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Acquisition of the passive in Spanish-speaking children

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Abstract: This work examines three- to six-year-old children's acquisition of the Spanish passive. This structure, a notoriously difficult concept for early learners, exhibits great variation in age of acquisition cross-linguistically. Spanish, with two passive constructions, is an ideal case study for the role of frequency in the development of the passive. This study utilizes data from CHIEDE, a spontaneous oral corpus spanning more than 20,000 words of child speech. Only a limited number of studies examining the passive have utilized spontaneous corpus data; as a result, it is unclear if lexical semantic patterns are due to experimental or task effect - an issue that only the inclusion of natural data can resolve. Results show that children only produce one of two possible forms of the Spanish passive. Their production is also limited to action verbs. Finally, while children as young as 3;0 produce the passive, cross-sectional data show the beginnings of a downward U-shaped developmental pattern. These results are explained in terms of acquisition by analogy as children utilize previously-acquired structures to create abstract syntactic representations.

INTRODUCTION

Children's acquisition of passive constructions (ie. The ship was sunk [by pirates].) is a window into the comprehension of argument structure and role of frequency in L1 development (Allen, 2009; Fox & Grodzinsky, 1998; Horgan, 1978; Maratsos, 1974; Maratsos, Fox, Becker, & Chalkley, 1985; Messenger, Branigan, McLean, & Sorace, 2012; Pinker, Lebeaux, & Frost, 1987; Slobin, 1966). Passivization requires that the semantic roles of agent and patient reverse from the active phrasing (1a) resulting in the syntactic displacement of the patient to subject position and the agent to phrase-final position, often in a prepositional phrase (1b).

- (1) a. Pirates sunk the ship.
b. The ship was sunk by pirates.

Studies have shown a delay in production of the passive which varies cross-linguistically: English-speaking children typically cannot productively produce the structure until 5;0 (Fox & Grodzinsky 1998), German-speaking children until 6;0 (Mills, 1985), and Hebrew-speaking children until 8;0 (Demuth, 1989), demonstrating some language-specific results in the acquisition of the structure.

Given these cross-linguistic differences, extension of the passive to research on Spanish language acquisition is an important contribution because, unlike English, Spanish's flexible word order permits post-verbal subjects and phrase-final agents even in *active* sentences.¹ This could prove advantageous to children as they acquire the unique thematic role pairings and syntactic displacement required of passive constructions - or it could result in delayed development as children detangle the passive from the active. Furthermore, unlike almost every other language in which acquisition of the passive has been studied, Spanish permits two passive constructions (2a, 2b). The reflexive passive (2b) is '2 to 19 times as numerous' as the former in oral discourse (Takagaki, 2005:303; Noh, 2011). This renders Spanish a test case for the role of input frequency as children's use of the two forms may or may not correspond to their input.

- (2) a. El coche fue vendido.
DET.3SG car is.PAST.3SG sell.PPRT.
the car was sold
'The car was sold.'
- b. Se vendió el coche.
PASS. sell.PAST.3SG DET.3SG car.
X sold the car
'The car was sold.'

We propose a corpus analysis of the acquisition of the passive in Spanish-speaking children. Only a limited number of studies examining the passive have utilized spontaneous corpus data (see Pinker et al., 1987 for English); as a result, we do not know if the patterns concerning novel verb usage are due to experimental or task effect - an issue that only the inclusion of natural data can resolve. Through a corpus study, the semantics of the first verbs that children passivize can be examined. This is a component of passive production that has been

referenced in elicitation studies (Maratsos et al. 1985) and lends insight into the means by which children begin to produce passive structures.

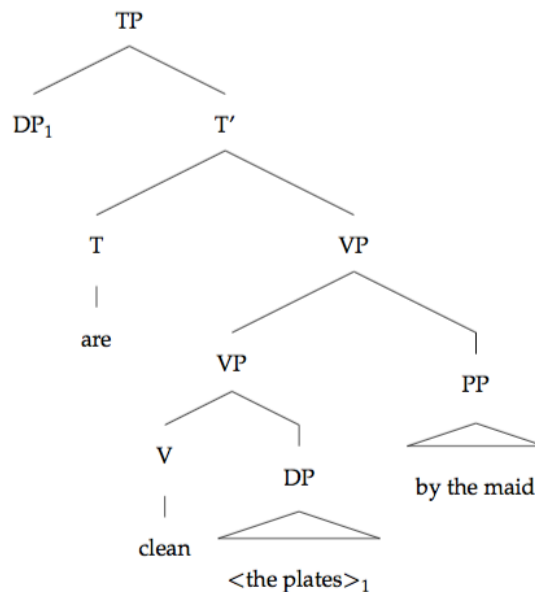
The recordings for this study come from the CHIEDE corpus of Castilian Spanish (Garrote & Moreno Sandoval, 2010), a spontaneous oral corpus, spanning more than 20,000 words of child speech and 40,000 words of child-directed speech (CDS). In this work, we examine the hypotheses that Spanish-speaking children produce passive forms according to the 1) statistical frequency of the input that they hear and 2) syntactic forms to which they have previously mapped functions.

BACKGROUND

The syntax of the passive

Generative approaches to syntax attribute the passive construction to movement of an argument in a phenomenon known as A-MOVEMENT (Chomsky 1965). As indicated in Figure 1, the agent, the maid, is reduced to an adjunct prepositional phrase (PP) position. In turn, the patient, the plates, moves to replace the agent at a higher position in the syntactic structure. The by-phrase adjunct with the agent can variably be included (full passive) or not (short passive).

Figure 1. A-Movement for Passive Construction



The passive construction can be employed to express certain pragmatic meanings; namely, to convey the importance of a patient over an agent (Dik, 1997; Fillmore, 1968; Hidalgo, 1994; Maldonado, 2007; Olbertz, 1998). Dik (1997) incorporates a semantic function hierarchy, as well as argument patterns, to explain the active-passive voice distinction. The semantic function hierarchy, spanning the roles of agent to time, lays out the potential semantic roles of a phrase (Table 1).

Table 1. Semantic function hierarchy of subject/object (Dik, 1997: 266; Fillmore, 1968)

	Agent	Goal/Patient	Recipient	Beneficiary	Instrument	Location	Time
Subject	+	+	+	+	+	+	+
Object		+	+	+	+	+	+
	→	→	→	→	→	→	
	More likely					Less likely	

While both the subject and object could take any of the semantic roles (with the exception of objects taking an agentive role), not all roles are created equal. For example, when a subject or object takes a semantic role such as location or time, the ensuing construction is more marked than the statistically and cross-linguistically more frequent subject-agent or object-patient pairings.

The active voice, the unmarked construction in languages such as Spanish and English, takes canonical subject-agent and object-patient associations (Dik, 1997). In these languages, dubbed ‘accusative with marked passive’, the first argument in the sentence takes the agent properties and the second takes the patient properties in the active voice. In the passive, the patient takes subject properties in the first argument position of the sentence, demoting the former agent. Thus, to produce well-formed passive constructions in accusative languages, the original second argument must acquire the properties which characterize the first argument in the active construction (for example agreeing in person and number with the finite verb).

The Spanish passive

Although a widely-studied structure cross-linguistically, the Spanish passive is particularly interesting since it manifests in two main forms. The PERIPHRASTIC passive is formed with the auxiliary copula *ser* (3a) or *estar* (3b), and a past participle.¹ Although both 3a and 3b are periphrastic constructions, the construction [*estar* + past participle] is referred to as the RESULTATIVE passive. The other passive structure, the REFLEXIVE, is the more common of the two constructions (Green, 1975; Hidalgo, 1994) and is formed with the multi-purpose clitic *se* and the active form of the verb (4a). In all passive constructions, it is not the demoted agent, but the patient, that controls subject agreement. For example in 3a and 4a, both the verb *fue* (be.PAST.SING) and *vendió* (sell.PAST.SING) agree in number with the singular subject-patient *coche* ‘car’.

(3) EXAMPLE OF PERIPHRASTIC PASSIVE

a.	El	coche	fue	vendido.
	DET.3SG	car	is.PAST.3SG	sell.PPRT.
	the	car	was	sold

RESULTATIVE PASSIVE

- b. El coche estaba vendido.
 DET.3SG car is.PAST.3SG sell.PPRT.
 the car was sold
 ‘The car was sold.’

(4) REFLEXIVE PASSIVE

- a. Se vendió el coche.
 PASS. sell.PAST.3SG DET.3SG car.
 X sold the car

Spanish, a pro-drop language, also permits both pre- and post-verbal placement of subjects – in reflexive, resultative, and periphrastic passive structures (Jaeggli, 1986; Becker & Kirby, 2015). Yet when the subject is placed pre-verbally, it is not easily classified as an agent or patient, and the structure is instead interpreted as the MIDDLE passive (4b).

(4) MIDDLE PASSIVE

- b. El coche se vendió.
 DET.3SG car PASS. sell.PAST.3SG
 The car X sold.
 ‘The car was sold.’

Maldonado(2007) proposed that the periphrastic passive takes theme promotion as its primary goal while agent demotion motivates the reflexive passive. This is also supported by the ungrammaticality of the reflexive passive when a by-phrase follows (4c). Unlike the periphrastic passive, the agent is not even variably stated in sentences with the reflexive passive.

- (4) c. *Se vendió el coche por el jefe.
 PASS. sell.PAST.3SG DET.3SG car by DET.3SG boss.
 X sold the car by the boss
 ‘The car was sold by the boss.’

The distinction between periphrastic and reflexive passives is not universal. The dual nature of the Spanish passive is of interest because the periphrastic passive is much less common than the reflexive providing an additional way to respond to questions of frequency in L1 development. Given the frequency disparity between the forms, we anticipate differences in their acquisition. However, the different formations of the two passive structures, one utilizing the common clitic *se* for example, also provide a way to respond to how children employ previously-acquired grammatical information to the acquisition of new structures.

Acquisition of the passive

The overarching research questions in the acquisition of the passive have examined why the structure eludes so many young learners and under what grammatical conditions the structure is eventually acquired (Slobin, 1966; Maratsos, 1974; Horgan, 1978; Maratsos et al., 1985; Borer and Wexler, 1987; Pinker et al., 1987; Demuth, 1989; Fox & Grodzinsky, 1998; Messenger et al., 2012). Crosslinguistic investigations have unearthed two central factors that impact children's acquisition of the structure: frequency effects and semantics, notably thematic role pairings and lexical semantics.

Slobin (1966) first addressed the role of semantics in children's comprehension of the passive and found that all English-learning children aged 5;0 and older could produce the structure. Yet the children had shorter response times for semantically nonreversible passives (where only one of the two NPs could feasibly fulfill agent role e.g. *The rock was thrown by the girl.*) than reversible passives (where either available NP could fulfill agent role e.g. *The boy was led by the horse* - the horse or the boy could be the agent). Two animate referents slowed down children's processing of passive sentences. Slobin concluded that children exhibit a delay in the passive partially for semantic reasons and exhibit a processing advantage for the nonreversible passive.

Maratsos et al. (1985) examined the role of verb semantics in passive production and found that children had more difficulty producing passives with mental verbs (e.g. *like*) than actional verbs (e.g. *hold*). This suggested that children expect passives to take common semantic relationships of agent-subject and patient-object; consequently, they struggle with semantic roles, such as experiencer-subject and theme-object, that deviate from this. Similarly, Pinker et al. (1987) argued that children's passivization rules were sensitive to the grammatical functions assigned to semantic roles. Utilizing experimental evidence from comprehension and production tasks, the authors found that children readily produced passives with canonical thematic assignment. But, when semantic roles were reversed, rates of passive production significantly decreased.

Other works focused upon the predictive role of frequency on acquisition of the passive. In a comprehension task, Maratsos (1974) found a negative U-shaped developmental pattern: young children of approximately 3;6 could comprehend passive constructions at rates up to 72%. A few months later, at ages 3;8-3;11, comprehension rate had dropped to 35%. Finally, between the ages of 4;4 and 4;7, comprehension rose again to an 81% accuracy rate. To account for the pattern, Maratsos suggested that as children age, they become more influenced by the unmarked, and more frequent, construction: the active. Children thus experience a 'frequency-driven bias' (Becker & Kirby, 2015:12) in the comprehension of passive structures and may resort to a default active interpretation for a period of time, prior to achieving adult-like abilities. Demuth (1989) also famously argued for a frequency effect. Contrary to previous works that reported delays in acquisition of the verbal passive (Mills 1985: German; Borer & Wexler 1987: Hebrew), Demuth found that children learning Sesotho, a Niger-Congo language without an adjectival passive, produced the verbal passive as young as 2;8. The author instead argued that the relative low frequency of verbal in comparison to adjectival passives in languages such as Hebrew could explain children's inability to produce the former until an older age.

Theoretical Approaches

Scholars have taken a variety of theoretical approaches to passive acquisition. Innatist studies have attempted to tease apart whether the Continuity Hypothesis (Pinker et al., 1987; Demuth, 1989; Fox & Grodzinsky, 1998) or the Maturation Hypothesis (Maratsos, Juczaj, Fox, Chalkley, 1979; Maratsos et al., 1985; Borer & Wexler, 1987; Horgan, 1978; Pierce, 1992) better explains the cross-linguistic delay in passive acquisition. Pinker et al. (1987) argued that children have continuous access to UG, and develop language-specific constraints along the path to acquisition – the gradual acquisition of these constraints explains the observed cross-linguistic variation in passive acquisition. Other works explained acquisition of the passive in terms of maturation stating that while children possess UG, the fully-formed grammar only becomes available as children mature biologically (Mills 1985; Borer & Wexler 1987). Consequently, a child's acquisition depends not on exposure to the passive, but the maturation of grammatical principles dictating its usage, namely A-chain formation. More recent work on Inuktitut (Allen & Crago, 1996), Japanese (Sugisaki, 1999; Okabe & Sano, 2002), and Sesotho (Demuth, Moloi, & Machobane 2010) continues to examine innatist approaches to passive acquisition.

Motivated by evidence that children employ statistical learning in language acquisition (Saffran, Aslin, & Newport, 1996; Pierrehumbert, 2003), usage-based and exemplar theoretic models turn to domain-general cognitive processes to explain passive acquisition in the CONSTRUCTION CONSPIRACY HYPOTHESIS (CCL) (Budwig, 1990; Abbot-Smith & Tomasello, 2006). The CCL argues that a child will learn a given construction earlier and quicker when s/he has already acquired a construction with related morphological/lexical subparts. However, when two or more forms have an identical semantic-pragmatic function, or a PARAPHRASE RELATION, (e.g. English future tense “will” and “going to”), children will experience inhibition in acquisition of one form as they detangle the semantic usages. The inhibitory predictions of the CCL are similar to STATISTICAL PREEMPTION, or when learners do not use a syntactic structure if an alternative structure with the same function is presented in the input e.g. *goed** versus *went* (Goldberg 2011).

In a production study, Abbot-Smith & Behrens (2006) found that a German-learning child produced the German stative passive (formed with lexical verb + auxiliary *sein*) more than the eventive (lexical verb + auxiliary *werden*). Input frequency could not account for the usage discrepancy since stative and eventive passives were equally frequent in adult language. Instead, the authors conclude that higher stative usage was due to previously-learned structures. For example, the child had already acquired the auxiliary *sein*, a highly frequent copula in German, well before his use of the stative passive, which required this auxiliary verb. However, he had not acquired any subparts of the eventive passive and could not, subsequently, rely upon any previously-acquired structures. The paraphrase relation effect is examined via the German eventive passive, constructed with the *werden* copula, and one of two future tenses in German (henceforth *werden*-future). The eventive passive was acquired prior to the *werden*-future. Semantic similarity explains this: the *werden*-future is one of two forms utilized to express the future tense, but its competitor is much more frequent. The child productively used the future tense, but relied upon the form that did not require *werden*. Once again, frequency alone could not account for the observed production patterns because the *werden*-future was actually *more* frequent in the adult input than the eventive passive.

The Spanish passive, too, provides an excellent test case for the CCL since Spanish exhibits two passive structures. Differences in acquisition stages of these structures could thus be explained as a consequence of bootstrapping information, such as subparts of the passive constructions, available to children in their previously-learned language. Furthermore, while the two Spanish passive structures are not identical semantic-pragmatic competitors – the periphrastic passive permits expression of the agent in a by-phrase and this is ungrammatical in the reflexive passive – the two passive forms can be seen as competing structures when the periphrastic passive without the by-phrase is considered. Consequently, the competition of forms may also provide explanation for children’s usage of one passive form over the other.

Acquisition of the Spanish Passive

Several works have focused specifically on passive acquisition in Spanish-speaking children. In a two task experiment, Pierce (1992) firstly found that children produced the reflexive passive with postverbal subjects more consistently than with preverbal subjects. However, Pierce then used a comprehension task to evaluate periphrastic passive usage and found that children had more difficulty comprehending postverbal subjects than preverbal. Five-year olds even demonstrated a downward U-shaped developmental pattern; in verb-subject order, the percentage of passive structures they correctly comprehended decreased. However, Pierce hesitates to award these periphrastic results much validity given the low token count. Álvarez, Casares, & Zinkgräf (2008) focused on children’s comprehension and found that children understood short passives, those without the by-phrase, at a higher rate than full. Given the low frequency of full passives in adult speech, the authors argue for learning patterns that follow input frequency. Finally, Aguillón (2010) found a task effect for passive production since children exhibited greater syntactic complexity during narrative tasks than in spontaneous production. Given the task effect of Aguillón (2010), the current work makes a critical contribution to analysis of passive production, especially in Spanish, through the inclusion of spontaneous CDS and child speech.

THE CURRENT STUDY

Research Questions

The current study expands the study of the acquisition of the passive to a spontaneous corpus analysis of Spanish-speaking children and their interlocutors. This work will address the following research questions concerning the acquisition of the Spanish passive:

- 1) When do Spanish-speaking children produce the passive?

Recent accounts suggest that Spanish-speaking children can produce the passive in semi-imitation elicited experimental tasks as early as 3;0 (Pierce, 1992; Álvarez et al., 2008; Aguillón, 2010). However, age-of-acquisition findings can vary by task (i.e. comprehension versus production, narrative versus spontaneous speech) with many children demonstrating comprehension abilities before production. This study is novel in its incorporation of naturalistic corpus data in response to this question.

- 2) Will Spanish-speaking children use one passive construction earlier/more frequently than another?

It is expected that children will produce the periphrastic passive less than the reflexive passive. This is preliminarily explained as a consequence of input frequency: the periphrastic passive is less frequent even in adult speech. The key question addressed here is whether frequency alone accounts for periphrastic versus reflexive passive use. Given the findings of previous works examining bootstrap effects in acquisition of the passive (Abbot-Smith & Behren, 2006), we predict that children will acquire passive structures that have subparts children have already acquired. For example, the reflexive may be acquired first due to the presence of the the third person clitic *se*, which composes part of the reflexive passive, and is common in child speech.

- 3) When Spanish-speaking children produce the reflexive passive, will they rely upon verbs that frequently collocate with *se* (e.g. *llamar*, ‘to call’)? To what extent, and with verbs of which semantic makeup, are they capable of extending beyond these familiar collocations and passivizing verbs that rarely occur without *se*?

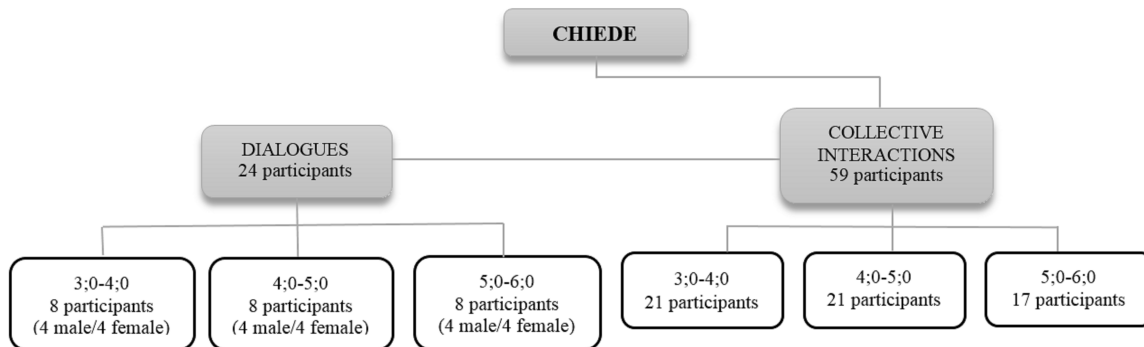
Children will likely produce passive structures with verbs that are frequently in the passive in their input. Previous works examining non-elicited production of the passive are sparse, yet Maratsos et al. 1985 demonstrated that children more readily passivize actional verbs. Consequently, it is predicted that children will incorporate more actional verbs than stative in their passive production.

METHOD

Corpus description

The research was based on a spontaneous child language corpus, CHIEDE, consisting of approximately 60,000 words, more than 20,000 words of child speech and around 40,000 words of child-directed adult speech. The linguistic variety is Castilian Spanish as spoken in central Spain. Data was collected in a kindergarten context and recordings were divided into two interactions: 1) collective spontaneous interactions that took place everyday before the lesson, where children talked about different, teacher-guided topics and 2) spontaneous dialogues between a child and an adult. The teacher population consisted of $n=5$ adults, (4 female), all speakers of central Peninsular Spanish. Collective interactions and dialogues are split into three sub-corpora, according to the child’s age and academic year (3;0 to 4;0, 4;0 to 5;0, and 5;0 to 6;0) for a total of $n=59$ participants (see figure 2), $n=24$ of which participated in dialogues. All participated in collective interactions. Balance by gender is maintained.

Figure 2. Structure of CHIEDE Corpus



Retrieval method

The corpus is morphosyntactically annotated, so information regarding passive structures could be retrieved semi-automatically (see Garrote & Moreno, 2010). A computer program was designed *ad hoc* to search for those utterances with the clitic *se* for the reflexive passive and those with a past participle following the auxiliary copula *ser* and *estar* for the periphrastic passive. Subsequently, data were manually selected, eliminating any non-passive structures from the analysis. For a reflexive passive interpretation, the structure needed a transitive verb and subject-verb agreement. When there is a disparity between subject-verb agreement, the interpretation is impersonal, and not passive. These tokens were excluded from the analysis. Likewise, constructions with singular intransitive verbs and singular DPs were excluded as they are impersonal structures.

RESULTS

According to data collected, 0.58% ($N=89$) of children’s total utterances were passive structures (Table 2). Reflexive passives account for approximately 78% of all passive structures and middle passives (pre-verbal subject placement) made up over 12% of all passives produced (Figure 3). 9% of passive structures produced were the resultative, realized with the copula *estar*. Unsurprisingly – though not exactly predicted – no tokens of the periphrastic passive with *ser* were produced. As a result, the *ser* periphrastic was not examined in this study, only the periphrastic composed with *estar*. Furthermore, the children did not produce a single instance of the long passive (with the by-phrase).

Table 2. Type of passive produced by Spanish-learning children aged 3;0-6;0

Periphrastic	Reflexive	Middle	Resultative	Total
0	70 (78.7%)	11 (12.4)	8 (9.0)	89 (100)

Figure 3. Type of passive produced by Spanish-learning children aged 3;0-6;0

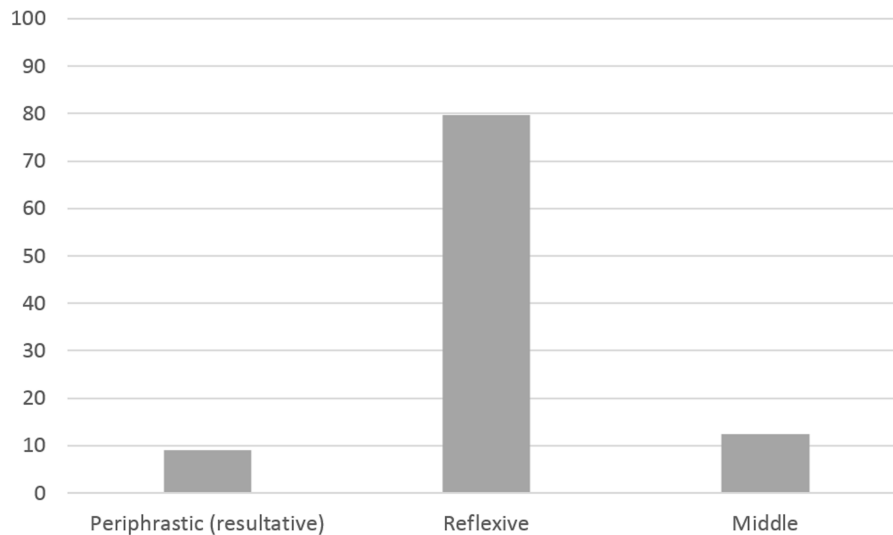
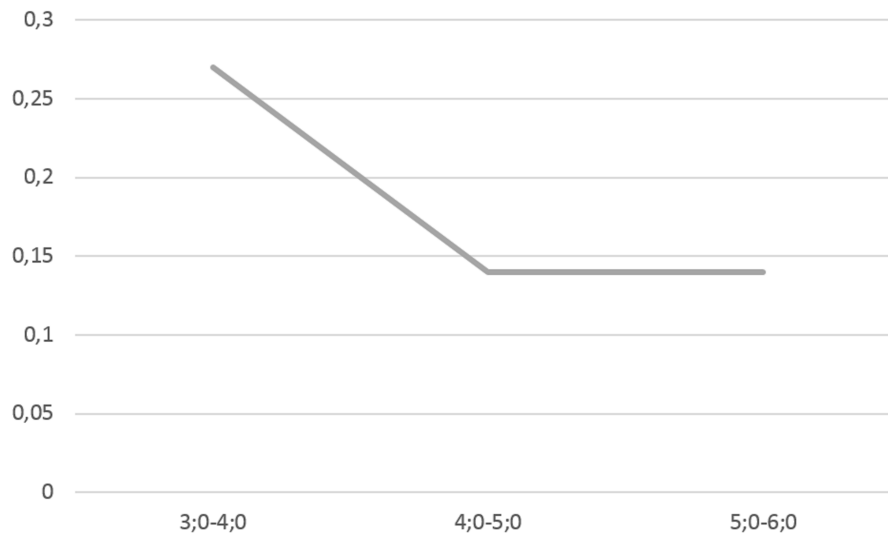


Table 3 and Figure 4 show cross-sectional data by age. Surprisingly, the highest figure in passive production belongs to the younger children, those from the first group of 3;0-4;0 years old, for whom the passive represented 0.27% of their total speech output. This age group produced approximately 48% of all passives in the corpus. Passive usage in 4;0-5;0 year old children dropped greatly as it represented just 0.14% of their total output and only about 26% of all passives produced. Finally, passive usage did not increase in the 5;0-6;0 year old age group as the passive once again represented 0.14% of the group's total output. Since Spanish-speaking children do eventually learn to produce the passive, we can predict a U-shaped developmental pattern in which rate of production increases again after age 6;0 and reaches the rate found among the 3;0 to 4;0 year-olds. A chi-squared test of independence comparing passive versus active usage in the youngest 3;0-4;0 age group and the combined 4;0-6;0 age group (the two eldest groups were collapsed as they produced passives at identical frequencies) demonstrates a significant difference between the youngest group and the two eldest under an alpha < 0.05 criterion ($df=1, \chi^2=5.185, p = .022$).

Table 3. Cross-sectional passive production in Spanish-learning children aged 3;0-6;0

Age	Absolute figures	%
3;0-4;0	43	0.27
4;0-5;0	23	0.14
5;0-6;0	23	0.14
Total	89	0.57

Figure 4. Cross-sectional passive production in Spanish-learning children aged 3;0-6;0



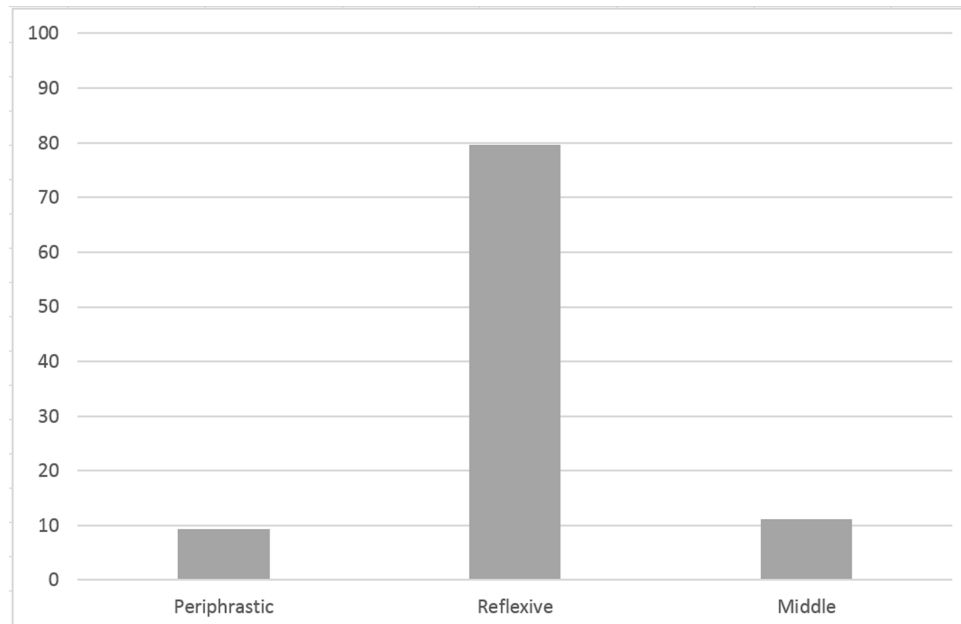
To compare the children's production with adult speech, Table 4 shows the distribution of passive and active structures across the children and their adult interlocutors. The low frequency of passive structures, and the complete absence of the periphrastic passive with *ser* in the children's speech, align with the adult model. In the speech of the children's adult interlocutors from the corpus, the periphrastic passive with *ser* is almost completely absent with just one token (see Figure 5). Overall, the passive is much more frequent in adult speech than the children's: 1.04% of adult utterances are passive structures compared to just 0.58% for children. However, the passive structures used follow a similar distribution: the reflexive passive made up almost 80% of adult and child passive structures. The middle passive made up another 11.11% compared to the children's 12.3%. And finally the resultative passive represented less than 9% of both adults' and children's total passive structures produced. A chi-squared test of independence on the types of passive used by adults and children was not significant, confirming the lack of difference between the groups ($df=2$, $\chi^2 < 0.053$, $p = .974$). (Note that the periphrastic passive was excluded from this analysis as it violates the $N=5$ per cell requirement for chi-squared). This further supports the hypothesis that children may follow the frequency of structures received in their input.

Table 4. Distribution of passive structures across adult and child Spanish

	Reflexive	Middle	Periphrastic	Resultative	Total
Children	70 (78.7%)	11 (12.4)	0	8 (9.0)	89
Adults	129 (79.62)	18 (11.11)	1 (0.61)	14 (8.64)	162

Figure 5 presents a visual display of the passive structures produced by the children's adult interlocutors. The reflexive surpasses the periphrastic passive. When children do begin to passivize, they may, in part, imitate the passive structure that they hear most often in their input: the reflexive.

Figure 5. Passive structure production by adults in CHIEDE corpus



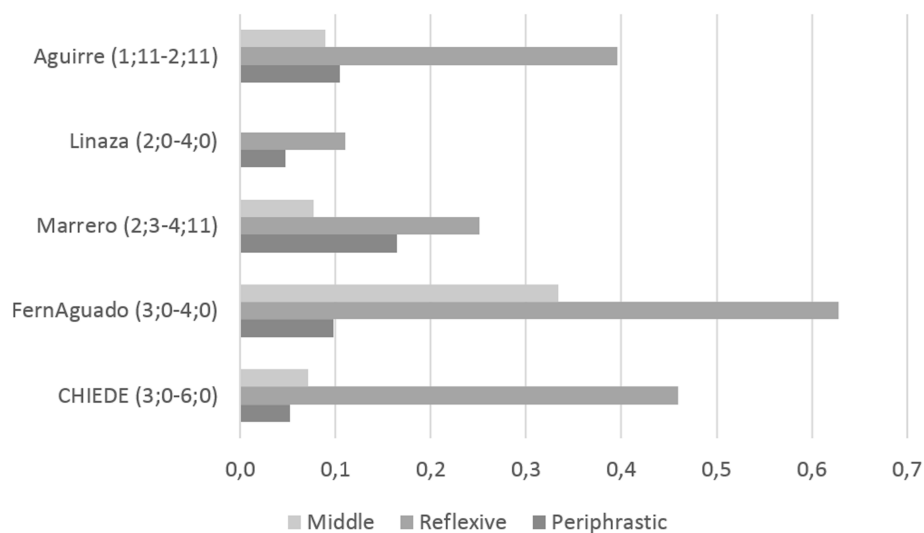
To further reinforce study reliability, the same methodology was applied to four Spanish corpora from the CHILDES database (Albalá & Marrero, 2004; Aguirre, 2004; Fernández Vázquez & Aguado Alonso, 2004; Linaza, Sebastián, del Barrio, 1981; MacWhinney, 2000). Although it is essential to indicate word count in the size of the corpus, Spanish corpora from CHILDES do not provide this measurement. Consequently, to guarantee consistency and homogeneity, 20 files from each of the five corpora were randomly selected for the test.

Additional data from CHILDES corpora support the downward U-shaped developmental curve first observed in the CHIEDE corpus (Table 5, Figure 6). Note that the resultative passive has been collapsed into the periphrastic passive in this table. In the Aguirre corpus, 0.59% of all structures were passive. This corpus exhibited a higher ratio of passive usage than several older children. From a time period spanning 2;0 to 4;0, Linaza produced far fewer passives - only 0.16% of all utterances. The Marrero corpus shows an upswing as 0.49% of all utterances were passive structures. Still, it is not until the eldest child, aged 3;0-4;0, that passive usage reaches the levels of the Aguirre corpus, that is, the youngest child.

Table 5. Relative figures of passive production in Spanish-learning children, CHILDES corpus

Corpus	Periphrastic	Reflexive	Middle	All structures
Aguirre (1;11-2;11)	0.10%	0.40%	0.09%	0.59%
Linaza (2;0-4;0)	0.05	0.11	0.00	0.16
Marrero (2;3-4;11)	0.16	0.25	0.08	0.49
FernAguado (3;0-4;0)	0.10	0.63	0.33	1.06
Hess (6;0-9;0)	0.03	0.79	0.00	0.82
CHIEDE	0.05	0.46	0.07	0.58

Figure 6. Passive production in Spanish-learning children, CHILDES corpus



The CHILDES corpora also support other findings from CHIEDE. Speakers from CHILDES produced more reflexive passives than any other passive form. The periphrastic/resultative represented 0.1% of the total speech of the Aguirre corpus but only 0.05% of the Linaza corpus. 0.16% of the total utterances from the Marrero corpus were periphrastic structures and .10% of the FernAguado corpus were periphrastic. Table 6 reports the percentage of utterances with a passive structure in the adult interlocutors from CHILDES and CHIEDE to explain how some environmental effects might dictate children's usage.

Table 6. Relative figures of passive production in adults, CHILDES corpus

Corpus	Periphrastic	Reflexive	Middle	All structures
Aguirre (1;11-2;11)	0.07%	0.67%	0.13%	0.87%
Linaza (2;0-4;0)	0.03	0.80	0.00	0.83
Marrero (2;3-4;11)	0.15	0.75	0.07	0.97
FernAguado (3;0-4;0)	0.10	0.75	0.37	1.22
Hess (6;0-9;0)	0.00	0.09	0.03	0.12
CHIEDE	0.10	0.84	0.12	1.05

Adult interlocutors between the two corpora do not exhibit much variation - the percentage of adult passive usage in CHIEDE falls within the rate of adult passive usage in the CHILDES corpora (0.83-1.04%). To compare CHIEDE and CHILDES, 0.10% of CHIEDE adult interlocutors' utterances were periphrastic passive constructions and likewise the periphrastic made up between 0.03 and 0.15% of CHILDES adult utterances. The percentage of reflexive passive utterances in CHIEDE was slightly more (0.84%) than that of the other CHILDES corpora (0.67-0.80%). However, for the middle passive, CHIEDE CDS falls roughly in the middle as 0.12% of all utterances were middle passives and the CDS of CHILDES had 0-0.37% of all utterances noted as middle.

To address verb-specific effects of passive acquisition predicted in research question three, Table 7 displays the verbs that the children and adults produced. As anticipated, some of the verbs the children frequently passivized were also present in adults' passive structures. Of the most common verbs that children produced in passive structures, all were present in the adult input and several verbs such as *meter*, *romper*, and *llamar* were listed as the most frequent passive constructions in both the children's and adult's speech.

Table 7. Commonly passivized verbs produced by children and adults

# of appearances	Children		Adults	
	2	Most frequent	2	Most frequent
<i>quemar</i> 'to burn'	<i>meter</i> 'to put' (4)	<i>bajar</i> 'to take down'	<i>encender</i> 'to turn on' (4)	
<i>sacar</i> 'to take out'	<i>perder</i> 'to lose' (5)	<i>castigar</i> 'to punish'	<i>apagar</i> 'to turn off' (5)	
<i>oír</i> 'to hear'	<i>poner</i> 'to put' (7)	<i>celebrar</i> 'to celebrate'	<i>escribir</i> 'to write' (5)	
<i>hundir</i> 'to sink'	<i>acabar</i> 'to finish' (7)	<i>comer</i> 'to eat'	<i>llamar</i> 'to call' (82)	
<i>echar</i> 'to throw out'	<i>romper</i> 'to break' (9)	<i>comprar</i> 'to buy'	<i>meter</i> 'to put' (5)	
<i>encender</i> 'to turn on'	<i>llamar</i> 'to call' (20)	<i>hacer</i> 'to make/do'	<i>romper</i> 'to break' (6)	
<i>abrir</i> 'to open'		<i>hundir</i> 'to sink'	<i>sacar</i> 'to take out' (4)	
<i>apagar</i> 'to turn off'		<i>manchar</i> 'to stain'	<i>ver</i> 'to see' (7)	
<i>cerrar</i> 'to close'		<i>mover</i> 'to move'		
<i>hacer</i> 'to make/do'		<i>oír</i> 'to hear'		
		<i>perder</i> 'to lose'		
		<i>titular</i> 'to title'		

Furthermore, as predicted, the majority of the verbs that children passivize are frequent collocations with *se* as corpus examples in 10 show. Recall that the reflexive passive, the passive structure that the children produced the most, is constructed with the clitic *se*.

(10) Que se llama Jorge.
'That is named Jorge.' (A4-02)

Si se rompe me compra otra.
'If it gets broken, s/he will buy me another.' (A3-02)

Crucially, these verbs rarely appear in the third person without the clitic pronoun. *Llamar*, 'to name or be named', is an example of this. *Llamar* constituted 22.47% of all children's passive structures in CHIEDE and 51.89% of adults'. While a common verb, *llamar* rarely appears without a clitic. A search on the oral Spanish corpus CREA (Real Academia Española, 2015) corroborates this finding in the children's data. Out of a preliminary sampling of 25 tokens of *llamar*, 20 (80%) are collocated following *se*. Similar patterns can be observed for other verbs that are frequently, if not almost exclusively, utilized with *se* such as *romper*, to break (11).

(11) Se ha roto.
'It was broken.' (ELE3)

Finally, concerning verb semantics, almost all of the children's passive structures employed actional verbs. This follows the findings of English-speaking children's production of the passive in Maratsos et al. (1985) as well as Sudhalter & Braine (1985) who showed that preschool-aged children comprehended passive structures with actional verbs better than those with stative or experiential verbs. This also follows general production tendencies of the passive since stative verbs do not passivize quite as easily as their actional counterparts (e.g. It was thought that the king was mad.) (Tomasello, 2009). Furthermore, as one reviewer points out, a majority of verbs that the children used are transitive-unaccusative alternating (e.g. hundir 'to sink', encender 'to turn on', abrir 'to open'). This tendency in the children's production bears particular relevance for Spanish since the intransitive realizations of these verbs require *se*. In the input, the frequent collocation of *se* + the verbs in an intransitive form may establish firmer foundations upon which the children can passivize the verbs in their transitive state.

DISCUSSION

The present study has demonstrated the cross-sectional development of the passive structure in Spanish-speaking children. Results present three significant trends in the data that will be explicated here. Firstly, children produced more reflexive passives than any other passive form. This confirmed our initial hypothesis that due to the relative rarity of the periphrastic in the input, children would produce less of this structure. A simple frequency account could explain the absence of the periphrastic passive in the children's speech. Given the scarcity of this

structure in adult language, we could assume that children have not yet accumulated a sufficient mass of exemplars to produce the structure – to imitate or to use it productively.

Still, frequency alone cannot explain the absence of the periphrastic passive because adults do *sometimes* produce the structure. The ratio of periphrastic passive input to its usage across adults and children does not match. Furthermore, children are exposed to overheard speech; adults produce the periphrastic passive and children are exposed to it. Yet, children do not produce the structure.

To address this, we look to potential analogies that the child could form as well as the CCL (Abbot-Smith & Behrens, 2006). Again, this hypothesis states that a child will learn those structures that are morphologically or lexically related to an already acquired structure faster than those that do not have such a relation. Conversely, if two forms share identical semantic/pragmatic meaning in a paraphrase relation, this inhibits a child's acquisition of one or the other of the forms (typically the less frequent of the two). While simple frequency can partially account for the frequency of the reflexive passive, the CCL can further explain its robustness in the children's speech.

The reflexive passive is constructed with the third person clitic [*se* + verb]. *Se* has myriad functions in Spanish: indicator in passive and impersonal constructions, personal pronoun in dative, reflexive, and reciprocal structures as well as indirect object marker (before third person direct object ie. *Juana se lo dió*. 'Juana gave it to him.'). (Real Academia Española 2004). One might anticipate that children would learn the reflexive function, utilized in child-friendly verbs as *lavarse* 'to wash oneself,' *despertarse* 'to wake up,' and *acostarse*, 'to go to sleep', well before the passive. However, in a study on the acquisition of children's production of the *se* clitic, Jackson-Maldonado, Maldonado, & Thal (1998) found that children aged 2;4-3;0 acquire *se* functioning as a middle marker, that is when there is little subject-object differentiation, well before the reflexive *se*. But more importantly, children do not show inhibitory effects in the acquisition of the reflexive passive (at least to the degree of the periphrastic passive) because despite the many functions of *se*, it does not change its morpho-lexical form by function. This subpart of the reflexive fulfills a criterion of the CCL and should reinforce the reflexive passive – a prediction realized in the data.

This conclusion inevitably leads to the counter question of why children use the bootstrapping information of the [*se* + verb] construction to reinforce the reflexive passive, but do not use similar information available to them in the periphrastic passive. The periphrastic passive is produced with the construction of the copula [*ser* + past participle]. *Ser*, in present or past tense, is a highly common verb in Spanish. This is especially so in L1 acquisition. Between the two Spanish copulas, *ser* and *estar*, children produce *ser* at a higher rate than adults as they acquire the semantic and pragmatic functions of the two copulas (Silva-Corvalán & Montanari, 2008).

Clearly, this structure also fits a criterion laid out in the CCL for material available to children for bootstrapping. Yet children do not employ it. Children may be manifesting the inhibition of semantic-pragmatic competitors that the CCL hypothesis predicts. While the periphrastic and reflexive passives are not the exact semantic-pragmatic competitors that the CCL outlines – the periphrastic passive permits agent expression in a by-phrase, a fact that clearly has the potential to alter the pragmatic content of a passive. An argument for similarity can still be made if the periphrastic is isolated to structures without the optional by-phrase. And no children produced a by-phrase in this study. To children, then, the reflexive and periphrastic

passive are competing semantic-pragmatic structures – they both raise the patient to subject and demote the agent to object position. The reflexive passive becomes the best candidate because it requires the least processing: it is more frequent and entrenched. Furthermore, a child's ability to produce the reflexive passive may diminish need to produce the periphrastic – a concept also in line with the observed conservative learning tendency in children's syntax and phonology (Boyd & Goldberg, 2012; Stoll, 2009) as well as statistical preemption (Goldberg 2011).

Alternative explanations not predicted by the CCL are also possible. Firstly, the bootstrapping information within the passive structures, the *ser* copula and the third person clitic *se*, are not created equal. *Se*, unlike *ser*, does not change syntactically by function. For example, while the reflexive passive is formed with [*se* + verb], the third person reflexive is also formed with [*se* + verb] (ie. *se lavó* 'He washed himself.'). In fact, this syntactic pattern of [*se* + verb] can be seen throughout the various *se* functions: reciprocal [*Se abrazaron*. 'They hugged each other'] and impersonal [*No se cuestionó a la policía*. 'One did not question the police.']. The syntactic structure of [*se* + verb] has a robust presence in the input children receive.

Ser, however, exhibits great variation in the input that children receive. Copular *ser* is highly frequent in child Spanish – more frequent than the copula *estar*, even. Children are most accustomed to hearing *ser* in contexts such as adjectival (12) or characteristic attribution (13).

(12) Pues nosotros no somos ordenados.
ser.2PL
'Well we are not organized.' (A3-01)

(13) ¿Era mala o buena?
ser.1SING
'Was it bad or good?' (A5-02)

The periphrastic passive, forcing an additional, albeit infrequent, syntactic usage of *ser*, [*ser* + past participle], has a *very* strong syntactic competitor in copular *ser*. This could result in inhibition of the periphrastic passive. What's more, as outlined in the CDS results, children are almost never exposed to the unique function of *ser* as a passive – most passive structures are reflexive. It should come as little surprise then that when given another syntactic structure and function for the copula *ser*, constructing the periphrastic passive, children struggle to produce this infrequent form. Such is the frequency and entrenchment of copular *ser*.

Finally, *ser* has multiple morphological manifestations where *se* does not. It varies by person (6 conjugations), tense (8 conjugations), and mood (3 conjugations). It is little wonder that children cannot rely upon *ser* the way they can upon *se* – *ser* exhibits far too much variation.

Thus, although *se*, like *ser*, has functional competitors, the syntactic construction of the reflexive passive does not differ from the syntactic or morphological construction of its functional competitors. Rather, functions such as the impersonal *se*, the reflexive *se*, or the reciprocal *se* actually serve to facilitate acquisition of the reflexive passive in Spanish.

The CCL does not predict that lexical similarity could inhibit a structure's usage. And this work will likely not determine the superiority of either explanation. Rather, these two functional explanations may work in tandem. Children produce the reflexive because they frequently hear the structure in their input. It is reinforced by a multiplicity of [*se* + verb] collocations in structures such as the reflexive and the impersonal. Additionally, children revert

to the reflexive passive instead of the periphrastic because, to children, the two passive structures exist in semantic-pragmatic competition. Finally, though the CCL does not predict this, we have argued that children do not produce the periphrastic because it competes with the highly-entrenched *ser* copula. The periphrastic passive function and structure are rare in child input – the copular *ser* is not. Furthermore, *ser* comes in a multiplicity of conjugations for mood, tense, etc. All of these factors add up to determine the passive structure that Spanish-speaking children use first.

A second important finding extrapolated from the data was that the children produced more reflexive passives than middle passives. Again, reflexive passives exhibit V-S argument ordering while middle passives have S-V. Results from the current study showed that children produced nearly seven times as many reflexive passives as middle ($n=70$, $n=11$, respectively). Even when the most frequent V-S construction, [*se llama* ‘is called’ + patient], is excluded from the type frequency, V-S order still dominated the children’s passive productions. This finding is crucial for a number of reasons. Firstly, the children’s preference for V-S argument structure corroborates previous experimental research (Pierce, 1992) which found that, when the passive was elicited during an imitation production task, children were more successful at producing V-S word order passives than S-V. However, Pierce also conducted a comprehension task for the periphrastic passive and found, counter to her hypothesis, that children comprehended both passive and active structures with pre-verbal subjects more than those with post-verbal subjects to a statistically significant degree. But experimental task and naturalistic data from the current study show that children produce far fewer instances of the middle passive than the reflexive passive. This results in an apparent disparity between comprehension and production of passive structures. Even Pierce acknowledges the inconclusivity of these results and attributes the findings of the comprehension task to ‘ambiguities in syntactic theory’ (1992:76) as well as to the near negligible presence of the periphrastic passive in adult Spanish.

The inclusion of CDS in the current study provides a solution to this apparent inconsistency in the data. A simple comparison of the passives produced by the children and their adult interlocutors shows an almost exact statistical distribution of reflexive and middle passives across the two speaker groups: the reflexive makes up approximately 78.7% of total passives produced by children and 79.6% of those produced by adults. Similarly, the middle passive constitutes 12.4% of all children’s passives and 11.11% of the adults. Thus, although previous research shows that children readily understand both V-S and S-V ordering in passive structures, in production, children follow the statistical patterns they receive in the input. Importantly, this argumentation does not preclude the contribution of statistical learning for innatist models (Lidz & Gagliardi, 2015); the importance of such learning for the mapping problem is acknowledged. However, such theories do not predict the exact statistical correspondences between CDS and the children’s production that the current study unearths. Rather, they predict some variability in environmental input and production something which is not observed in the current findings. Consequently, it is not that the children haven’t sufficiently matured to acquire complex rule-based trajectories such as A-chain movement (Borer & Wexler, 1987); rather, they produce those structures that require the least processing – that is, those that have non-competing correspondences in the children’s linguistic repertoires.

A final conclusion to be drawn from this investigation is that Spanish-speaking children undergo a negative U-shaped developmental pattern in their acquisition of the passive. Specifically, we documented that while children from ages 3;0-4;0 readily produce the reflexive

and middle passives, by the age of 4;0 through 6;0, passive usage decreases dramatically. Further data from CHILDES demonstrates the upward swing of this developmental pattern. This finding corroborates findings by Maratsos (1974) who found a similar pattern in children's comprehension of the English passive in children that rose again by age 4;7. While the exact ages are not comparable across the studies because Maratsos (1974) conducted a comprehension task, the overall pattern is the same. Similar to Maratsos (1974), we explain this pattern in terms of frequency effects in the input. Specifically, as children age, they become more influenced by the unmarked and more frequent construction: the active. Children thus experience a 'frequency-driven bias' (Becker & Kirby, 2015:12) in the comprehension of passive structures and, it seems, for a time, to default to active interpretations along their path to adult-like production.

Innatist Explanation

The discussion of the CCL above provides an emergentist explanation for the finding that Spanish-speaking children utilize the reflexive passive to the almost complete exclusion of the periphrastic passive. Yet innatist perspectives also have some explanatory power. As noted above, many studies have taken issue with the maturational explanation of the A-chain Deficit Hypothesis (Borer & Wexler 1987) for children's acquisition of the passive, noting how problematic the vast cross-linguistic variation in passive acquisition is for such an account (Pinker et al., 1987; Demuth, 1989; Fox & Grodzinsky, 1998). As a result, additional hypotheses such as the External Argument Requirement Hypothesis (Babyonyshev et al. 2001) and the Universal Phase Requirement (Wexler 2004) have been advanced. Most recently, Hyams & Snyder (2005) have shown that the Universal Phase Requirement makes predictions that do not manifest in children's performance. The authors propose the Universal Freezing Hypothesis which states that children, until approximately age 4;0, cannot remove parts from moved phrases and, as a result, are unable to produce the passive.

In lieu of maturational explanations, Pinker et al. (1987) showed how children come to acquire adult-like semantic constraints to compliment an already present-and-available UG as they acquire the passive. Children still pass through semantic constraint-based paths on their way to adult-like usage; specifically, children will prefer animacy-based pairings first, those in which the agent is the most animate item in a phrase, and eventually they could come to passivize those phrases with patients that are more animate than their accompanying agents. A similar logic can explain the lack of periphrastic passive constructions in the children's speech of this study. While data are too scarce to comment on the children's preference for animate agents over animate patients, we can look to tendencies in the various passive constructions to explain the observed difficulty with the periphrastic passive. As already demonstrated, the A-movement of the patient to subject position could be problematic for a child to realize. But crucially, the movement is required for the periphrastic passive - there is no other way for a child to accurately map environmental input to underlying structure. Movement SHOULD also be required for the reflexive passive. But the reflexive passive structure contains something that the periphrastic does not: the clitic *se*, realized in canonical subject position.

Se is not a subject, but it is more than plausible that children interpret it as such. There is an acknowledged preference in both first and second language acquisition to interpret the first NP of a sentence as the subject in comprehension experiments (Corrigan 1988) and per the FIRST NOUN PRINCIPLE (VanPatten, 2004). Additionally, while the patient-subject can be variably

expressed pre- or post-verbally in the periphrastic and reflexive Spanish passive, data from the current analysis show a lopsided preference for post-verbal subject placement in passive structures. So, when presented with the reflexive passive, a child misinterprets the clitic *se* as the subject of the phrase, and the post-verbal patient-subject as a patient-object. The lack of any agent expression in a by-phrase in the children's speech only provides further support for this argument. A child would not produce an agent in the by-phrase because s/he interprets the passive clitic as an agentive subject. Unlike the Maturation Hypothesis, this explanation permits the child complete access to UG; yet, such an explanation does imply that children can misinterpret syntactic structure as they make statistical inferences from the environmental input and map it to innate, underlying structures. This still leaves unresolved the issue of whether children, in interpreting the passive clitic as the agentive subject, are actually producing the passive at all. Additionally, since the innatist theory presumes that adult Spanish speakers come to produce the passive, and have thus acquired A-movement, it also remains unclear at what age correct mapping occurs - though assuredly increased input contributes to eventual accuracy and the resolution of mapping issues (Lidz & Gagliardi, 2015).

CONCLUSION

This study has proposed a corpus-based analysis to study the acquisition of the Spanish passive by Castilian-Spanish children aged 3;0-6;0. Results show the beginnings of a negative U-shaped developmental pattern across the three age groups, corroborating previous studies for the English passive (Maratsos, 1974). This suggests that Spanish-speaking children aged 4-5 and 5-6 show a more diminished capacity to produce the passive than even those aged 3-4. Results also show that of the two passive structures in Spanish, the periphrastic and the reflexive, children produced the latter with greater frequency. However, the relative low frequency of the periphrastic passive in CDS cannot account entirely for the absence of this structure in the children's production. Consequently, we proposed that children utilize previously-acquired structures, that have robust representations in CDS as well as their own production, to account for the acquisition of the reflexive passive over the periphrastic. In doing so, Spanish-speaking children in this context employed bootstrap mechanisms to the development of the passive. This, combined with semantic-pragmatic competition between the two passive structures explains the acquisition of the reflexive passive over the periphrastic in Spanish-speaking children.

This work is not without limitations. Although the corpus data analyzed was robust and representative of children and CDS, Spanish is a diverse language constituting much dialectal variation (Lipski, 1994). Although to the authors' knowledge no works have examined the passive/active voice distinction as a variable structure in Spanish, we could hypothesize that Spanish-speaking children in other countries and cultural settings, exposed to different varieties of Spanish, could follow a different trajectory from the one outlined in this work.

Future works should also examine corpora production data of other pro-drop languages, especially those typologically related to Spanish, such as Portuguese or Catalan (for elicitation data of these languages see Chocarro [2015] for Spanish and Estrela [2013]; Lima Júnior [2016] for Portuguese). If the flexible word order of these languages acts as a bootstrap mechanism in the acquisition of the passive voice, we should expect to see passive production at a younger age in Spanish, Catalan or Portuguese-learning children than in languages with fixed word ordering such as English.

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Footnotes

¹ While English may not permit the same word order flexibility as Spanish, as one reader has pointed out, English-speaking children still produce active sentences with postverbal agents such as ‘the ship sank because of pirates’.

² The verbal versus adjectival status of the periphrastic passive formed with the copula *estar* + past participle is a matter of debate. See Salinas (2000), Jiménez (2004), & Bosque (2014) for further reading.