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The semantics of the tense deficit in child Spanish SLI

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Children with SLI manifest difficulties with tense, however it is not clear whether it is limited to morphosyntax or extends to semantics. Typically-developing children show a bias towards using the telicity of predicates to guide their use of grammatical aspect and tense – possibly for information processing reasons (Wagner 2009). Using a comprehension experiment, with a sample of 53 monolingual Spanish-speaking children, 20 of whom are diagnosed with SLI, we investigate the degree to which children with SLI follow this pattern. Our results show that they do not, confirming for Spanish the English findings of Leonard et al. (2007) and Leonard and Deevy (2010), and suggesting that SLI is a deficit not only of the morphology and syntax of tense, but also of its semantics.

Keywords: finiteness; tense; SLI; child language; Spanish; aspect first hypothesis; comprehension; optional infinitive

1. Introduction

In the present article, we investigate the juncture of two existing lines of investigation. The first is concerned with children's knowledge of tense interpretations and, in particular, the degree to which these tense interpretations interact with lexical and grammatical aspect. In general, it has been shown that children and adults tend to associate past tense morphology with perfective grammatical aspect, which tends to associate with telic lexical aspect. Further, it has been shown that present tense tends to be associated with progressive grammatical aspect, which tends to be associated with atelic lexical aspect. The second line of investigation has shown for a variety of child languages, including English, French, Dutch and, more recently, Spanish, that children with specific language impairment (SLI) are significantly worse at marking tense on verbs than are same age controls or same language level controls. Arising from this juncture, then, is the question of whether the tense-related deficit that has been

documented for children with SLI is limited to morphosyntax or whether it extends to the semantics of tense as well, which we will investigate in a sample of child Spanish-speakers from Mexico City, diagnosed with SLI, using a comprehension experiment.

2. Tense and aspect

The basic observation we take as a point of departure is that in an array of child languages, children tend to produce predicates with the characteristics listed in Group 1 of the following table or predicates with the characteristics listed in Group 2 of the following table, but that they do not tend to mix these characteristics. That is, children tend to produce sentences such as *Bill made a sandwich.*, which is telic, perfective and past or *Mary is flying.*, which is atelic, imperfective and present. In contrast, children are unlikely to produce grammatical sentences that violate these prototypes such as *Bill is making a sandwich.*, which is telic, imperfective and present or *Mary flew.*, which is atelic, perfective and past (e.g. Antinucci & Miller 1976; Berman 1983; Bloom, Lifter & Hafitz 1980; Bronckart & Sinclair 1973; Li 1990; Shirai 1998; Shirai & Andersen 1995).

Table 1. Prototypical tense-aspect combinations

	Group 1	Group 2
Lexical aspect	Telic	Atelic
Grammatical aspect	Perfective	Imperfective
Tense	Past	Present

Lexical aspect, given in the second row of Table 1, refers to *Aktionsart* (Vendler 1967), the primary semantic dimension of which is whether or not a predicate has an inherent endpoint. If it does, it is referred to as telic, which further subdivides into achievements and accomplishments, while if it does not have an inherent endpoint, it is referred to as atelic, which may include activity and stative predicates. For example, *llegar a la cima/reach the summit* and *dejar caer la pelota/drop the ball* are telic predicates, with inherent endpoints, while *jugar futbol/play soccer* or *sentirse triste/feel sad* are atelic predicates.

Grammatical aspect, given in the third row of Table 1, refers to whether an event is open and in progress, in which case it is referred to as imperfective, or closed, in which case it is referred to as perfective. Spanish marks two simple past tenses that express these distinctions. The imperfect expresses an open, in progress event in the past, e.g. *Juan bailaba*. ‘John was dancing.’, while the preterit expresses a closed, completed event in the past, e.g. *Juan bailó*. ‘John danced.’

Absolute tense, given in the fourth row of Table 1, refers to the relationship of the event to speech time, in the sense of Reichenbach (1947), which can either be prior, making it past tense, simultaneous, making it present tense, or posterior, making it future tense.

2.1 Aspect before tense

In research using production data, dating back to the 1970s, it has been shown that children tend to follow the groupings in the columns of Table 1, associating telic lexical aspect, perfective grammatical aspect and past tense together, and associating atelic lexical aspect, imperfective grammatical aspect and present tense together (e.g. for child English: Bloom, Lifter & Hafitz 1980; Shirai & Andersen 1995; for child French: Bronckart & Sinclair 1973; for child Italian: Antinucci & Miller 1976 and for child Spanish: Jackson-Maldonado & Maldonado 2001). The most extreme interpretation of these results has been that children were not marking tense at all, but rather were using lexical and grammatical aspect in place of tense (e.g. Bronckart & Sinclair 1973; Bloom, Lifter & Hafitz 1980).

With respect to comprehension studies, there are two important findings. First, children's grammars do allow them to operate outside of grammatical prototypes (i.e. the columns of Table 1, in the sense of Shirai & Andersen 1995) and mix tense, lexical aspect and grammatical aspect. Much of this work was done by Richard Weist and colleagues with child English and Polish (e.g. Weist, Wysocka & Lyytinen 1991; Weist, Atanassova, Wysocka & Pawlak 1999; Weist, Lyytinen, Wysocka & Atanassova 1997). Second, though children are able to operate outside of prototypes, even in comprehension studies, their tendency is to follow prototypical combinations of tense and aspect (Wagner 2001, 2002; Li & Bowerman 1998). Thus, children's grammars allow non-prototypical combinations of tense and aspect in comprehension, but tend to limit themselves to prototypical combinations in production. Why is this?

In answer to this question, Wagner (2009) argues that children's production of verbal predicates is constrained by information processing limitations. In particular, she argues that it is easier to mark an event as past if it has an inherent endpoint, as do telic predicates, because less information is required to determine whether that endpoint has been reached. In contrast, atelic predicates, which lack inherent endpoints, are more difficult to evaluate as being in the past or the present, without the addition of information outside the verb itself to convey that the event is in the past. To illustrate, the telic predicate in sentence 1 is roughly as easy to identify as complete as is the same telic predicate in sentence 2, which includes extra information reinforcing the fact that the action is completed. In contrast, the atelic predicate in sentence 3 is ambiguous as to whether it is completed or ongoing, but can be seen to be completed in sentence 4, with the addition of similar extra reinforcing information, in parentheses

in sentences 2 and 4, to that given in 2. These examples illustrate Wagner's point that telic predicates are easier to associate with the past than are atelic predicates because they include an inherent endpoint, which is critical information for identifying an event as past tense.

Telic

- (1) He broke the table.
- (2) He broke the table (in half).

Atelic

- (3) He flew a kite.
- (4) He flew a kite (until the string broke).

This same information processing constraint appears to not hold in comprehension to the same extent, which makes it easier for children to identify non-prototypical combinations of tense and aspect in comprehension experiments.

In child Spanish, the few studies that have been done have shown that children tend to follow prototypical grouping in both production (Jackson-Maldonado & Maldonado 2001) and in comprehension (Grinstead, Pratt & McCurley 2009).

3. Tense and root infinitives in child Spanish

Now we turn to the second stream of tense-related research to be considered in this study. It has been empirically well established that children with the language disorder known as specific language impairment (SLI) have severe, prolonged difficulties marking tense. This has been shown in production for child English, French, Dutch and Hebrew (e.g. Jakubowicz & Roulet 2004; Leonard, Dromi, Adam & Zadunaisky-Ehrlich 2000; Rice, Wexler & Hershberger 1998; Wexler, Schaeffer & Bol 2004) and it has been shown receptively for child English (e.g. Rice, Wexler & Redmond 1999).

For Spanish, however, the picture has been somewhat clouded by the difficulty of deciding on what a nonfinite verb looks like. Without clarity on this point it is impossible to determine whether or not children with SLI have difficulty with tense marking or not. Many researchers (e.g. Aguado-Orea 2004; Bel 2001; Freudenthal, Pine & Gobet 2006, 2010; Grinstead 1994; Guasti 1994; Torrens 1995) have only counted morphological infinitives as nonfinite forms (e.g. *Él cantar*. He to sing.), following the pattern in child Germanic languages. This approach fails to consider the possibility that child Spanish could also include a nonfinite form like the one used in child English, which is usually thought of as a bare stem. It is also an oversimplification to conclude that child English speakers use only bare stems as their nonfinite form, as they also use bare participles (Schütze & Wexler 1996b; Vainikka 1993).

In child Spanish, bare stems (e.g. *canta*. sing) are homophonous with 3rd singular present indicative verbs and 2nd singular imperatives (at least, outside of *voseante*

dialects).¹ The idea that *canta* could be a bare stem form follows from a definition of morphological stems as word forms lacking inflection (Bloomfield 1933; Sapir 1939). From this perspective, the root of *canta* is *cant-* and *-a* is a theme vowel. Theme vowels, following Harris (1991), distinguish grammatical categories such as nouns (e.g. *cant-o* – song) from verbs (*cant-a* – sing). Distinguishing grammatical categories is a hallmark trait of derivational morphemes, which we take the theme vowel to be. For this reason, the form *cant-a* is viewed as potentially a verb stem in child Spanish, as it consists of a root (*cant-*) and a derivational morpheme (*-a*) and no inflection. Of course, at some point in language development, additional inflectional features for tense, agreement and mood must be added to this form, in order for it to be used as a third, singular, present-tense form and as a second person, singular imperative form. These features will have no overt representation on the verb, which we take to be the source of the confusion in adult interpretations of children's use of these forms.

Notice that various forms in adult Spanish that are non-finite in various ways share characteristics with putative bare stem forms. 2nd person singular imperatives (e.g. *¡Canta!* – Sing!) lack a finite temporal interpretation and instead are interpreted as irrealis. Further, impersonal passive forms (e.g. *Se cortan árboles.* – Trees are cut.), as the name implies, cannot vary in their person specification, but rather are limited to the least specified, 3rd person form. Some varieties of Spanish and Catalan in fact accept these forms without number specification either, as in examples such as *Se corta árboles.* – Trees are cut. (Rigau 1991). Obviously, the impersonals also include a sentence-initial clitic, but it is worth noting that they can lack agreement marking and resemble the forms that children overuse (as in Davidson & Goldrick 2003). Similarly, imperatives lack tense marking and resemble the forms that children use. What the three forms would seem to have in common is a lack of a “complete” verb finiteness complex, where finiteness is understood as tense, number and person marking on the verb. Some examples of bare stems that occur with non-third person singular subjects follow, from Grinstead, De la Mora, Pratt and Flores (2009, p. 242). These examples are informative inasmuch as they give the appearance of lacking agreement morphology. Because tense and agreement morphology are largely expressed by the same portman-teau morphemes in Spanish, we take these forms to be strong evidence of the Optional Infinitive Stage in child Spanish.

- (5) Carlos – 3;3.28
Yo pone.
I-nom put (root + “e” theme vowel)
“I puts.”

1. In *voseante* dialects, the 2nd person singular imperative form would not be *canta*, but rather *cantá*, which is prosodically distinct from third singular present or bare stem forms. See Fonatella de Weinberg (1976, 1977).

- (6) Eduardo – 2;2.0
Es tú.
Copula stem you-nom
“Is you.”
- (7) Eduardo – 3;0.28
Yo quiere hacerlo.
I want (root + “e” theme vowel) do-inf CL-ACC-SG-masc
“I wants to do it.”
- (8) Graciela – 2;6.5
Hace esto yo.
do (root + “e” theme vowel) this I-NOM
“I does this.”
- (9) Graciela – 3;3.26
Este, yo quiere.
this, I-NOM want (root + “e” theme vowel)
“This, I wants.”

In addition to bare stem forms, actual morphological infinitives (e.g. *cantar* – to sing) have been noted in child Spanish and Catalan (e.g. Grinstead 1994, 1998). Some examples including the following, from Grinstead, De la Mora, Pratt and Flores (2009, p. 241).

- (10) Carlos – 2;2.7
Payaso venir.
clown come inf
“Clown come.”
- (11) Graciela – 2;3.11
Bañar.
bathe inf
“Bathe.”
- (12) Eduardo – 2;8.26
Pintar.
paint inf
“Paint.”

Similarly, children produce bare progressive participles, such as *cantando* – singing, in root contexts, with no discourse-salient temporal interpretation for them to adopt (e.g. Grinstead 1994; Lintz 2012). The following example is a bare progressive participle produced by a Spanish-speaking child with SLI (Lintz 2012, p. 43):

- (13) INV: ¿Y cuéntame a qué juegas con tus hermanos?
And tell me what you play with your siblings?
INV: ¿A qué te gusta?
What do you like?

CHI: **Estudiando.**

Studying.

INV: ¿Estudiando?

Studying?

INV: ¿Pero a veces juegan?

But, do you play sometimes?

According to Lintz, these forms occur in spontaneous production in some children, but not others.

In short, two unsurprising nonfinite forms are used by child Spanish speakers in the Optional Infinitive and Extended Optional Infinitive period: morphological infinitives and bare progressive participles. A third, more difficult to perceive form, which we take to be a bare stem, is also used in child Spanish, though it has frequently been confused for a third person singular present indicative or second person familiar imperative form, with which it is homophonous. This homophony has resulted in an underestimate of the number of nonfinite forms in child Spanish, even leading some authors to characterize it as a “Non-Root Infinitive Language” (e.g. Phillips 1995; Salustri & Hyams 2004). As the number of researchers who are aware of this underestimate increases, a growing number of studies of spontaneous production have appeared that assume that an array of nonfinite forms, including bare stems, exist in child Spanish and Catalan (Buesa 2006; Clahsen, Avelado & Roca 2002; Davidiak & Grinstead 2004; Davidson & Goldrick 2003; Licerias, Bel & Perales 2006; Radford & Ploennig-Pacheco 1995).

3.1 Tense and root infinitives in Spanish-speaking children with SLI

Bosch and Serra (1997) is a spontaneous production study of Spanish-Catalan bilingual children in Barcelona ($n = 24$). In general, in language contact situations, some sort of syntactic language transfer could be expected, in the sense of Müller and Hulk (2001), however, there are no obvious results that would suggest this in Bosch and Serra (1997). Rather, they report that the 12 children diagnosed with SLI in their study (mean age = 7;6) were significantly worse than typically-developing age controls in their use of 3rd person plural, present tense forms. It appears from the report that children were producing third singular present forms (e.g. *cantan* becomes *canta*), which is consistent with our contention that a bare stem form is a predominant error in children with SLI. Similarly, in another spontaneous production study of children in a language contact environment (Spanish-speaking children in an English-dominant US context), Bedore and Leonard (2005) report that a group of 15 Spanish-speaking children diagnosed with SLI (age range = 3;11–5;6; group MLUw = 2.88) was significantly worse than both age-matched and MLU-matched typically-developing controls at using third person plural, present tense. There is no direct evidence in the report regarding the nature of the errors that they produced, but it is possible that these were

non-adult-like forms of the same type reported in Bosch and Serra (1997), which would be consistent with the claim that bare stems are the most prominent nonfinite form used by child Spanish-speakers.

Sanz-Torrent, Serrat, Andreu and Serra (2008) also carry out a spontaneous production study of bilingual Spanish-Catalan-speaking children in Barcelona. They report that the SLI group ($n = 6$, mean age at time 1 = 3;9, mean age at time 2 = 4;9) differs from the MLU_w control group in using more 3rd singular present forms. Though the authors suggest that this difference may relate to a difference in the way that the spontaneous production data was collected from the MLU_w group, it is also possible that they were producing large numbers of bare stem forms.

In the domain of elicited production studies, Kernan and Blount (1966) report that monolingual typically-developing child Spanish-speakers in Mexico make large numbers of errors when encouraged to produce 3rd person preterit (past perfective) forms, a finding echoed in Pérez-Pereira (1989) with both real and nonce words. While these two studies say little about the kinds of errors children produce, Bedore and Leonard (2001, 2002) report that the child Spanish-speakers diagnosed with SLI in the US in their elicited production study ($n = 15$, age range = 3;11–5;6; group MLU_w = 2.88) produced verbal inflection errors that predominantly consisted of producing a 3rd person singular present form, when a different person, number and tense was called for. Under the assumption that at least some of these forms were in fact bare stems, this data is strong confirmation of the claim that bare stems are the most prominent error type produced by Spanish-speaking children with SLI.

More specifically confirming this claim, Grinstead, De la Mora, Vega-Mendoza and Flores (2009) show, using an elicited production study, that a sample of 21 monolingual Spanish-speaking children, diagnosed with SLI (age range = 57–78 months, mean age = 68 months) produce significantly more finiteness marking errors than do an age-matched sample of typically-developing children, and that those errors consisted of bare stem and root progressive participle forms. In a receptive experiment, Grinstead, De la Mora, Pratt and Flores (2009) used a receptive, Grammaticality Choice Task (Pratt & Grinstead 2007), to show that a sample of 9 monolingual Spanish-speaking children in Mexico City diagnosed with SLI (mean age = 5;6; MLU_w = 3.0) were significantly worse at choosing the adult-like tense marked form (e.g. *Yo abro la boca*. I open my mouth.), instead of the child-specific bare stem form (e.g. *Yo abre la boca*. I opens my mouth.) or a morphological infinitive form (e.g. *Yo abrir la boca*. I to open my mouth.) than were 9 age-matched, typically-developing children ($p < .001$) or 9 language-matched, typically-developing children ($p < .001$).

In more recent work, Baron, Grinstead, De la Mora, Vega-Mendoza and Flores (2013) have shown that an array of spontaneous speech measures correlate with both elicited production and Grammaticality Choice Task measures of tense marking in Spanish-speaking children with SLI, validating the earlier findings. The spontaneous

measures included MLU measured in morphemes, Number of Different Words and the Subordination Index. For the Grammaticality Choice Task, spontaneous data from a sample of 46 monolingual Spanish-speaking children in Mexico City was analyzed. Twenty-one of the 46 children were diagnosed with SLI (age range = 4;10 – 6;4, mean age = 5;7) while the remaining 25 were typically-developing (age range = 3;1 – 6;7, mean age = 5;2). Pearson correlation coefficients for the correlations between these spontaneous speech measures and the Grammaticality Choice Task are given in Table 2. As can be seen in Table 2, results from the Grammaticality Choice Task of Tense marking correlated highly with a variety of lexical and grammatical spontaneous speech measures. This corroborates its validity as an instrument for measuring children's linguistic knowledge.

Table 2. Correlations of spontaneous speech measures with results of the grammaticality choice task of tense marking in sample of typically-developing and SLI children

	MLUm	NDW	SUB-I
Pearson correlation	.504**	.542**	.508**
Sig. (2-tailed)	< .001	< .001	< .001
N	46	46	46

** Correlation is significant at the 0.01 level (2-tailed).

In Table 3, we see the correlation coefficients for the correlations between the elicited production task and spontaneous speech measures derived from the language samples of the Spanish-speaking children who took the test. Note that the spontaneous speech samples were not of uniform length. For the elicited production task, spontaneous speech data from a sample of 36 monolingual Spanish-speaking children in Mexico City was used. 18 of these children were diagnosed with SLI (age range = 4;10 – 6;10, mean age = 5;9), while 18 of them were typically-developing children (age range = 4;10 – 6;4, mean age = 5;5).

Table 3. Correlations of spontaneous speech measures with results of the elicited production task of tense marking in sample of typically-developing and SLI children

	MLUm	NDW	SUB-I
Pearson correlation	.539**	.537**	.390*
Sig. (2-tailed)	.001	.001	.019
N	36	36	36

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

In Table 3, we again see that spontaneous speech measures correlated highly with the elicited production task's tense marking results. This corroborates its validity as a measure of children's linguistic knowledge.

Finally, Baron et al. (2011) show that an array of tense-related discriminant functions can classify Spanish-speaking children with SLI from those without, with fair to good sensitivity and specificity. In a sample of 40 children (SLI = 21, TD = 19), a function consisting of MLUm and the Grammaticality Choice test results had 100% sensitivity (detected 21 out of 21 children with SLI) and 84% specificity (classified 16 of 19 TD children as TD). The elicited production test of tense by itself, in a sample of 36 children (SLI = 18, TD = 18), resulted in a function that had more balanced sensitivity (16/18 – 89%) and specificity (16/18 – 89%).

In summary, though there are obstacles to determining whether tense marking is difficult for both typically-developing children and children diagnosed with SLI in Spanish and other null subject languages, they are not insurmountable. In particular, there exist results from spontaneous production, elicited production and receptive grammatical tasks that suggest that difficulty with tense marking, manifesting itself in the non-adult-like use of morphological infinitives, bare progressive participles and bare stems in root contexts is sufficient to distinguish children with SLI from those without.

3.2 SLI as a tense deficit at the semantic level

In the existing research, it has been more than adequately demonstrated across a variety of languages that at least one of the loci of the specific language impairment disorder is tense marking, and this appears to be the case for Spanish, as well. However, while this has been tested both expressively and receptively, the variables being tested have been either morphophonological or morphosyntactic. There has been, until relatively recently, no suggestion that the deficit might extend to the domain of semantics. Ideally, a theory of syntax should be closely related to a theory of semantics and correspondences between the two levels of grammar, including concomitant deficits, are predicted. This is where the aspect before tense observation comes in. Because the work on the development of tense in this line of research has been fundamentally about the development of semantics, we can ask whether similar semantic patterns obtain in the grammars of children who are known to have morphosyntactic tense deficits, namely, children with SLI.

Leonard, Deevy, Kurtz, Chorev, Owen, Polite, Elam and Finneran (2007) show in a production study that child English speakers with SLI were less likely than age and language controls to produce verbs marked with *-ed* to express telic predicates and were also less likely to produce verbs marked with *-ing* to express atelic predicates. In the comprehension domain, Leonard and Deevy (2010) show that a sample of English-speaking children with SLI ($n = 15$, mean age = 5;2) was worse than an age-matched

sample of typically-developing children at responding to requests that described completed actions in the past, presented with telic predicates, than they did with completed actions in the present. The TD control group was equally proficient at past and present, as long as they were completed. This suggests that the connection between telicity, grammatical aspect and tense may be more tenuous for English-speaking children with SLI than it is for typically-developing children.

4. Research questions

This brings us to our research questions:

1. Will monolingual Spanish-speaking children diagnosed with SLI associate tense-aspect morphology with its corresponding tense interpretations, on a receptive task?
2. Will monolingual Spanish-speaking children diagnosed with SLI show a tendency towards using prototypical combinations of lexical aspect, grammatical aspect and tense, as do typically-developing children, on a receptive task?

5. Methods

5.1 Participants

Fifty-three monolingual Spanish-speaking children in Mexico City participated in this study. Twenty of these children were diagnosed with SLI (Age Range = 4;9 – 6;4, Mean Age = 5;7), using conventional exclusive and inclusive criteria. A Spanish translation of the WIPPSI (Weschler Preschool and Primary Scale of Intelligence) was used to determine non-verbal IQ. Only children with scores above 85 were included in the sample. The *Batería de Evaluación de la Lengua Española* or BELE (Rangel, Romero & Gómez 1988) was the standardized language test used. The BELE is a test that was locally developed and normed and consists of 7 subtests. Four of them were used in our identification process. Our criterion was that children have a score of at most 6 (–1.25 SDs below the mean, see Leonard 1997) on at least one comprehension test (“Comprensión Gramatical” Grammatical Comprehension or “Adivinanzas” Riddles) and at least one production test (“Producción Dirigida” Elicited Production or “Definiciones” Definitions) to be included. Children were also given the family questionnaire of Restrepo (1998), which has been shown to have good sensitivity and specificity in identifying children with SLI. Finally, children were given a phonological screen in which they were asked to repeat 24 nonce words that included the segments used in Spanish to represent tense and

aspect markers in word-final position, with appropriate stress. Children had to produce at least 4 out of 5 correctly from each category in order to be included in the study. With respect to hearing, the children were given thorough hearing tests and had to pass them at conventional levels. Further, parental report and medical history had to suggest no recent episodes of otitis media with effusion in order for a child to be included. Similarly, neurological tests determined that the children had no frank neurological damage. With respect to oral structure and oral motor function, initial examination ruled out structural anomalies and assured normal function. Parental report and family history interviews ruled out concerns pertaining to social and physical interactions.

Thirty-three typically-developing children participated in the study (Age Range = 3;3 – 5;8, Mean Age = 3;9). The children who formed the control group were also given the standardized language test and their results were within 1 standard deviation of the mean for their ages, to eliminate language-impaired children. They were also given the phonological screen and passed to eliminate possible skewing of the results for phonological reasons. Our interactions with them as well as their parents' and teachers' reports suggested no abnormalities in their speech or language.

Because the older typically-developing children in Grinstead, Pratt and McCurley (2009) are at ceiling with respect to the dimensions of language we are testing by the time that they are the mean age of our SLI group, we have not matched the typically-developing group to the SLI group, but rather present their data to give an idea of how a significantly younger group performs. Our conclusions will be limited to within group measures.

5.2 Procedures

In the experiment, a Winnie the Pooh puppet is presented to the children, who are told that Pooh hopes that the children will ask him questions about pictures of himself, based on stories that will be told. The children are then told that Pooh likes to hear them tell stories about the pictures so much that he blindfolds himself so that he can just listen to what they say. Next, children are shown three pictures to familiarize them with the format. The picture sequences are also used as fillers. In the pictures, given in Figure 1, we see: Pooh holding a basketball, Pooh in a boat and Pooh driving a car.



Figure 1. Warm-up/filler images

Children are then asked by Pooh to show him “I am driving a car.” *Enséñame “Yo manejo el coche.”* This step was necessary to assure that children could match a picture with a sentence. There are 2 such comparisons, in which corrective feedback is given. None is given after that. Two similar items serve as fillers. To be included in the sample, children had to do both correctly.

In the next step, children are shown a set of three pictures, given in Figure 2, and it is explained to them that the stories have a beginning, a middle and an end. This is accomplished by pointing while telling the story to show that the events progress from left to right.

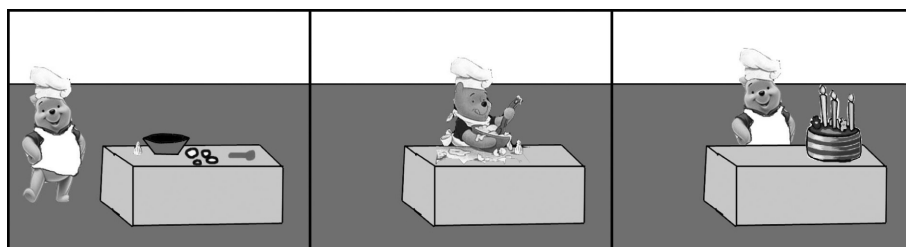


Figure 2. Left to right sequence warm-up item

Another set of three pictures, given in Figure 3, are then shown to the children, who are asked to explain what the pictures show. Only children who said, in some way, that the pictures represented the time before the event happened, the event in progress and the aftermath of the event were included.

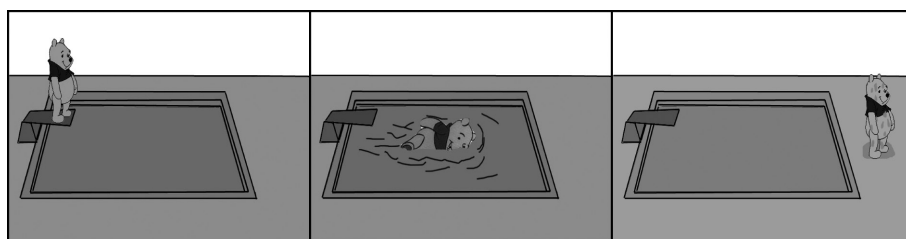


Figure 3. Narration sequence

Critically, it was not necessary for children to produce inflectional morphology to express these concepts. Nonetheless, they did have to demonstrate that they perceived the event depicted as having three temporal stages. This part of the test serves to provide us with an inflectional morphology-independent measure of children’s temporal interpretations. Children who could not narrate the three pictures in this way were excluded.

We then remove Pooh's blindfold and he tells children that they need to help him understand them, since he has been blindfolded and could not see them. For each set of 3 pictures, Pooh utters one of the three following request types, in randomized orders:

Show me: "I'm going to sleep." - Enseñame: "Yo voy a dormir."
 Show me: "I am sleeping." - Enseñame: "Yo estoy durmiendo."
 Show me: "I slept." - Enseñame: "Yo dormí."

The order of the three different statements for each set of pictures was randomized. Children were shown 6 such sets of 3 pictures that varied by conjugation class and telicity, as illustrated in Table 4.

Table 4. Predicates used by conjugation class and telicity

Predicate-English	Predicate-Spanish	Conjugation class	Telicity
To play soccer	jugar al futbol	AR	atelic
To draw a boat	dibujar un barco	AR	telic
To ride the horse	montar el caballo	AR	atelic
To eat the cereal	comer el cereal	ER	telic
To bite the apple	morder la manzana	ER	telic
To sleep	dormir	IR	atelic

To make it more likely that the children would be familiar with the predicates, the verbs were taken from the Spanish version of the MacArthur Communicative Development Inventory (Jackson-Maldonado, Bates & Thal 1992). Finally, the order of presentation of the scenarios was counterbalanced.

When referring to our stimuli, we will use the following cover terms:

- "Future" - for future tense and modal/irrealis grammatical aspect
- "Present" - for present tense and progressive grammatical aspect
- "Past" - for past tense and perfective grammatical aspect

We used pictures and sentences that represented both tense and grammatical aspect. Children were asked to match the sentence with the picture that represented the appropriate tense and grammatical aspect.

6. Results

Returning to our research questions, we ask whether monolingual Spanish-speaking children diagnosed with SLI associate adult-like tense morphology with adult-like

tense interpretations. Based on our results, the answer appears to be that they do. The Spanish-speaking SLI and TD children in our study performed above the level of chance (33% – 6 of 18 items, in our design) for associating prototypical tense-aspect combinations with images representing past, ongoing and future events, as illustrated in Table 5.

Table 5. Mean number of adult-like responses to 18 scenarios with corresponding one sample t-test values

	TD (n = 33)	SLI (n = 20)
Mean total correct answers (of 18)	9.97	9.35
One-sample T-test (greater than chance .33, 6 of 18)	* $p < .001$	* $p < .001$

The fact that the children's answer totals were above chance is illustrated in Figure 4.

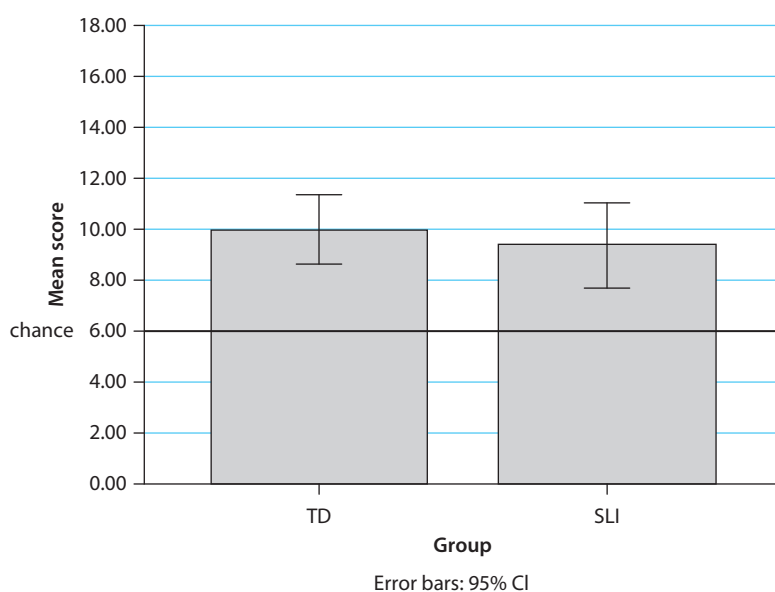


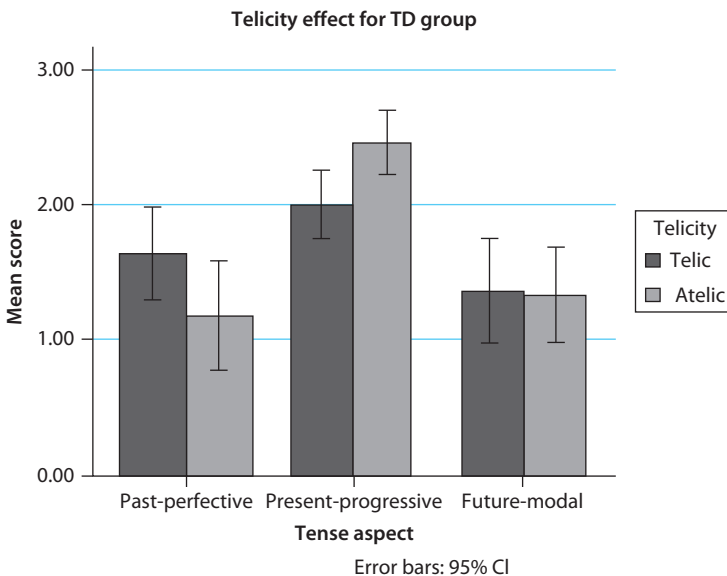
Figure 4. Typically-developing and SLI group mean numbers correct

Turning to our second question, we ask whether monolingual Spanish-speaking children diagnosed with SLI will show a tendency towards using prototypical combinations of lexical aspect, grammatical aspect and tense, as do typically-developing children. The answer in our data appears to be (consistent with the production data of Leonard et al. (2007)) that they do not. The TD children showed this effect, as in previous research, but the SLI children did not. The answers of both groups are displayed in Table 6.

Table 6. Mean telic and atelic numbers correct out of 3 possible for SLI and TD groups with corresponding paired t-test comparisons

Group	Morphology	Mean telic	Mean atelic	<i>t</i>	<i>df</i>	<i>p</i>	Sig. dif. ($\alpha = .05$)
TD	Pres. Prog.	2.00	2.45	-2.78	32	.009	Yes
TD	Past Perf.	1.64	1.18	2.17	32	.037	Yes
TD	Future Modal	1.36	1.33	.20	32	.845	No
SLI	Pres. Prog.	2.10	2.35	-1.31	19	.204	No
SLI	Past Perf.	1.40	.95	1.76	19	.095	No
SLI	Future Modal	1.40	1.15	1.31	19	.204	No

Table 6 gives the mean correct answer for each group, out of a possible 3, for telic vs. atelic items, for each of the three tense-grammatical aspect combinations. In Table 6, we see in the second row that the typically-developing children in our study show a statistically significant tendency to associate atelic predicates with present progressive morphology. Further, in the third row, we see that this same group shows a significant tendency towards associating telic predicates with past perfective morphology. These results are consistent with the standard aspect before tense prototypes discussed. These trends are illustrated in Figure 5.

**Figure 5.** Typically-developing children's mean number of associations of telic/atelic predicate with three morphological alternatives

In contrast to the typically-developing children, we note that our SLI group, in the fifth row of Table 6, does not show a significant preference for associating atelic predicates with progressive morphology, nor do they show, in the sixth row, a significant tendency to associate telic predicates with past perfective morphology. This pattern, illustrated in Figure 6, for SLI children does not follow the well-attested prototypical pattern for typically-developing children, but does follow the pattern attested in English production data, reported by Leonard et al. (2007).

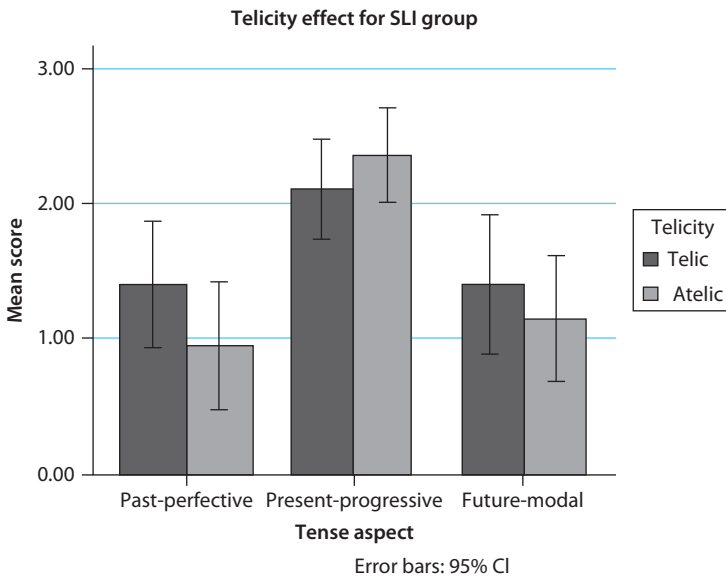


Figure 6. SLI Children's mean number of associations of telic/atelic predicate with three morphological alternatives

7. Conclusions

To begin with, we recognize that the current study is limited in that direct comparisons to an age control or language control group, following convention in the discipline, were not performed. Thus our conclusions are tentative and limited to describing the SLI group's performance within group, with the TD group's results giving us an idea of what not completely adult-like temporal interpretations look like. Notably, the control group shows the aspect-before-tense behavior that has been documented for both adults and children in a wide array of languages. With that in mind, in conclusion, Spanish-speaking children with SLI do not follow the aspect-before-tense pattern, alluded to, in temporal-aspectual interpretations. On the one hand, their temporal

judgments do not appear, superficially, to differ from those of typically-developing children. They manage to solve the problem of associating temporal and aspectual interpretations with pictures that represent them visually. On the other hand, they do not appear to solve the problem *in the same way* as typically-developing children. In particular, they do not appear to use prototypical combinations of tense with lexical and grammatical aspect to get the job done. How they are solving this problem is not obvious to us and awaits further research.

Speculating, there are multiple ways in which the account of Wagner (2009) could be relevant. Perhaps children are failing to encode telic predicates as having an inherent endpoint. If so, because they are able to associate tense-aspect combinations with pictures that represent them, perhaps they are able to determine an endpoint, without attending to the lexical semantic nature of the predicates they use. If this is true, it is unclear how it can be squared with the documented problem for SLI children of using tense in general, because it seems to predict that they should not have such problems. Alternatively, it may be the case that children are aware of the endpoint inherent in telic predicates, but are simply unable to do anything with that information because they have, as Rice and Wexler (1996) have proposed, a deficit specifically with tense. From this perspective, they might associate lexical and grammatical aspect in the usual way, but be unable to associate them with tense. Of the two possibilities enumerated, this seems the more probable option, though a great deal more work on the semantics of tense in children with SLI is called for before the matter is well-understood.

An additional consideration is what it means for children who are purported to have problems only in the language domain to have problems with what Wagner has qualified as an information processing problem, which presumably is not specific to the language domain, but rather applies to higher level reasoning. Again, while this view might seem contradictory to the standard view of SLI, it could be consistent with it, under the assumption that impaired tense simply cannot make use of information about telicity in the way the typically-developing children do. From this perspective, it is a language-specific deficit that impairs the processing of information about telicity and not a problem with information processing per se. In this way, Wagner's view, which seems promising, can be maintained, as can be the Rice and Wexler (1996) account of impaired tense as a locus of SLI.

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