, I reanalyzed 16 of the children from the Miller (2007) study. Of these 16 children, eight (4;6–5;6, *M* = 5;0) had acquired the plural marker, as indicated by their behavior on the comprehension task. These children consistently placed more than one item into the box for all four trials in the plural indefinite condition (e.g., *unas niñas* [some-PL girl-PL]) and only one item into the box for all four trials in the singular indefinite condition (e.g., *una niña* [a/one-SG girl-SG]). These children were labeled the *plural knowers*. The other eight children (ages 4;5–5;7, *M* = 5;0) had not yet acquired the plural marker. These children placed only one object into the box in both the plural and singular indefinite conditions (for all trials), even though they placed more than one object into the box in the control conditions. These children were labeled the *plural non-knowers*.

Materials and procedure. In the present study the two groups of children (the plural knowers and plural non-knowers) participated in two elicitation tasks: (a) a Berko-style task and (b) a repetition task. These two different tasks were used to determine whether task type plays a role in children's use of the plural marker. To ensure consistency in the plural words produced across children, I chose to use a repetition task for eliciting plural noun phrases in sentences rather than carry out a corpus study of conversational speech.

For the Berko-style task children were presented with plural sets of miniature toy objects and were prompted by the experimental question "*¿Qué son?*" ["What are-3PL (these)?"] Similar to the experimental prompt used by Grinstead et al. (2008), the experimental prompt—"*¿Qué son?*"—carries linguistic information for plurality because the Spanish copula verb *son* [are-3PL] agrees with a plural noun phrase (see also Berko, 1958). The following plural nouns were elicited from children: *autos* [cars], *monos* [monkeys], *arañas* [spiders], *perros* [dogs], *vasos* [drinking glasses], *lápices* [pencils], and *bolitas* [marbles]. These nouns were chosen because they represent common objects with which children are familiar. All of the children were able to name these objects in the experimental task with no difficulty.

In the repetition task children were asked to repeat sentences containing plural and singular noun phrases, as shown in Examples (2) and (3):

(2) Un monito está comiendo una pera.
a-SG monkey-SG is-3SG eat-GER a-SG pear-SG
A monkey is eating a pear.

(3) Unos monitos están comiendo peras.
some-PL monkey-PL are-3PL eat-GER pear-PL
Some monkeys are eating pears.[2]

The experimental sentences contained four tokens of a plural noun phrase headed by *unos* (two masculine and two feminine) and four tokens of a plural noun phrase headed by *algunos* (two masculine and two feminine). The singular forms of these indefinites (*un*/*una alguno*/*alguna*) were included as controls. In addition, five bare plural noun phrases were included to allow for comparison with nouns headed by determiners. The indefinite noun phrases always occurred in subject position where verbal agreement was also an indicator of subject number, whereas the bare plural noun phrases always occurred in object position because Spanish bare nouns are restricted to object position. For this reason, the plural morpheme on the bare plural nouns in the repetition task was the only indicator of number.

The plural marker was followed by a word whose initial sound was either a bilabial fricative ([β], four tokens), a bilabial nasal ([m], four tokens), an unstressed vowel ([e], eight tokens), or a sentence-final pause (six tokens). For each sentence, the child was asked to repeat immediately the sentence that the researcher read aloud. The researcher pronounced all /s/ tokens, including all of the plural markers, as an alveolar fricative. The goal was to determine whether children would repeat the plural marker or whether they would omit it. An omission could indicate that the child had not yet fully acquired the plural marker. A picture was provided for each trial to help the children remember the sentence to be repeated. A sample picture is provided in Figure 1. All sentences are provided in the Appendix.

Coding. All data were recorded with a Marantz PMD 222 recorder and a Shure cardioid lavalier condenser microphone. Two native-speaking Chilean Spanish research assistants coded child repetitions of the plural marker [-s] on all nouns and determiners. Each child token was coded as being pronounced as [s], [h], or an omission. The plural marker was counted as present if the child repeated it as either [s] or [h] and absent if it was omitted.

Reliability. Interrater reliability was established by having the two native-speaking Chilean Spanish research assistants code the same data. In the Berko-style task reliability reached 94% (153/163 tokens) of all plural tokens. In the repetition task reliability reached 90% (325/362 tokens). Disagreements were always between [h] versus omission, whereby one native speaker coded a token as an omission and the other coded it as [h]. To resolve the disagreements in coding, I acted as a third rater. Of the 10 disagreements in the Berko-style task, all 10 were recoded as omissions. Of the 37 disagreements in the repetition task, seven were coded as [h], and 30 were recoded as omissions.

Results

The two production tasks showed different levels of plural marker omissions in the plural-knowers and non-knowers. In the Berko-style task the plural-knowers omitted the plural marker 43% (32/74) of the time. In the repetition task these same children omitted only the plural marker 25% (45/178) of the time. Similar to the plural-knowers, the non-knowers omitted the plural marker 44% (39/89) of the time in the Berko-style task; however, in the repetition task they omitted the plural marker at the much higher

[2] GER = gerund.

Figure 1. Repetition task sample picture.

rate of 67% (124/184) of the time. In other words, the non-knowers did not repeat the plural marker over half of the time.

Because the data were not normally distributed, a Spearman rank order correlation was used to examine whether there was an association between plural comprehension and plural production. There was no significant correlation between children's omission of the plural marker in the Berko-style task and their comprehension of the plural marker, $r_s(14) = -.191$, $p = .479$ (see Figure 2). However, children's comprehension of the plural marker was associated with their omission rates of the plural marker in the repetition task, $r_s(14) = -.842$, $p < .001$. Figure 3 shows that in the repetition task the plural knowers and the non-knowers differed in their ability to repeat the plural marker in noun phrases headed by determiners, but not in their ability to repeat the plural marker on bare nouns.

The overall percentage of omissions for both groups of children in the Berko-style task approaches the percentage that was reported in the task Bedore and Leonard (2001) used to test Mexican Spanish-speaking children with LI living in the United States. Because none of the children in the present study had LI, these data suggest that children acquiring dialects of Spanish with /s/ lenition show levels of plural marker omissions on experimental tasks similar to those of Mexican Spanish-speaking children with LI (as reported in Bedore & Leonard, 2001). It is important to note that this similarity is due to a dialect difference and not to an LI. Moreover, the repetition task, but not the Berko-style task, was able to distinguish between the plural knowers and non-knowers.

Study 2

The goal of Study 2 was to examine children's comprehension and production of bare plural noun phrases. Study 1 revealed that comprehension of indefinite plural noun phrases correlated with children's production of the plural marker on indefinite noun phrases in the repetition task, but not with their production of the plural marker on bare plural nouns (i.e., nouns produced in isolation). I concluded that Berko-style tasks that elicit bare nouns in isolation do not provide an accurate assessment of plural morphology acquisition in Spanish-speaking children acquiring dialects of Spanish with /s/ lenition. In Study 2, I attempted to provide additional evidence for this conclusion by investigating whether there is a correlation between comprehension and production of the plural marker on bare plural noun phrases.

Method

Participants. Twenty-eight Chilean Spanish-speaking children participated in this study (ages 4;4–8;7, $M = 5;10$). Ten Chilean adult control participants were included to determine target behavior in the comprehension task. To

Figure 2. Plural marker production in the Berko-style task, Study 1. Pseudonyms were used to represent each child. Age is presented in years;months.

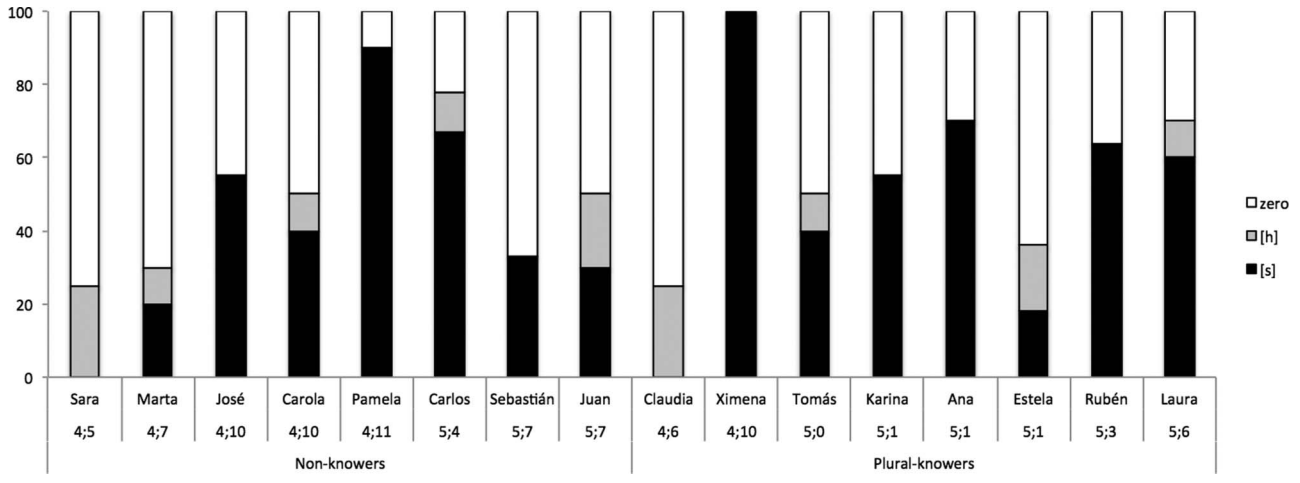
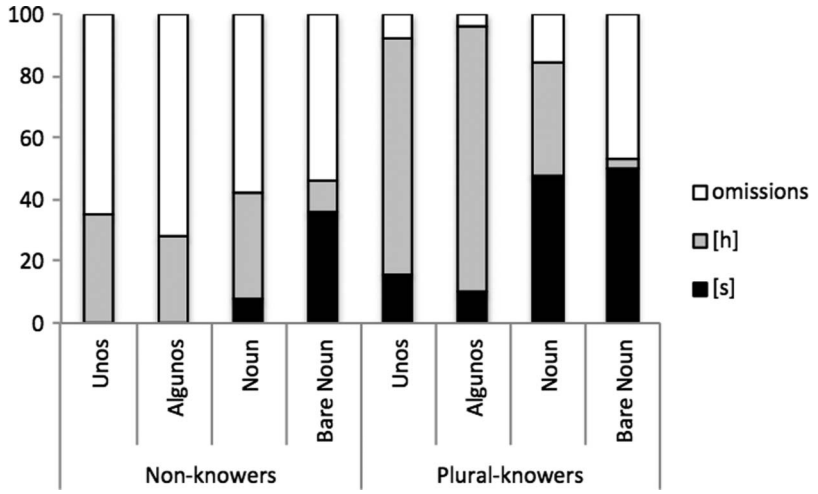


Figure 3. Plural marker production in the repetition task, Study 1.



compare the results of Study 2 with those of Study 1, I divided the children into two age groups: (a) 14 in the younger group (ages 4;4–5;6, *M* = 5;4) and (b) 14 in the older group (ages 5;8–8;7, *M* = 6;9). Children in the younger group were the same age as the children in Study 1 so that the acquisition of the plural marker on bare nouns could be more easily compared to the acquisition of the plural marker on indefinite noun phrases. Moreover, older children were included in Study 2 to determine how comprehension and production of the plural marker changes across development.

Materials and procedure. Children were tested on their comprehension of sentences containing bare plural and bare singular count nouns like those in Example (4a). All bare nouns occurred as predicates of the verb *tener* [to have] because bare singular count nouns are most productive in Spanish in this context (cf. Bosque, 1996). The bare singular count noun in Example (4a) does not encode number (Bosque, 1996) and therefore is consistent with a plural or singular interpretation. The bare plural (4b) can be associated only with a plural interpretation. Control sentences (5) ensured that children would provide both plural and singular responses during the course of the experiment.

(4) a. ¿Cuál niña tiene llave?
which girl has key-SG
Which girl has (a) key?

b. ¿ Cuál niña tiene llaves?
which girl has key-PL
Which girl has keys?

(5) a. ¿Cuál niña tiene una sola llave?
which girl has one only key-SG
Which girl has only one key?

b. ¿Cuál niña tiene muchas llaves?
which niña has many-PL key-PL
Which niña has many keys?

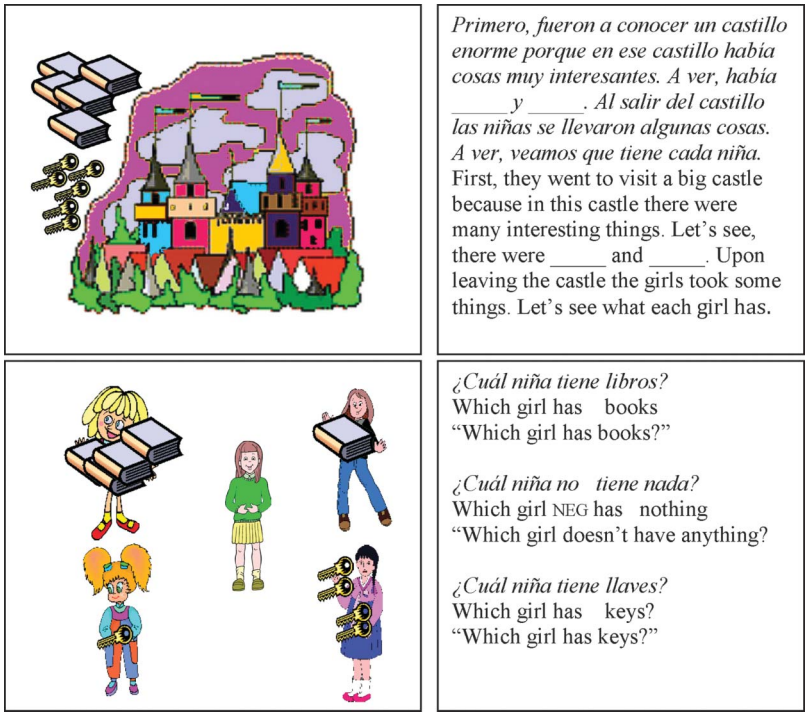
The following nouns were used in the experiment: *llave* [key], *libro* [book], *pelota* [ball], *toalla* [towel], *moneda* [coin], *carta* [letter], *gato* [cat], and *perro* [dog]. These nouns were chosen because they are allowed as bare singular count nouns in Spanish and because they refer to common objects with which children of this age are familiar.

There were four trials in the bare singular condition (like Example 4a, above), four trials in the bare plural condition (like Example 4b), four singular controls (*un solo* [only one]), and four plural controls (*muchos* [many-PL]). The singular control condition ensured that children would provide a singular response (i.e., choose the character with only one item) because it contained both the numeral 1 and also the lexical item *only*. The plural control condition ensured that children would provide a plural response (i.e., choose the character with a plural set of items) because the quantifier *muchos* [many] indicates a large quantity even if the plural marker is ignored. In addition, there were 10 distractor trials.

A picture matching task also was used. Children were presented with a booklet that contained four short narratives (see Figure 4) about a group of children who were taking a trip together. After each short narrative children were asked two questions with either bare plural noun phrases (*llaves*/*libros* [keys-F-PL/books-M-PL]) or bare singular noun phrases (*llave*/*libro* [key-F-SG/book-M-SG]; as shown in Figure 4). The middle question, "¿*Cuál niña no tiene nada?*" ["Which girl has nothing?"] was presented to draw children's attention back to the center of the display. All pictures were presented in color.

A Berko-style task was also incorporated into the experiment. Bare plural nouns were elicited by asking children to name what they saw in the first slide of the experimental display (i.e., the books and keys in the upper left hand corner). Similar to Bedore and Leonard's (2001) study, the existential verb *haber* [there is/there are] was used in the experimental prompt. Because *haber* can occur with either plural or singular noun phrases, children's production of the

Figure 4. Sample experimental display, Study 2.



plural marker was dependent on the plural set shown in the picture. This is different from the experimental prompt used in the Berko-style task in Study 1, where the verb *son* [be-3PL] must agree with a plural noun phrase.

Coding. As in Study 1, all data were recorded with a Marantz PMD 222 recorder and a Shure cardioid lavalier condenser microphone. Two native-speaking Chilean Spanish research assistants coded the plural marker on all nouns for the pronunciation of the plural marker as [s], [h], or omission. The plural marker was counted as present if it was pronounced as either [s] or [h] and absent if it was omitted.

Reliability. Interrater reliability was established by having the two native Spanish-speaking research assistants code the same files. In the Berko-style task reliability reached 96% (238/249 tokens). As in Study 1, I acted as a third rater to resolve the disagreements. Of the 11 disagreements, four were disagreements between [h] and an omission. Two of these were recoded as [h] and two were recoded as an omission. The other seven tokens involved disagreements between [h] and [s]. All seven of these tokens were coded as [s] in the third rating.

Results

In the comprehension task adult participants behaved at ceiling, choosing the singular picture in the bare singular condition 98% of the time and the plural picture in the bare plural condition 100% of the time. Moreover, both children and adults behaved at ceiling on the control conditions. However, children behaved differently from adults in the target conditions. The results are shown in Table 1 for both groups of children.

The proportion of plural responses (i.e., choosing the character with more than one item) was analyzed with a repeated-measures analysis of variance with condition (singular, plural) as a within-subject factor and age group (younger children, older children) as a between-subjects factor. The results showed a main effect of condition, $F(1, 26) = 39.351$, $p < .001$, $\eta_p^2 = .602$, indicating that children associated bare plural noun phrases with plurality more often than they did so for bare singular noun phrases. This main effect was qualified by a two-way interaction between condition and age group, $F(1, 26) = 9.838$, $p = .004$, $\eta_p^2 = .275$, indicating that the difference between plural and singular was more substantial for the older children than for the younger children. Children's plural marker comprehension in the comprehension task was compared with their plural

Table 1. Study 2: Means and standard deviations of accurate responses in the bare plural and bare singular comprehension task for each age group.

	Younger children		Older children	
M or *SD*	Singular	Plural	Singular	Plural
M	39	86	77	98
SD	29	23	40	6.6

marker omission rates in the Berko-style production task. Spearman rank order correlations showed no evidence that these two variables were associated with each other, for neither the younger children, $r_s(12) = -.369$, $p = .194$, nor the older children, $r_s(12) = -.201$, $p = .491$.

These results confirm those in Study 1 that, in /s/-leniting dialects of Spanish, production of the plural marker on bare nouns produced in isolation (e.g., Berko-style elicitation tasks) does not correlate with children's comprehension of the plural marker. Study 2 showed that this is true even when the comprehension measure examines bare noun phrases. The data also show that by age 6 years, most children produce and comprehend the plural marker [-s] in dialects of Spanish with /s/ lenition.

General Discussion

The purpose of these studies was to examine comprehension and production of the plural marker in children acquiring a dialect of Spanish with a phonological process of /s/ lenition. In the following sections, I discuss the studies' findings with respect to the research questions posed at the beginning of the article.

How Does /S/ Lenition Affect Children's Acquisition of Plural Morphology?

The results of both Study 1 and Study 2—taken together with previous research on children's acquisition of plural morphology in dialects of Spanish with /s/ lenition and dialects without /s/ lenition—indicate that acquisition of the plural marker takes longer in children acquiring /s/-leniting dialects than for children learning varieties of Spanish without /s/ lenition. Crucially, it is not just that /s/ lenition affects the acquisition of the phoneme /s/ in syllable final position. In fact, children of /s/-leniting dialects begin to produce /s/ in syllable-final position by at least age 3 years (Miller, 2013). Instead, the phonological process of /s/ lenition causes variability at the morphological level such that adult speakers sometimes produce and sometimes omit the plural marker when speaking with their children. It is this variability that affects children's acquisition of morphology: Children exposed to a variable input for plural morphology do not associate the plural marker /*–s*/ to a more-than-one interpretation until around age 4 to 5 years.

The timing difference in the acquisition of variable versus nonvariable morphology fits well within Yang's (2002) VLM, as described above. The model predicts a longer acquisition period of variably produced morphology because the child receives evidence both for (e.g., production of the plural marker) and against (e.g., omission of the plural marker) that morphology in the input. Similar findings supporting the VLM have recently been reported. For example, variable omission of the 3SG verbal affix /*–s*/ in African American English (AAE)–speaking adults results in a timing difference in the acquisition of 3SG –s (Johnson, 2005) and in the acquisition of the past tense affix /*–ed*/ (Yang, Ellman, & Legate, 2013) in AAE-speaking children, the latter finding indicating that the variable input for 3SG –s affects acquisition of tense morphology more generally. Yang et al. (2013) showed that AAE-speaking children exposed to 3SG /*–s*/ omissions in the input omit the past tense affix –ed at significantly higher rates than other children, even though the AAE-speaking caregivers of these children do not themselves omit past tense /*–ed*/ in their own speech.

Similar findings have been reported for the acquisition of agreement marking on the English auxiliary *do*. English-speaking adults often produce sentences like those in Example (6) to varying degrees depending on a variety of social factors. In working-class White speakers, this variation in agreement marking on the auxiliary is found only when it occurs with the negative clitic *n't* (Miller, 2012):

(6) a. She doesn't want to go (agreeing doesn't)
b. She don't want to go (non-agreeing don't).

Yet recent research has indicated that variable production of non-agreeing *don't* in the input (examples like those in 6b) affects children's acquisition of agreement marking on the auxiliary *do* more generally. In other words, it affects their acquisition not only when the auxiliary occurs with the negative clitic *n't* but also in nonnegative contexts. In particular, children pass through a stage where they produce sentences like "Do he want to eat?" (Miller, 2012). These examples—along with the studies presented in the current article—suggest that features associated to forms that occur variably in the input may take longer to acquire.

Do Children Acquiring Dialects of Spanish With /S/ Lenition Show Levels of Plural Marker Omissions Similar to Those of Spanish-Speaking Children With LI Living in the United States?

When Berko-style elicitation tasks are used for assessing plural morphology acquisition, the answer to this question is "yes." Bedore and Leonard (2001) reported that Spanish-speaking children with LI omitted the plural marker in a Berko-style elicitation task about 58% of the time. In the current study, both Berko-style elicitation tasks showed similarly high amounts of plural marker omissions, even in children who comprehended the plural marker in the comprehension tasks. The high plural marker omission rate in the plural knowers is not related to not having yet acquired plural morphology; instead, it is related to the phonological process of /s/ lenition found in their dialect of Spanish and to word position: Utterance-final position tends to show an increase in omissions and the full variant [s].

At the same time, many children in the two studies did not comprehend the plural marker as an indicator of more than one—even at age 5 years, a finding that I believe is due to the variability in the input for plural morphology. Before age 6 years, omissions of the plural marker in children's speech will occur either because the child has not fully acquired the plural marker or because he or she is leniting final /s/ in utterance-final position. Repetition tasks—such as the one presented in Study 1—are key for deciding between these two alternative explanations of plural marker omissions.

What Sort of Production Task Correlates More Closely With Children's Comprehension of Plural Morphology?

Most experimental studies that have investigated plural morphology acquisition in children have relied on Berko-style elicitation tasks that elicit bare plural nouns in isolation (Bedore & Leonard, 2001; Berko, 1958; Grinstead et al., 2008; Kernan & Blount, 1966; Kvaal, Shipstead-Cox, Nevitt, Hodson, & Launer, 1988). Although the Berko-style task has been essential for understanding how young children acquire plural morphology more generally, its use is not recommended for children acquiring dialects of Spanish with syllable-final /s/ lenition. Instead, the results indicate that repetition tasks, like the one presented in Study 1, is a much better indicator of plural morphology acquisition.

The difference in results between task types is due to the linguistic factors that constrain Spanish /s/ lenition. Many studies have highlighted the effect of word position on Spanish /s/ lenition (File-Muriel & Brown, 2011; Hammond, 1980; Miller, 2013; Miller & Ramos, 2013). As noted above, word-final position shows a higher percentage of omissions in adult speech, whereas phrase-final position shows an increase in the full variant [s] (Cepeda, 1995). This means that bare plural nouns produced in isolation are predicted to show a higher proportion of omissions and an increase in the full variant [s], and there should be fewer tokens of aspiration. This prediction was borne out in the production tasks presented here. Children produced and omitted the plural marker on bare nouns at similar rates, regardless of whether they comprehended the plural marker.

In the repetition task children were asked to repeat sentences containing noun phrases embedded within a sentence frame. This resulted in many more tokens of aspiration overall. Moreover, the non-knowers showed higher omission rates on nouns headed by indefinite determiners than on bare nouns (which always occurred in phrase-final position), whereas the plural knowers showed a higher percentage of aspiration and the full variant [s] on nouns headed by indefinite determiners but similar amounts of the full variant [s] on bare nouns. It was only on the repetition task that a difference was found between children who comprehended the plural marker and those who did not.

Many previous studies have taken dialect into account when assessing LI in children (Goldstein & Iglesias, 1996, 2001; Oetting, 2005; Smith, Myers-Jennings, & Coleman, 2000) among others). Most studies have chosen—with good reason—to not include assessment of forms that occur variably in the input. The data presented in the current article show that assessment of plural morphology in children acquiring /s/-leniting dialects of Spanish is possible if the linguistic factors constraining /s/ lenition are taken into consideration. Assessments should not involve Berko-style elicitation tasks that elicit nouns in isolation. Instead, the assessment of plural morphology acquisition should rely on the sort of repetition task presented in Study 1 whereby plural noun phrases are produced in sentence frames. Acquisition of plural morphology should be expected by at least age 6 years in typically developing children acquiring dialects of Spanish with /s/ lenition.

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Appendix

Experimental Sentences Used in Study 1

Researcher: Este juego se llama "Escucha y Repite." ¿Tú sabes como jugar? Yo te voy a decir algo sobre el dibujo y tú tienes que repetir lo que yo digo. ¿Te parece?
[This game is called "Listen and Repeat." Do you know how to play? I am going to say something about the pictures here and you have to repeat what I say. Do you want to play?]

P La niña tiene un chaleco verde.
R The girl has a green sweater.

P La niña tiene un chaleco azul.
R The girl has a blue sweater.

1	Algunos	bomberos	están	comiendo	manzanas.	
	Some.PL	firemen.PL	are.3.PL	eating	apples.PL	
2	Estoy	comiendo	chocolates.	¿Quieres	alguno?	
	I am	eating	chocolates.PL	Do you want	one.SG?	
3	Un	monito	está	comiendo	una	pera.
	A/One.SG	monkey.SG	is.3.SG	eating	a/one.SG	pear.SG
4	Unas	bolitas	están	en	la	silla.
	Some.PL	marbles.PL	are.3.PL	on	the	chair.
5	Hay	muchas	galletas.	¿Quieres	alguna?	
	There are	many.PL	cookies.PL	Do you want	one.SG?	
6	Algunas	muñecas	están	en	el	piso.
	Some.PL	dolls.PL	are.3.PL	on	the	floor.
7	Un	bombero	está	comiendo	una	manzana.
	A/One.SG	fireman.SG	is.3.SG	eating	an/one.SG	apple.SG
8	Algunos	monitos	están	comiendo	frutillas.	
	Some.PL	monkeys.PL	are.3.PL	eating	strawberries.PL	
9	Una	bolita	está	en	la	silla.
	A/One.SG	marble.SG	is.3.SG	on	the	chair.
10	Unas	muñecas	están	en	la	cama.
	Some.PL	dolls.PL	are.3.PL	on	the	bed.
11	Un	monito	está	comiendo	una	frutilla.
	A/One.SG	monkey.SG	is.3.SG	eating	a/one.SG	strawberry.SG
12	Algunas	bolitas	están	en	la	mesa.
	Some.PL	marbles.PL	are.3.PL	on	the	table.
13	Un	bombero	está	comiendo	una	papa.
	A/One.SG	fireman.SG	is.3.SG	eating	a/one.SG	potato.SG
14	Unos	bomberos	están	comiendo	papas.	
	Some.PL	firemen.PL	are.3.PL	eating	potatoes.PL	