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Article use in Spanish-speaking children with Specific Language Impairment*

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ABSTRACT

The current study analysed article use in Spanish-speaking children with specific language impairment who are learning English as a second language. The SURFACE HYPOTHESIS account of specific language impairment was evaluated in relation to the use of articles in these children. Language samples were obtained from 15 Spanish-speaking children with language impairment and 15 with normal language, ages 5;0 to 7;1, matched by age, gender, and school. The percentage of article errors was tested between groups with a nonparametric analysis and an analysis of covariance with mean length of terminable unit as the covariate. Results revealed significant differences between groups on percent of article errors with and without MLTU as the covariate. Nonparametric statistics on percent of article error types indicated that most errors consisted of omissions and gender agreement substitutions. As predicted by the Surface Hypothesis, article errors were likely to occur in unstressed definite articles, suggesting that perceptual and prosodic processes have some impact on children's production of articles.

INTRODUCTION

The crosslinguistic study of children with specific language impairment (SLI) is essential to determine whether theories on the nature of SLI can explain differences in the manifestation of the disorder across different languages. Data on Spanish-speaking (SS) children with SLI, however, have been limited, and therefore not accounted for in theories of SLI. The

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purpose of the current study was to examine the characteristics of article use in SS children with SLI, in light of current accounts of SLI, specifically, the Surface Hypothesis proposed by Leonard (1989; 1998).

SLI is a developmental disorder in which children demonstrate a significant language difficulty that is not explained by any sensory, neurological, intellectual, or socioemotional problems (e.g. Leonard, Sabadini, Leonard & Volterra, 1987). Further, the language difficulty seems to impact language form, specifically morphological skills, to a greater degree than other aspects of language (Leonard, 1989; 1992). Theories on the nature of grammatical deficits in children with SLI have focused on the fact that these children exhibit an extraordinary difficulty with the acquisition of verb tense and verb agreement; however, the research literature has debated whether the manifestations of the disorder are equivalent across languages (e.g. Rice & Wexler, 1996; Leonard, 1992; Leonard, Eyer, Bedore & Grela, 1997).

Crosslinguistic research has expanded the focus on verb tense to include other grammatical deficits such as use of articles (e.g. Leonard, 1989; 1992). For example, difficulties have been documented for article use in English (Leonard *et al*., 1997), Italian (Leonard, Bortollini, Caselli, McGregor & Sabadini, 1992; Bortollini, Caselli & Leonard, 1997; Leonard *et al*., 1997), German (Clahsen, 1989), and Hebrew (Rom & Leonard, 1990). Research with French-speaking children with SLI, however, has been inconclusive (Le Normand, Leonard & McGregor, 1993; Methé & Crago, 1996). Le Normand *et al*. found no differences between an SLI group and age- and language-matched groups on article use. In contrast, Methé & Crago (1996) found significant group differences, although the level of correct production of articles was high for the group with SLI.

The Surface Hypothesis

Several accounts have been proposed to explain the difficulties that children with SLI have with grammatical morphemes: the Surface Account (Leonard, 1989; 1998), Extended Optional Infinitive (Rice, Wexler & Cleave, 1995; Rice & Wexler, 1996), the Missing Agreement Hypothesis (Clahsen, 1989), and the Missing Feature Hypothesis (e.g. Gopnik & Crago, 1991). Of these theories, the Surface Hypothesis (Leonard, 1989; 1998) seems to have the potential to explain the nature of the disorder across a variety of languages. In the Surface Hypothesis account of SLI, Leonard (1998) proposed that these children present with a limited processing capacity that interacts with the surface characteristics of the language. Acoustic properties of short or unstressed morphemes, for example, would contribute to children's difficulty in the language. According to this account, children are able to perceive short final consonants, but when these forms play a morphological role, they become more taxing because of the children's limited processing capacity. In

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turn, the children's processing of the morphological forms is incomplete, requiring greater exposure to the forms before they are acquired. The hypothesis relies on the co-occurrence of specific characteristics in the input, their interactions with semantic, prosodic, and phonological aspects of the language, and presumed processing limitations in the children with SLI (Leonard, 1998).

Leonard and his colleagues (e.g. Leonard, 1989; Leonard *et al.*, 1997; Leonard, 1998) proposed that grammatical morphemes in English are difficult for children with SLI due to the fact that they tend to be short in duration and unstressed. Because these children present with a general processing capacity limitation, they may find it problematic to perceive specific morphemes, to hypothesize their grammatical function, and to differentiate their function from that of other morphemes. Further, children's limitations perceiving the surface characteristics of the morphemes interact with other aspects of the language such as frequency of occurrence of the form, and phonological and prosodic features of the language. Forms that are used less frequently tend to be more difficult than more frequently used forms. In addition, it is assumed that those morphemes that are semantically transparent (e.g. plural -s), and appear in more languages, are higher in the learning hierarchy of morphological paradigms than those that are less semantically transparent and occur in fewer languages. In English, for example, plurality would be easier to learn than third person singular, although both forms involve the use of -s at the end of a word, are unstressed, and short in duration.

Problematic morphemes for English-speaking children with SLI, then are expected to be those short in duration, unstressed, and lower in the learning hierarchy of morphological paradigms, such as past tense -ed and third person singular -s. Similar predictions have been corroborated in studies in Italian and Hebrew. For these languages, the Surface Hypothesis predicts that children with SLI will exhibit frequent article omissions and substitutions, in particular when articles follow and/or precede weak syllables (e.g. the banana) (McGregor & Leonard, 1994; Bortolini & Leonard, 1996).

In a study of four to six-year-old Italian-speaking children with SLI, Leonard, Bortolini, Caselli & Sabbadini (1993) found that children with SLI omitted the articles more frequently than normally developing (NL), MLU-matched children. Further, they found that Italian SLI and NL children demonstrated significantly more difficulty with plural than with singular articles. Italian children with SLI mainly substituted less frequent forms that occur in limited phonetic contexts and replaced them with the more frequent forms that occur in broader phonetic contexts (i.e. *il* (the, masculine singular for most nouns) for *lo* (the definite masculine singular for words that start with /s/ or /z/) and *i* (definite masculine plural before most nouns) for *gli* (definite masculine plural before nouns that start with vowels, /s/, or /z/

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cluster). Further, they found that the children with SLI had significant difficulty with the article *il* (the, masculine, singular), probably due to difficulty with the syllable structure of the article, ending in a consonant, which is not a frequent syllable form in Italian. They also found that the difficulty occurred when the article preceded multisyllabic words. In addition, the investigators predicted that the children would have significant difficulty marking gender because the grammatical paradigm is more complex for gender than number agreement, yet their results did not support this prediction. Leonard *et al*. (1993) suggested that gender agreement might be a problem only at a younger age.

In a second study with Italian-speaking children (Bortolini *et al*., 1997), the children with SLI produced more omission than substitution errors, and they also had greater difficulty with number agreement rather than gender agreement in definite articles. In addition, no differences were found on comprehension of articles, and thus it appears that the children's difficulties were related more to production problems associated with the surface and prosodic features of the language than to comprehension difficulties. In contrast, French children with SLI do not appear to have a major problem with their articles due to the greater availability of perceptual cues in the language. In French, the duration of stressed and unstressed syllables are the same in non-final positions, and thus articles do not differ in duration from other forms (Le Normand *et al*., 1993).

Spanish articles : a problem for children with SLI?

Spanish is a romance language where articles must agree in gender and number with the noun. There are five definite and four indefinite articles. See Table 1 for the list of articles. Nouns that end in /a/ are usually feminine and

TABLE 1. *Description of the article system in Spanish*

	Definite articles		Indefinite articles	
	Masculine	Feminine	Masculine	Feminine
Singular	el	la	un	una
Plural	los	las	unos	unas

The neuter article /lo/ is excluded from the analysis because it does not appear before a noun. It is used before adjectives, adverbs, and prepositional phrases (e.g. lo bueno [the good thing]).

nouns that end in /o/ are usually masculine. Nouns that end in /e/, /l/, /d/, /s/, and /n/ can be masculine or feminine. When a feminine singular noun starts with /a/, however, the article that precedes it is always the masculine

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el with a few exceptions (those used to distinguish the semantic gender of the person/animal). When the noun is used in the plural form, or when the article precedes an adjective in the noun phrase, the article will match the actual gender of the noun (i.e. *el agua*, (the water) vs. *las aguas* (the waters), *el aguila* (the eagle) vs. *la bella aguila* (the beautiful eagle). Semantic features of noun referents provide reliable cues to gender in only a small portion of instances. The nouns *mamá* (mom), *casa* (house), and *vida* (life) are all feminine, but only *mamá* (mom) has a semantic gender. In effect, there is some evidence that when SS children, ages 4;0 to 11;0, are presented with competing cues (semantic, morphophonological, syntactic) to decipher the gender of articles in noun phrases, they rely primarily on morphophonological and syntactic information (Pérez-Pereira, 1991).

Article stress. Definite articles in Spanish are always unstressed, although indefinite articles can occur in stressed and unstressed forms (Alarcos Llorach, 1994). Unlike English, the definite article is not stressed for emphasis. Only the noun is. In Spanish, stress is expressed by increasing intensity and changing pitch. Duration is not a significant factor in marking stress in Spanish because it is a syllable-timed language and not a stress-timed language like English (Delattre, 1966; Peters, 1997). The duration of stressed and unstressed syllables in Spanish varies only slightly, compared to English. Spanish syllable duration is almost constant across stressed and unstressed syllables because their stressed and unstressed vowels vary minimally in intensity (Delattre, 1966).

Given the prosodic characteristics of Spanish articles, the Surface Hypothesis may help explain the nature of the article errors in the language. Since Spanish definite articles (i.e. *el*, *la*, *los*, *las*) are unstressed, it is possible that they will be less salient and thus, more difficult for SS children with SLI. Saliency is defined as the properties that make linguistic features more or less perceptible to a listener (Barcroft & Van Patten, 1997). On the other hand, the indefinite articles *una*, *unas*, *unos*, and *un* can be stressed and may not present much difficulty to SS children with SLI. Specifically three of these articles have two syllables, and are stressed on the first syllable (*ùna* feminine singular, *ùnas* feminine plural, *ùnos* masculine plural) (Stress marked as to indicate the place where it occurs when not marked orthographically). It is also possible that SS children with SLI do not exhibit significant difficulties with their definite articles, regardless of these perceptual differences.

The acquisition of articles by SS children. The development of the definite article appears to be complete by age three years in monolingual SS children. Hernandez Pina (1984) reported that her son Rafael produced proto-articles as early as 1;4–1;6, and true articles by the two-word stage. Article–noun agreement in Spanish appears to be complete by age three years, and gender agreement errors are frequent until then (Maez, 1984; Hernandez Pina,

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1984; Clark, 1985; Barreña, 1997). Similarly, Italian and French-speaking children's article acquisition is complete by three years and it appears that their acquisition is relatively problem free (Pizzutto & Caselli, 1992; Le Normand *et al*., 1993; Bortolini *et al*., 1997).

Most researchers who examined the sequence of acquisition of feminine or masculine articles in Spanish report that SS children tend to initially use the feminine form for the masculine. Clark (1985), for example, reported that children overgeneralized articles to the feminine form. Clark suggested that the definite feminine *la*, which pluralizes as *las*, is more salient than the definite masculine *el*. The form of *la* does not change from singular to plural, except for the addition of plural -s. In contrast, the definite masculine *el* changes its form when it pluralizes to *los* and when it contracts with the preposition *a* as in *al* ('to the' masculine singular), and *de* as in *del* ('of the' masculine singular). Additionally, López-Ornat (1997) suggested that children's overuse of the feminine may relate to its relatively higher form–function transparency compared to the masculine. She indicated that feminine cues have greater reliability because (a) nouns ending in -a are rarely masculine and (b) feminine noun determiners end in -a (e.g. *la*, *una*, *otra*, *esa*, *esta*, *aquella*). Similarly, the masculine form has limited reliability because the masculine noun can end in any vowel (a, e, i, o, u) and frequently the ending vowel is not -o. Further, Mariscal (1996) found in her longitudinal study of a child from 1;7 to 2;11 that the child omitted pre-nominal vocalic forms more frequently before masculine than before feminine nouns. Overall, there were more inconsistencies with the masculine forms than with the feminine forms, and thus the masculine form may be more problematic for SS children with SLI.

In contrast, a few investigators have found that the feminine form *la* (the) is more problematic than the masculine form. Hernández Pina (1984), for example, found that a child at age 1;11 started marking the gender of articles using masculine forms, specifically, for irregular nouns (e.g. *un llave* for *una llave* – a key; *un leche* for *una leche* – a milk). Then, shortly after, the child started overusing the feminine article for irregular masculine nouns (e.g. *una camión* for *un camión* – a truck). Similar patterns were also noted in a different study with a bilingual child. Barreña (1997) found that most article errors in an Euskera-Spanish bilingual child (age 2;3–2;4) were due to overuse of masculine forms. The child produced 20 errors, which accounted for only 10 percent of the articles. Of those, 15 errors were due to use of masculine articles with feminine nouns. Barreña stated that the development of gender and number in bilingual children is like that of monolingual children in which young children may ignore the ending of nouns and show masculine for feminine substitution errors during the early stages of morphological development. Thus, research findings regarding the acquisition of gender in SS children are still inconclusive.

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Previous research with SS children with SLI

Based on the Surface Hypothesis, forms with limited perceptual salience such as the definite articles in Spanish may pose specific difficulty to SS children with SLI. Research with SS children has been limited. Bosch & Serra (1997) compared article production in seven-year-old SS children with SLI and age-matched controls from Spain. The SS children with SLI were divided into two groups, those with phonological problems and those with good phonological skills. It is assumed, because the authors did not state otherwise, that the children were monolingual Spanish speakers. The children were identified by experienced speech-language pathologists, and had IQs above 85 on the Wechsler Intelligence Scale. No other criteria or identifying information were reported. Their findings indicated that the SS children with SLI made significantly more errors on the definite articles than the controls, although the error rate was only 12·56%. Most of the errors were of omission (10·14%), rather than substitution (2·21%), and the most frequent omission was that of the definite feminine singular article *la* before a multisyllabic word. The most frequent substitutions were the use of /a/ for *la* as a protodeterminer and a reduction of the plural masculine *los* to /lo/. Bosch & Serra (1997) reported that only SS children with SLI with phonological production problems produced most of the article errors, indicating the possibility that the errors for this subgroup of children were primarily phonological rather than morphological in nature. Thus, these results are difficult to interpret and more research is needed to describe article use in children who do not exhibit significant phonological difficulties.

If the SS children with SLI with phonological problems have specific difficulties with grammar, Bosch & Serra's findings may provide support for the Surface Hypothesis. Their data indicate that children tended to have difficulty with definite articles, which, in Spanish are unstressed monosyllables. The results of the Bosch & Serra (1997) study also would corroborate the idea that phonological and prosodic aspects of the language impact article production (McGregor & Leonard, 1994). McGregor & Leonard (1994), for example, found that English-speaking children with SLI tended to omit the article more frequently when the article follows a weak syllable or when it precedes words that have weak–strong syllable structure, rather than strong–weak syllable structure. Similarly, in Bosch & Serra's study, children had most difficulty with multisyllabic words. Penultimate stress is the most common stress pattern for nonverb words in Spanish (Harris, 1983) such as *màno* (hand), *pàto* (duck), *màmi* (mommy), and *dùlce* (sweet) (stress marked with ` when not marked orthographically). Words with more than two syllables tend to have penultimate stress such as *casìta* (house-diminutive), *camìno* (road), *malèta* (suitcase), which would form a weak-weak-strong-weak pattern with the article: *la casìta* (the house-

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diminutive), *el camìno* (the trail), *la malèta* (the suitcase) (stress marked with ` when not marked orthographically). Thus, it is possible that the children had problems with multisyllabic words because these words are frequently in weak-weak-strong weak pattern with the article and offer limited perceptual cues for the child.

Based on these studies, it is expected that SS children with SLI will demonstrate problems in the production of definite articles because, in Spanish, they are unstressed. Furthermore, it is hypothesized that gender agreement may be more problematic for these children than number agreement because the semantic paradigm is more abstract for gender. In addition, article errors may occur more frequently when they are preceded by a weak syllable, rather than when they are preceded by a strong syllable, or when the article is followed by a weak syllable. Finally, it is hypothesized that SS children with SLI will have more difficulty with the singular masculine definite article *el* because of its irregularities across contracted and plural forms. The indefinite articles *un*, *una*, *unas*, *unos* are not expected to be problematic for SS children with SLI because of the greater availability of perceptual cues in these forms.

METHOD

Participants

Characteristics. Thirty SS children, who ranged in age from 5;0 to 7;1, were selected for study from preschool, kindergarten, and first-grade classes in which the primary language of instruction was Spanish. There were 22 boys and 8 girls, and all were from two school districts in the Southwest of the United States. Fifteen SS children (mean age = 5;9, S.D. = 0;8) had a diagnosis of moderate to severe SLI, using criteria to be described in detail later. A comparison group, 15 SSNL children (mean age = 6;1, S.D. = 0;7) were identified as having NL; each child was matched to an SS child with SLI according to age (+/−3 months), gender, and school. Whenever possible, children were also matched for classroom. No language-age matches were selected because of the preliminary nature of the study, the lack of appropriate language control measures for Spanish, and the confounding theoretical issues that language matches provide (Plante, Swisher, Kiernan & Restrepo, 1993).

According to school records, 95% of the children in the study were from low-income families and received assistance through the school lunch programme. All the families were from Mexican-American backgrounds that lived in the southwest of the United States. Due to the nature of the tasks, and the grammatical analyses, no dialectal variations in the use of articles were noted. Information regarding the children's history of otitis media was not available.

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Selection criteria. All SS children had to score within normal limits on a pure-tone hearing screening (20 to 30 dB HL at 1000 Hz, 2000 Hz, and 4000 Hz and 25 to 35 dB HL at 500 Hz) (ANSI, 1969) on the day testing began. Higher than the recommended 20 dB was used when the school's noise interfered with the recommended level. In addition, they scored within normal limits (> 1·64 S.D. below the mean) on the nonverbal scale of the Kaufman Assessment Battery for Children (Kaufman & Kaufman, 1983) and had limited English proficiency as determined by (a) classroom placement, (b) eligibility for language-arts instruction in Spanish, (c) the Home Bilingual Usage Estimate (HBUE), (Skoczylas, 1971) and (d) a teacher's questionnaire. Lastly, the children had no physical, social, or behavioural problems as reported by the teacher in the teacher's questionnaire.

The children's classroom placement was based on limited English scores on the Language Assessment Scale (Duncan & DeAvila, 1986) (LAS), and a school-administered home-language-use questionnaire. Additionally, scores on the teacher questionnaire, which the first author created to rate children in language use and proficiency, further verified limited English proficiency for all children at home and at school. In this questionnaire, the teachers were asked to rate the frequency of use and proficiency of the child's English and Spanish language skills in different settings and with different people based on a three-point scale. Children only used English words that related to names of movies, and other words such as *bye* and *lunch* that had been integrated into the children's dialect.

Because there is no agreed upon best practice for the identification of primarily SS children with SLI in the United States, there is no measure available to provide external validation to the identification of the SS children with SLI. However, investigators have demonstrated that clinical judgment can be reliable when identifying a clinical population and the severity of a disorder (e.g. Lewis, 1995). In addition, teacher judgment has been found to be accurate for the identification of children at risk for language or learning disabilities (Frontera & Horowitz, 1995). Therefore, in this study, a series of steps based on clinical and teacher judgment were taken to ensure that the SS group with SLI truly demonstrated an LI.

Children identified only by ASHA certified, bilingual, speech-language pathologists were included, and the speech-language pathologists had to be Spanish-English bilinguals, with at least 3 years experience. In addition, children identified with only moderate to severe impairments were included to ensure that they were not identified due to a language difference (normal variation due to second language influences); therefore children with mild difficulties that could have resulted from language differences or mild language problems were excluded from study. The SS children with SLI had to be enrolled in speech and language intervention with ASHA-certified, bilingual speech-language pathologists, or with native SS paraprofessionals

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with at least 3 years experience providing speech and language services to SS children with SLI, supervised by an ASHA certified bilingual, speech-language pathologist. Finally, the SS children with SLI were judged as having language or academic problems by the teacher and reported in the teachers' questionnaire.

All the speech-language pathologists who referred children for the study were interviewed regarding the method of identification of SLI they used. The speech-language pathologists reported that they used the *Pruebas de Expresión Oral y de Percepción de la Lengua Española* (Mares, 1980), which is a norm-referenced measure for Mexican-American children; their own informal measures of auditory comprehension and oral expression; language sample analysis of language form, content, and use; classroom observation; and parent interview. It should be noted that most SSNL children came from the same classroom as the SS children with SLI. This further assured that the two groups of children were indeed different in language abilities in spite of being similar in all other skills (see Table 2). The children's speech

TABLE 2. *Means and standard deviations for participants characteristics*

	SS children with NL		SS children with SLI	
	Mean	S.D.	Mean	S.D.
Age (in months)	72·93	(6·75)	71·40	(6·71)
Nonverbal IQ	100·06	(7·73)	93·2	(12·06)
MLTU*	5·49	(·48)	4·53	(·91)
Teacher question. Eng.*	26·66	(14·35)	14·53	(10·89)
Teacher question. Spa.	65·86	(3·24)	63·06	(10·89)

SS, Spanish-speaking; NL, normal language; SLI, specific language impairment; MLTU, mean length of terminable unit; Eng., English; Spa., Spanish.

* $p > 0{\cdot}05$.

was judged to be intelligible enough to participate in a language sample. Children with severe phonological problems or with a phonological disorder as the primary diagnosis were excluded upon discussions with their primary speech-language pathologist; SS children with SLI with mild phonological or articulation problems (those problems related to the phonological rules or the sound system of the language that did not interfere with intelligibility and transcription of the sample) were not disqualified from the study.

The SSNL children were enrolled in regular educational classrooms and were not enrolled in special education services or programs for at risk children as per teacher report. In addition, they had no speech, language, academic, physical, or behavioural problems as judged by the teachers and reported in the teachers' questionnaires. One child was disqualified because he had speech problems.

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Measures and procedures

The children selected for the study participated in the Kaufman Assessment Battery for Children-Nonverbal Scale and hearing screening for qualification purposes. Children's use of articles was based on children's elicited language samples. A research assistant (RA) elicited three language samples using picture description, interview with the child, and story retelling. All the language samples were audiotaped and then transcribed by the RA who collected the samples, an undergraduate student in speech-language pathology and native Spanish-speaker from the community. In the picture description, the child selected four of eight pictures that depicted several actions related to the following scenes: park, classroom, store, school. The RA turned the set of pictures face down and asked the child to select one without showing it to her, and to tell a story about it.

In the interview with the child, the RA used open-ended questions following the child's lead in the conversation and encouraged the child to speak as freely as possible. The RA introduced preselected topics for discussion including a scary experience, a hospital experience, a trip to the zoo, and a favorite movie. In the story retelling format, the RA used one of two Mercer Meyer 'frog' wordless books: *A Boy, a Dog, and a Frog* (Meyer, 1967) and *Frog Where Are You?* (Meyer, 1969), for which one of the authors wrote a script. The RA told the story to the child while showing the child the pictures in the book. The RA then asked the child to retell what was in the story by looking at the same pictures one page at a time.

The three spontaneous language samples were segmented into terminable units (T-units) following Gutierrez-Clellen & Hofstetter's (1994) adaptation to Spanish of Hunt's (1965) procedures. Accordingly, each utterance could contain a main clause and any subordinate clauses (Hunt, 1965). Following Gutierrez-Clellen's procedure, Spanish subjectless clauses were coded as separate T-units because, in Spanish, the subject is not obligatory. T-units with unintelligible words and English words that were not part of the dialect were excluded from the analyses. T-units with words such as *bye-bye* and *VCR* were judged by the transcriber to have been incorporated into the dialect and thus were not eliminated from the analysis. Although some children used English during the study, only a few T-units had to be excluded from the analysis due to codeswitching.

An average of words per T-unit (mean length of T-unit or MLTU) was obtained as a gross estimate of sentence complexity. Incomplete T-units and phrases were excluded from MLTU or article analyses. A native Spanish speaker coded articles in the complete T-units according to definiteness, gender, and number. A second coder, also a native Spanish speaker, identified the articles and the types of errors as follows: article addition, omission, gender or number agreement substitution, and substitution of both

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gender and number. The first author checked all the samples and coding. Disagreements between the coder and the first author were resolved by consensus. Percentages were obtained by dividing the number of errors produced by the total number of obligatory contexts for the article.

Reliability between two different coders was then obtained by recoding independently 20% of the samples from each group. The point-to-point reliability for article type and error coding was 86·75% for the SS group with SLI and 90·1% for the SSNL group.

All the samples of the SS children with SLI were further analysed based on the prosodic contexts in which article errors occurred. Prosodic contexts were categorized according to the stress characteristics of the syllables preceding and following the article in error by one of the authors and a research assistant, both native Spanish speakers, by consensus. Based on the different stress patterns, four prosodic contexts were compared: S_W_W, W_W_S, W_W_W, or S_W_S. For contexts in which the article was the first syllable in the subject of the sentence, the prosodic contexts were W_W or W_S.

RESULTS

Main comparisons

Due to the fact that the percent of article errors had no normal distribution (see Table 3), the groups were compared using a nonparametric test. A Kruskal-Wallis Test on the percent of articles errors produced in obligatory contexts revealed that the SS children with SLI produced a significantly higher percent of errors than the SSNL group [χ^2 (1, 28) = 11·998, p = 0·0001]. To determine whether the percent of errors could be accounted for by sentence complexity, an analysis of covariance (ANCOVA) with MLTU as the covariate was run. Because nonparametric statistics do not allow for ANCOVAS and the distribution of the scores was not normal, arcsine transformations on the percent of errors were performed before the ANCOVA. Results revealed a statistically significant difference between groups on the total percent of errors [F(1, 27) = 6·65, p = 0·016].

To determine what type of errors accounted for the differences between groups a Kruskal-Wallis test was used to compare errors of gender agreement, number agreement, omissions, and other across the two groups. Other errors included number and gender agreement, additions, and substitutions by pronouns and fillers. Because of the multiple tests involved, alpha levels were set to 0·01 for determination of statistical significance. The SS group with SLI produced significantly more omission errors [χ^2 = 13·27, p = 0·0001], gender agreement errors [χ^2 (1, 28) = 16·80, p = 0·0001], and other

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TABLE 3. *Means, standard deviations, and ranges for percent of article errors by group*

	SS children with NL		SS children with SLI	
	M	S.D.	M	S.D.
	(Range)		(Range)	
Combined article errors*+	2·81 (0–8)	2·28	22·30 (1–64)	17·01
Gender agreement*	0·57 (0–3)	0·88	10·51 (2–53)	13·50
Number agreement	0·65 (0–3)	0·98	2·38 (0–8)	1·72
Omission errors*	1·17 (0–3)	1·02	7·29 (1–29)	7·23
Other errors*	0·41 (0–1)	0·80	2·78 (0–10)	3·01
Definite errors	1·25 (0–3)	1·49	16·76 (1–61)	14·64
Indefinite errors	1·54 (0–4)	1·46	5·54 (0–19)	5·34

SS, Spanish speaking; SLI, specific language impairment; NL, normal language.
* $p < 0{\cdot}01$, $^{+}p < 0{\cdot}01$ when covaried with mean length of utterance.

TABLE 4. *Frequencies and percentage of error type of definite articles for SS children with SLI*

	Total	Gender	Omission	Number	Other
el	98	58 (59)	25 (25)	4 (4)	11 (11)
la	29	12 (41)	13 (45)	0 (0)	4 (13)
los	12	3 (25)	6 (50)	0 (0)	3 (25)
las	11	3 (27)	0 (0)	8 (73)	0 (0)
Total	150	76 (51)	44 (58)	12 (16)	18 (24)

SS, Spanish-speaking; SLI, specific language impairment.

errors [χ^2 (1, 28) = 7·298, $p = 0{\cdot}007$] than the control group. Number agreement errors were not significantly different between groups ($p = 1{\cdot}92$).

Irregular gender agreement

The use of irregular forms in the SS children with SLI was also analysed to determine if the substitutions related to over-regularization errors. Productions of all articles that presented with irregular agreement were counted such as in *el agua* (the water) *la nariz* (the nose) and *la noche* (the night). All errors such as *la agua* (the water) for *el agua* (the water) were

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counted in each group. The SSNL children had 14 obligatory contexts to produce irregular agreement, and produced no errors of over-regularization. The SS children with SLI had 17 obligatory contexts, and produced 10 errors of overregularization, 9 of which were with *la agua* for *el agua*. These results suggest that the marking of gender in the SLI group is established as a rule-based process.

Definite versus indefinite article comparisons

To determine whether definite articles are more problematic than indefinite articles in SS children, the percentage of errors in definite articles was compared to the percentage of errors in the indefinite articles. A Wilcoxon Signed Ranks T test was run. The results indicated that there were significant differences between both types of percent of article errors ($U = -2{\cdot}222$, $p = 0{\cdot}026$). SS children with SLI produced 16·76% (S.D. = 14·64) of errors in the definite forms and 5·57% (S.D. = 5·34) in the indefinite form. In contrast, SSNL children produced 1·25% (S.D. = 1·49%) errors in the definite and 1·54% (S.D. = 1·46) in the indefinite articles. See Table 3 for a description of percent errors per article types.

Analysis of definite article errors

Given that the majority of article errors were on the definite forms (see Table 3), it was important to determine which definite articles were most problematic for the SS children with SLI. It was predicted that *el* (definite singular masculine) would be more difficult for the children than the other definite articles because of its limited reliability, saliency, and consistency in production. Results revealed that the most frequent error of gender was with the article *el* (definite singular masculine), which was substituted with the article *la* (definite, singular, feminine article). The second most frequent gender error was with *los* (definite, masculine, plural article), which was substituted with the feminine plural *las*. The next most frequent gender error was *la* substituted with *el*, and lastly *las* substituted with *los* (see Table 4 for a summary of errors).

An analysis of the most frequently omitted forms revealed that *el* was also the most frequently omitted article. The SS children with SLI had 25 omissions of *el* out of 44 total omissions. The next most frequently omitted article was *la*, and then *los*. There were no omissions of the article *las*. An analysis of 'other' errors revealed frequent problems with *el*, *la*, and *los*, in this order. There were no 'other' errors with *las*.

Prosodic contexts where article errors occurred

The prosodic contexts in which article errors occurred were compared to determine which contexts presented more difficulty to the children with SLI (W_W_S, W_W_W, S_W_W, or S_W_S). Results revealed that SS children

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with SLI had the most errors in the W_W_S context (34·8%), then in the W_W_W context (30·2%), then in the S_W_S (21·7%), and last in the S_W_W (3·8%). In addition, errors occurred when the article was not preceded by any syllable W_S (4·65%) and W_W (4·65%). To determine the impact of a preceding weak syllable, the W_W_W and the W_W_S contexts were summed, accounting for 65·17% of the errors. Similarly, to determine the impact of having a weak syllable follow the article, the W_W, W_W_W, and S_W_W patterns were summed, accounting for 38% of the errors. These results suggest that article errors tend to occur in contexts preceded by a weak syllable, as in the following examples,

(1) estàba en *la trabàjo
W W *W* W
was at *the job
(2) tiène *la sàpo
W *W* S
Has *the frog,

DISCUSSION

The present study found that SS children with SLI differ from their age peers in the use of articles. When the analysis of covariance was run to account for differences in sentence length, the percent of article errors continued to be significantly different between groups. These findings indicate that article problems in SS children with SLI do not just represent delayed development, but possible problems beyond what is expected of younger children with the same MLU (cf. Rice & Wexler, 1996). Their atypical errors reflect a persistent difficulty in article production that cannot be accounted for by maturation problems or sentence length limitations alone (cf. Rice & Wexler, 1996; Leonard, 1998). Furthermore, the findings indicate that when sentence structure and complexity place processing demands on the child's language production, errors in the article system are more likely to occur.

SS children with SLI had most difficulty with definite articles, which are unstressed monosyllables. These results support the Surface Hypothesis prediction that unstressed function morphemes are more vulnerable to difficulties than morphemes that are stressed. Indefinite articles appeared to present less difficulty, perhaps because, three of the four indefinite articles have two syllables, one of which is stressed. Moreover, they can occur in stressed or unstressed forms.

The results of the study further supported the prediction that gender agreement may be more difficult to learn because the paradigm is more abstract than number agreement, and it occurs less frequently across

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languages. Gender appears to be in a lower hierarchy of learning (more difficult to learn) than forms that occur in other world languages (Leonard, 1998). SS children with SLI demonstrated significant difficulties with gender agreement and omission of the articles, but not with number agreement. Interestingly, several of the errors that children made were on words that have a semantic gender cue such as *mamá* (mother), *niño* (boy), *niña* (girl), *Paco* (male name), and *Martín* (male name), indicating that these semantic cues do not have a strong impact on gender production, and that other aspects of the language seem to override these cues (cf. Pérez Pereira, 1991).

The prediction that the singular definite article *el* would be more problematic for children because of the irregularities across contracted and plural forms (Clark, 1985; Mariscal, 1996; Lopez-Ornat, 1997) was confirmed. Analyses of the specific articles that were problematic for the children revealed that the singular masculine definite article *el* was the form in which these children made the most errors, followed by the definite singular feminine article *la*. These results are consistent with some of the current developmental data. Nevertheless, not all children made most errors with *el*. Some children made more errors on the form *la*, indicating that there are individual variations in how article problems are manifested in SS children with SLI, even though these forms are generally more vulnerable to errors due to their unstressed nature.

The Surface Hypothesis was examined to explain the error patterns found in SS children with SLI. The findings of the current study support the hypothesis that forms that are less salient and that involve additional paradigms of abstract features, such as gender marking in Spanish, would be more difficult for children than those that do not present with these two characteristics (Leonard *et al.*, 1993). SS children with SLI demonstrated significant problems with gender agreement and omission of the singular definite articles *el* (masculine) and *la* (feminine), which occur in unstressed syllables (as opposed to indefinite articles which have stressed syllables).

The prediction that gender agreement would be more difficult to learn because it is semantically more abstract than number agreement was supported in the current study. Unlike children with SLI who speak other languages, the SS children with SLI in the current study demonstrated a high number of substitutions, which according to the Surface Hypothesis, occurs only when the form is not completely analyzed because of incomplete processing (Leonard *et al.*, 1997). It is possible that in highly inflected languages where inflections are always present from early language, forms are analysed at least partially; whereas in less inflected languages, like English, incomplete processing results in frequent omissions rather than substitutions due to the limited number of inflections in the language. Further, it is possible that other production aspects such as prosody, sentence complexity,

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or discourse demands (e.g. Evans, Viele & Kass, 1997) may be interacting with the perceptual characteristics of the language.

The prediction that SS children with SLI would have most difficulty in prosodic contexts where articles are preceded by a weak syllable such in W_W_S and W_W_W contexts was confirmed. Further, having the article followed by a weak syllable did not appear to present greater difficulty to them. Children had the least difficulty when the article was preceded by a strong syllable and followed by a weak syllable (S_W_W). These results support McGregor & Leonard's findings with English-speaking children with SLI who also have problems when the article is preceded by a weak syllable. These findings indicate that the prosodic features of the language seem to have some impact on the children's production of the articles, although there is great variability in production and contexts where errors occur. Current theories must therefore, account for not only saliency aspects, but also prosodic, frequency, and grammatical aspects of the language.

The difficulties of the SS children with SLI in the present study corroborate Bosch & Serra's (1997) findings that SS children with SLI have difficulty with definite articles. However, whereas the children in Bosch & Serra's had most difficulty with the article *la* (rather than the definite singular masculine *el*), the children in the present study had most difficulty with *el*. Further, Bosch & Serra found that the most frequent error type was omission rather than substitution. These discrepancies are possibly due to differences in the phonological abilities and language experience of the groups across studies. In the Bosch & Serra study, the primary diagnosis of the children with article difficulties may have been phonological rather than grammatical. Future research will be needed to examine these issues with other SS groups.

The results of the present study are based on SS children who are learning English as a second language and live in bilingual environments. Studies with monolingual and bilingual children are needed to determine the extent to which second language acquisition influences article performance in children with language-learning difficulties. Preliminary research suggests that bilingual children with SLI will present with problems in all the language aspects of monolingual speakers of that language, in addition to atypical or idiosyncratic difficulties (Restrepo & Kruth, 2000). Future research should also focus on which linguistic factors are language specific and which factors are pervasive across languages when children present with SLI. It will be important to also examine whether the article problems described in the present study parallel those of younger, MLU matched children. If the level of accuracy is lower with younger children, one may find different patterns of errors, and possibly more omissions.

In conclusion, the findings supported the predictions based on the Surface Hypothesis. First, SS children with SLI produced a higher percentage of article errors than the control group, indicating that these forms are

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vulnerable due to their unstressed nature. Second, the prediction that SS children with SLI would have greater difficulty with definite than with indefinite articles given that they are always unstressed, and specifically with the single definite article *el* because it also presents with irregularities in its contractions and plural forms, was also confirmed. Third, the expectation that children would have more problems with gender agreement than number agreement because gender agreement is more abstract than number agreement was supported. Fourth, the prediction that children would have more article errors in contexts in which the article is preceded by a weak syllable was also supported. Although the results are consistent with the predictions of the Surface Hypothesis, it is important to note that there are individual differences in article use within SS children with SLI. Continued crosslinguistic research in this area will be needed to better understand which aspects of SLI are individual, which are language specific, and which are universal.

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