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Acquisition of mood selection in Spanish-speaking children

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ABSTRACT

Previous research indicates that the development of mood selection in Spanish spans several years and ends in the mastery of mood selection with sentential complements to express complex semantic meanings. The present study investigates this underexplored late stage by examining how Spanish-speaking children acquire adultlike mood selection in sentential complements to factive emotive predicates involving mental state adjectives (presupposition) and the negated epistemic verb *creer* ‘believe’ (nonassertion). Results of an oral sentence-completion task with 66 children (4;02–10;03) and 13 adults indicate that in contrast to the early acquisition of subjunctive to express volition (with *querer* ‘want’), children exhibit adultlike mood selection by ages 6–7 in the presupposition condition and ages 9–10 in the nonassertion condition. The discussion highlights not only the protracted nature of the acquisition of adultlike mood selection but also how the rate of development is context-specific as a function of semantic, syntactic, and processing complexity.

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1. Introduction

Modality, which allows the speaker to relay an attitude or opinion about a proposition (Fábregas 2014; Palmer 2001), can be expressed through mood morphology. For example, Spanish verbs express an attitude about a proposition by being marked in the subjunctive (SUBJ) or indicative (IND) moods. In child language, modality appears to be a primal notion expressed early and often (Deen 2016). In Spanish, children begin to express modality through the use of SUBJ to convey direct and indirect commands around their second birthday (Hernández-Pina 1984; López-Ornat et al. 1994). Nonetheless, mastery of mood selection in the various SUBJ contexts occurs over a number of years.

Previous research indicates the following developmental path for the Spanish SUBJ: indirect commands > adverbial clauses > relative clauses > sentential complements (Blake 1980; Pérez-Leroux 1998; Sánchez-Naranjo & Pérez-Leroux 2010). The developmental path begins with deontic modality, which expresses a subject’s desire, wish, intention, or command for some possible world to be the actual world. For example, one of the first uses of the SUBJ is with the volitional matrix verb *querer* ‘want.’ The culminating stage of SUBJ acquisition dealing with sentential complements can also be called “epistemological modality” (Chung & Timberlake 1985; Pérez-Leroux 1998), which involves cases in which a proposition is evaluated in relation to the beliefs or desires of the subject in a sentence (as opposed to the speaker of the sentence). Examples of epistemological modality include the SUBJ in contexts of nonassertion (as in (1)) and in contexts of presupposition (as in (2)).

- (1) Mariana no cree que *estés* (SUBJ) embarazada.
‘Mariana doesn’t believe that you *are* pregnant.’

- (2) Mariana está alegre de que *estés* (SUBJ) embarazada.
‘Mariana is glad that you *are* pregnant.’

Although a small amount of previous (albeit somewhat problematic) research suggests that the acquisition of SUBJ contexts relating to epistemological modality (as in (1) and (2)) occurs relatively late, there remain open questions concerning *how* Spanish-speaking children acquire adultlike mood selection in sentential complements. The present study not only aims to determine precisely when children acquire adultlike SUBJ use in presupposition contexts (i.e., complements to factive predicates with mental state adjectives as in (1)) and in nonassertion contexts (i.e., complements to the negated epistemic verb *no creer* ‘not believe’ as in (2)), it also aims to elucidate the developmental path to adultlike mood selection in each context.

2. Mood Selection in Spanish

By being marked for mood, Spanish verbs express a perspective on the truth value of a proposition (Fábregas 2014). Indicative (IND) is traditionally described as the default mood for assertions. In contrast, the subjunctive mood (SUBJ) occurs mostly under subordinate clauses, selected under certain predicates or under the scope of a modal or negation (Harrington & Pérez-Leroux 2016), and it has diverse meanings: (i) nonassertion; (ii) volitionality, obligation, and desire; (iii) prospectivity; (iv) futurity; (v) influence; and (vi) presupposition (Fábregas 2014). In certain grammatical contexts the SUBJ is categorically used, such as in embedded clauses that are complements to verbs of volition or desire (i.e., ii), as in (3).

- (3) La maestra quiere que los estudiantes *obtengan* (SUBJ) buenas notas.
‘The teacher wants that the students *get* good grades.’

In other grammatical contexts, the SUBJ may be optional, and its use marks a specific meaning. For example, in relative clauses, instead of being governed by the syntactic context of the embedded clause, the use of SUBJ “independently contributes to the semantic composition and the mood marker only needs to be compatible with the intended semantics” (Sánchez-Naranjo & Pérez-Leroux 2010:230). Consider (4) and (5):

- (4) Busco una chaqueta que *tiene* (IND) lunares.
‘I am looking for a jacket that has polka dots.’
(5) Busco una chaqueta que *tenga* (SUBJ) lunares.
‘I am looking for a jacket that has polka dots.’

The embedded clause in (4) describes a referent that the speaker has in mind, whereas the embedded relative clause in (5) does not have a specific referent. More importantly for this article, nonassertive predicates allow the SUBJ to be used when the speaker does not commit to the truth of the proposition (in (i)), and this can be achieved by using a nonassertive matrix verb (e.g., *dudar* ‘doubt’) or by negating an assertive matrix verb, as in *no creer* ‘not believe’ in (6). Yet, not only does the weakly assertive verb *creer* ‘believe’ (as well as strongly assertive verbs like *saber* ‘know’) trigger the IND in positive polarity clauses, the IND can also occur with negative polarity clauses (7).

- (6) El niño no cree que su tía le *traiga* (SUBJ) una bicicleta.
‘The boy doesn’t believe his aunt *is bringing* him a bicycle.’
(7) El niño no cree que su tía le *trae* (IND) una bicicleta.
‘The boy doesn’t believe his aunt *is bringing* him a bicycle.’

The IND in (7) implies that the speaker believes the proposition “the aunt is bringing him a bicycle” to be true even though the subject of the sentence does not believe it to be the case. But with

the SUBJ in (6), the speaker is simply reporting the beliefs of the boy and has a neutral attitude to the proposition “the aunt is bringing him a bicycle” (Harrington & Pérez-Leroux 2016).

The diverse and heterogeneous meanings contributed by the SUBJ (i–vi) have led Fábregas (2014) to argue that, although there is a family resemblance among the uses of SUBJ, “it is unclear whether a single value can behave as an umbrella that covers all uses” (Fábregas 2014:22). For example, some approaches have tried to capture a single semantic difference between IND and SUBJ through a realis/irrealis, certainty/uncertainty, or an assertive/nonassertive distinction (for a review see Fábregas 2014). These approaches, however, immediately run into counterexamples. One such counterexample is the use of SUBJ in the presupposition context (vi). Such SUBJ uses contain factive emotive predicates that include verbs (e.g., *alegrarse de* ‘to be happy about’) or expressions with mental state adjectives as in (8).

- (8) Mi padre está alegre de que mi abuela *haga* (SUBJ) ejercicio.
 ‘My father is happy that my grandmother *exercises*.’
- (9) Mi padre está alegre de que mi abuela *hace* (IND) ejercicio todos los días.
 ‘My father is happy that my grandmother *exercises* every day.’

The lexical semantics of factive predicates usually specifies that they do not introduce new information to the common ground of the speaker and addressee. This presupposed meaning calls for the SUBJ, as in (8). However, the IND is possible, as in (9), “when the same verbs are used to introduce information that the addressee is not expected to share with the speaker” (Fábregas 2014:21). It is important to note that in (8) the speaker strongly asserts that her grandmother exercises in the actual, real world but still uses the SUBJ in the embedded clause.

Accordingly, some have proposed that the SUBJ does not contribute any single direct meaning to a proposition but “is used as a marker that there has been a shift in the kind of model that is used to evaluate the truth of the proposition” (Fábregas 2014:24; Quer 2001), with “model” referring to the set of worlds associated in some sense to a particular individual (Giannakidou 1998). The default model is one where the proposition is evaluated as true or false (in the actual world) in relation to the set of beliefs or desires that the speaker holds; when there is a shift from the default, the SUBJ is used. For volitional predicates as in (3), the speaker does not relate the embedded proposition “the student gets good grades” to the actual world but instead is to employ a bouletic model that leads us to evaluate the proposition in relation to possible worlds relativized to the desires of the subject “the teacher.” Similarly, nonassertive predicates contrast a default model to other belief models. For example, (6) and (7) mark a contrast between an epistemic model of the speaker (7) and the subject (6), so the use of the SUBJ in the complement to the negated epistemic verb *creer* indicates that there is a switch in the model used to evaluate the truth of the proposition (Harrington & Pérez-Leroux 2016).

3. Acquisition of mood selection in Spanish

Spanish-speaking children begin producing SUBJ forms shortly after their second birthday (Hernández-Pina 1984; López-Ornat et al. 1994). However, the development of mood selection in Spanish displays protracted development in the sense that some contexts are mastered before other contexts. Since, as Fábregas (2014) argues, there is no single umbrella meaning contributed by SUBJ usage in Spanish, there is also no single semantic notion that is to be learned in the process of acquiring the Spanish SUBJ. Learners not only must learn the morphology of the SUBJ but also must acquire the many and often subtle semantic meanings that the SUBJ marks, and some of the contexts could be delayed in virtue of being less frequent in the input, variable, or more semantically complex and thus possibly depend on developmental changes in the associated cognitive representations (e.g., Pérez-Leroux 1998; Sánchez-Naranjo & Pérez-Leroux 2010).

Blake (1980) remains the most comprehensive study of the acquisition of the SUBJ. Blake’s study tested Mexican children in a sentence-completion task that included a variety of syntactic contexts.

His findings indicated that target mood selection is achieved by age 5;00 with adverbials (e.g., *después de* ‘after,’ *hasta* ‘until’) and by age 7;00 with indirect commands or predicates of volitionality, obligation, and desire (e.g., *querer* ‘want,’ *esperar* ‘hope’). The SUBJ with relative clauses comes halfway on the continuum, followed by the contexts that presented increasing degree of difficulty to children—namely, nonassertive predicates (e.g., *dudar* ‘doubt,’ *no creer* ‘not believe’) and finally, factive emotive predicates (e.g., *alegrarse de* ‘to be happy about,’ *dar lástima* ‘feel sorry’).¹

Along modality lines, Pérez-Leroux (1998:591) outlines the developmental path in (10), from which most existing research has focused on the earliest stages.

(10) Deontic modality (Indirect commands) > Epistemic modality (Adverbial clauses, Relative clauses) > Epistemological modality (e.g., Sentential complements)

In (10) the earliest uses of the SUBJ correspond to deontic modality, which refers to obligation expressed by the speaker (Deen 2016:370 ff; Pérez-Leroux & Sánchez-Naranjo 2010:236). An example of one of the first uses of the SUBJ is with the volitional matrix *querer* ‘want’ (Hernández Pina 1984; López Omat et al. 1994). Adultlike near-categorical SUBJ use with indirect commands has been reported to be achieved after age 6;00 in sentence completion (Blake, 1980), although this finding is based on data from three different matrix predicates. Studies using other elicitation tasks such as questions for children to answer (Morgan, Restrepo & Auza 2013; Sánchez-Naranjo & Pérez-Leroux 2010) report lower rates of SUBJ use with *querer* perhaps due to the less structured nature of the task that allowed other nontarget, but communicatively felicitous, answers such as infinitives.

The development of adultlike use of the SUBJ with contexts falling under epistemic modality such as temporal clauses and in particular relative clauses takes longer due to particular semantic interpretations of the SUBJ (Pérez-Leroux 1998; Sánchez-Naranjo & Pérez-Leroux 2010:249). For example, Pérez-Leroux (1998) argues convincingly that acquisition of the SUBJ in relative clauses referring to nonactual entities (like ‘the jacket’ in (5)) requires the ability to evaluate and interpret events nonfactually—that is, in relation to possible but not actual worlds—which implicates the process of acquisition with the development of a ‘representational theory of mind’ and the ability to understand false beliefs. Her study shows that by 6;11 children have developed the ability to extract the implication that the item in the stimuli does not exist and also have mastered the selection of the SUBJ in subject relative clauses that refer to nonfactual entities.

Pérez-Leroux suggests that adultlike SUBJ use with predicates involving epistemological modality (i.e., where the truth of a proposition is evaluated with respect to the subject of the matrix clause) should emerge after mastery of relative clauses and other adverbial clauses that reflect epistemic modality, yet there is limited evidence on the acquisition of epistemological modality. To the best of our knowledge, the only study that has addressed the acquisition of mood selection in contexts of epistemological modality in Spanish is Blake (1980), who conducted a sentence-completion task. As part of his stimuli, Blake included nine nonassertive matrices “of doubt and denial” (e.g., *dudar* ‘doubt,’ *no creer* ‘not believe’) and nine factive matrices “of attitude” (e.g., *alegrarse de* ‘to be happy about,’ *dar lástima* ‘feel sorry’), both of which would fall into what Pérez-Leroux (1998) refers to as ‘epistemological modality’ and were predicted to select SUBJ. The results for the two conditions showed fluctuations between ages 7;00 and 9;00. Adultlike mood choice was reported around age 10;00 with nonassertive matrices and around age 12;00 with factive emotive matrices. Those results, however, need to be interpreted with caution given the variability in the adult data as well as between the particular matrices (tested only once throughout the experiment), which were collapsed to form each condition. With respect to this last point, Blake (1983) suggests that “. . . mood choices associated with

¹Blake (1980), surprisingly, also found high rates of SUBJ use with strongly assertive predicates (e.g., *ser obvio* ‘be obvious’) in child and adult participants. He hypothesizes that the finding could be rooted in dialectal variation and also in the nature of the test used by the adults who performed a written sentence-completion task. Given that here we concentrate on contexts in which the SUBJ is expected, we will not focus on this unexpected finding.

each governing matrix seem to develop on a word-by-word basis rather than categorically ...” (p. 27). This underscores the need for research focusing on the acquisition of SUBJ in sentential complements to particular matrices in order to better understand how children progress toward adultlike mood selection in contexts that fall under epistemological modality. Thus, the present study seeks to answer the following research question: How do children acquire adultlike mood selection in sentential complements to particular matrices of presupposition and nonassertion?

To address this question, we used an oral sentence-completion task that tested the acquisition of mood selection with two specific matrices connected to epistemological modality—namely, complements to factive emotive predicates with mental state adjectives (Presupposition condition) and complements to the negated epistemic verb *no creer* ‘not believe’ (Nonassertion condition). Based on the research discussed previously, we hypothesize that adultlike mood selection with sentential complements will occur late and after SUBJ uses falling under deontic or epistemic modality, and, based on Blake (1980), we tentatively hypothesize that SUBJ in the Presupposition condition will be acquired after the Nonassertion condition. We also tested a volitional matrix (*querer* ‘want’) to corroborate previous findings that deontic modality is acquired very early, and we added a strongly assertive predicate (*saber* ‘know’) as a control condition to ensure that, in contrast with the other conditions, children use predominantly IND in this context.

4. Method

4.1. Participants





Sixty-six middle-class, monolingual Spanish-speaking children from Argentina (4;02 to 10;03) participated in the experiment. The participants were recruited from three private elementary schools in the same town in Argentina. All participants were in the appropriate grade for their age and demonstrated in the practice trials that they could perform a sentence-completion task, which was required for participation in the experimental trials. Children were divided into three groups: twenty-one 4- and 5-year-olds (4;02–5;06; $M = 4;09$, $SD = 0;05$), twenty 6- and 7-year-olds (6;04–7;08; $M = 6;10$, $SD = 0;04$), and twenty-five 9- and 10-year-olds (9;04–10;03; $M = 9;09$, $SD = 0;03$). Thirteen middle-class Argentine adults from the same local area were tested to determine adult behavior.

4.2. Stimuli and procedure

We created a novel sentence-completion task that followed the general design of Blake (1980). Participants were presented with a large color drawing depicting a situation with two characters. Then, pointing at these characters in the image, the experimenter told the participant a brief story. Next, the experimenter asked the participants to complete a sentence, which consisted of a matrix clause followed by the beginning of a complement clause (the complementizer *que* ‘that’ + NP). Four conditions were tested that, for the purposes of clarity and brevity, will be referred to as: (i) Control (with the strongly assertive *saber* ‘know’), (ii) Volition (with *querer* ‘want’), (iii) Presupposition (with mental state adjectives), and (iv) Nonassertion (with negated epistemic verb *no creer* ‘not believe’). A sample trial for each condition is presented in Table 1. In Spanish, grammatical completion of these subordinate clauses requires the use of a finite verb in either the SUBJ or IND moods. The participants were given two practice trials prior to being tested on 16 experimental trials, four per operator.

In addition to turning in written parental consent forms, the children provided verbal assent before being tested in a quiet room in their school. The experimenter was a native speaker of Spanish and from the same local area as the children. To help the children become comfortable with the experimenter before beginning the task, the children spent a few minutes playing with Disney™ character figures and engaging in conversation about them. Then the experimenter presented the children with the two practice trials to familiarize them with the task. Next, the children completed

Table 1. Sample trials for each condition.

Condition/Matrix	Picture	Situation	Prompt	Expected Responses
Control/ <i>saber</i> 'know'		<i>Cuando los nenes no hacen la tarea, los papás se preocupan, ¿no es cierto? Este papá no está preocupado porque sabe que a su hijo le encanta hacer la tarea.</i> 'When children don't do their homework, parents get worried. Isn't that right? This dad is not worried because he knows that his son loves doing his homework.'	<i>Completó lo que digo: El papá sabe que el nene siempre ...</i> 'Complete what I say: The dad knows that the boy always ...'	<i>hace-IND la tarea</i> 'does the homework.'
Volition/querer 'want'		<i>La mamá está preparando la comida, y la nena está mirando la televisión. La mamá necesita ayuda para poner la mesa.</i> 'The mom is preparing food, and the girl is watching television. The mom needs help to set the table.'	<i>Completó lo que digo: La mamá quiere que la hija ...</i> 'Complete what I say: The mom wants that her daughter ...'	<i>ponga-SUBJ la mesa</i> 'set the table'
Presupposition/ <i>estar [adj] de</i> 'be [adj]'		<i>El papá y el hijo están en una fiesta. Al hijo le encanta bailar, y eso al papá lo pone contento. ¡Mirá su cara!</i> 'The dad and the son are at a party. The son loves to dance, and this makes his father happy. Look at his face!'	<i>Completó lo que digo: Siempre, el papá está contento de que el hijo ...</i> 'Complete what I say: Always, the dad is happy that his son ...'	<i>baile-SUBJ 'dances'*</i>
Nonassertion/ <i>no creer</i> 'not believe'		<i>Antes de comenzar el partido, este chico se lastimó el pie y le duele mucho.</i> 'Before the start of the game, this boy injured his foot and it hurts a lot.'	<i>¿Va a jugar el partido? El entrenador no cree. Completó lo que digo: El entrenador no cree que el chico ...</i> 'Is he going to play in the game? The coach doesn't believe so. Complete what I say: The coach does not believe that the boy ...'	<i>juegue-SUBJ al partido</i> 'is going to play the game.**'

*Note that while the IND is possible in this syntactic context with factive predicates, it is not the expected response with presupposed events (also presented visually) as in this condition. **In this condition, the use of SUBJ is expected to be more likely given that the situation underscored the point of view of the subject of the matrix clause. However, the IND is also possible when this point of view is not taken into account by the speaker (as explained in Section 2).

the experimental trials in two parts (Part 1: Volition and Presupposition; Part 2: Nonassertion and Control). These two parts were broken up by an unrelated 10-minute activity to prevent boredom with the task. Within each condition, the child chose one of the four corresponding cards at random, which meant that the order of presentation varied across participants. The procedure was identical for the adult participants, except that they were tested in a quiet location in their homes. Responses were coded based on the mood of the finite verb: IND or SUBJ.

5. Results and discussion

The adults' and children's production of the SUBJ in each condition can be seen in Figure 1. The adults showed categorical use of the IND (i.e., 0% SUBJ use) in the Control condition and categorical use of the SUBJ (i.e., 100% SUBJ use) in the Volition condition, as predicted based on previous literature. In the Presupposition condition, adults also categorically produced SUBJ. Other studies have documented IND usage with the relevant factive predicates (Blake 1980; Gudmestad 2010), which is reasonable since the IND is licensed when the complement is judged to be new information. However, the adult's categorical production of the SUBJ in the Presupposition condition in our study is to be expected because this study made it especially clear that the embedded proposition is

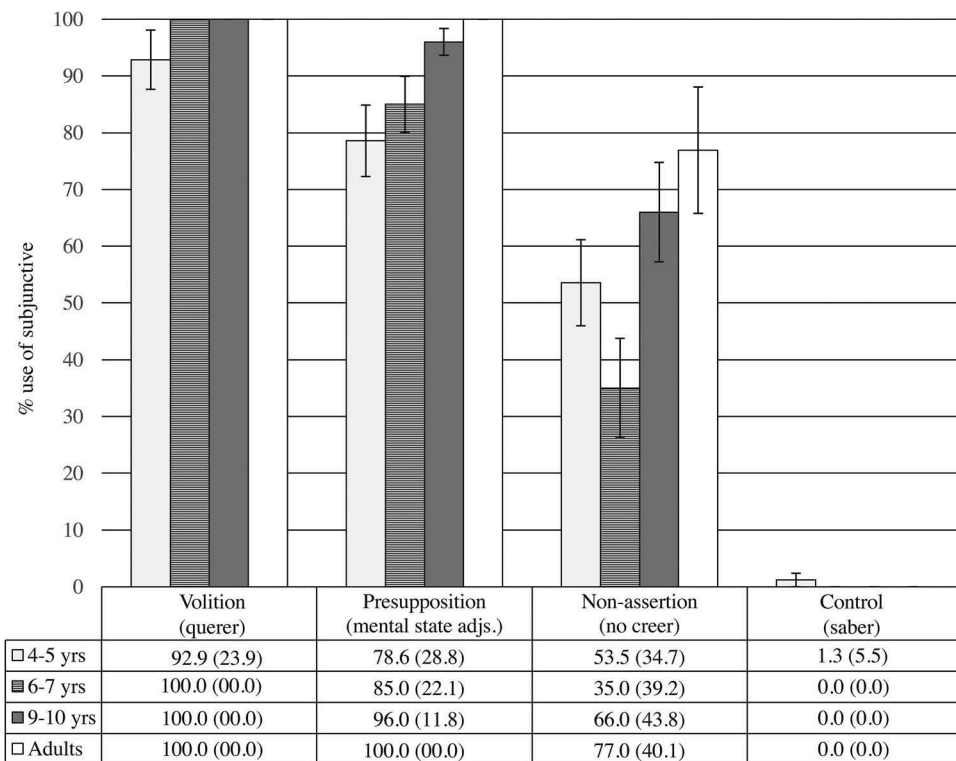


Figure 1. Group means for SUBJ use in each condition.

Note. Error bars: ± 1.00 SE; standard deviations presented in parentheses next to group means.

presupposed and the mental state adjectives used in this study always license the SUBJ when the embedded clause is presupposed. Finally, as a group, the adults showed variable use of the SUBJ (77%) in the Nonassertion condition. This is a cogent finding because mood selection in the Nonassertion context depends on the semantic intention of the speaker (see (6) and (7) in section 2). Overall, the adult use of SUBJ in this experiment is consistent with findings from previous studies that indicate that the rate of SUBJ varies across contexts (e.g., Blake 1980; Gudmestad 2010). These findings for the adults are further discussed in the following in comparison to those of the children.

5.1. Control and Volition Conditions

Figure 1 shows, as predicted, that children exhibit adultlike mood selection in the categorical Control and Volition conditions. Following strongly assertive *saber* in the Control condition, all of the children categorically used the IND, with the exception of one 4-year-old child who used SUBJ in one of the four trials. In the Volition condition, Figure 1 reveals that the children are showing categorical use of the SUBJ, like the adults, by 6 years old. However, closer analysis of the 4–5-year-old group indicates that all 5-year-olds are also producing SUBJ categorically in this condition. SUBJ use by the 4–5-year-old group in the Volition condition (93%) was not categorical due to 5/21 children choosing IND, and these five participants were all 4 years of age. There were in fact no significant differences between the 4–5-year-old group and any other group in this condition, $F(3,75) = 1.721$, $p = .170$. Accordingly, with the matrix *querer* ‘want’ tested in the present study, children become adultlike (selecting SUBJ categorically) by age 5;00.

These results suggest that children acquire SUBJ with volition earlier than the age previously reported by Blake (1980), who found that children become adultlike after age 6. Further, the results

provide support for the developmental path that predicts early acquisition of the SUBJ with deontic modality (Pérez-Leroux 1998). Lastly, the almost categorical use of IND in the Control condition as compared to the near categorical use of SUBJ in the Volition condition serves as convincing evidence that the children have acquired the core cases of mood selection by age 4–5.

5.2. *Presupposition and Nonassertion Conditions*

A repeated measures ANOVA comparing adult and child rates of SUBJ use across the two conditions of interest (Presupposition and Nonassertion) revealed a significant main effect for Age Group (4–5-year-olds, 6–7-year-olds, 9–10-year-olds, and adults), $F(3,75) = 5.338$, $p = .002$, $\eta_p^2 = .18$, and Condition, $F(1,75) = 45.665$, $p < .001$, $\eta_p^2 = .38$. There was no significant Condition x Age Group interaction, $F(3,75) = 1.715$, $p = .171$, $\eta_p^2 = .06$. We conducted pairwise comparisons (computed with Bonferroni correction) to examine differences in SUBJ use across these two conditions as well as between groups, which will be reported in the following two sections.

5.2.1. *Presupposition condition with mental state adjectives*

In the Presupposition condition with mental state adjectives, the 4–5-year-old group produced significantly less SUBJ (79%) than the adult group, who categorically selected SUBJ ($\bar{X}_1 - \bar{X}_2 = .857$, SE: .279, $p = .018$). There were no significant differences between the 6–7-year-old group (85%) and the adult group ($\bar{X}_1 - \bar{X}_2 = .600$, SE = .281, $p = .217$) or between the 9–10-year-old group (who are using SUBJ at a near categorical mean rate of 96%) and the adult group ($\bar{X}_1 - \bar{X}_2 = .160$, SE = .270, $p = 1.000$). These results suggest a simple pattern of acquisition in the Presupposition condition in which, across the age groups, the children reduce the use of the present IND, which is the only alternative response provided in this Presupposition condition, and increasingly employ the SUBJ.

Our finding concerning Presupposition differs from Blake's (1980), who reports that children do not pattern like adults until around age 12;00.² Additionally, the fact that children aged 4–5 are already producing SUBJ 79% of the time in the Presupposition condition and that children aged 6–7 are statistically adultlike suggests that acquisition of SUBJ in presupposition contexts occurs close to and potentially overlaps with acquisition of SUBJ uses falling under deontic and epistemic modality. This study's finding concerning Presupposition complicates the view that SUBJ uses falling under epistemological modality occur after SUBJ uses falling under deontic and epistemic modality (Pérez-Leroux 1998).

Possible explanations for the relatively early acquisition of SUBJ in the Presupposition condition can be elucidated in relation to factors that may condition the process of acquisition in this context. We propose three factors that may be influencing the path of acquisition in the Presupposition condition. First, the progression toward adultlike categorical SUBJ use may represent a gradual recognition of the fact that mental state adjectives with presupposed complements always and uniformly license the SUBJ. Second, the elimination of IND responses and increase of SUBJ responses may correspond to a child's developing abilities to process complementation. Previous research strongly suggests that children 5 and younger have not yet fully grasped that a lower clause is under the scope of a matrix clause and that, for its interpretation, the child needs to take the point of view of the matrix subject (de Villiers & de Villiers 2009; de Villiers et al. 2011). Young children are liable to process the lower clause before the matrix clause (Blake 1980:159) and interpret the lower clause outside the matrix clause (de Villiers et al. 2011), which means they would likely structure the lower clause as an independent clause asserting a fact and thus produce the IND during sentence completion tasks like the one employed in this study. Third, adultlike SUBJ use in the presupposition context requires determining whether the embedded proposition is presupposed or

²Possible reasons for Blake's data showing acquisition of the SUBJ with presupposition at such a late age could be: His experiment used a number of different matrix constructions (collapsed into the one category), each participant was exposed only one time to each matrix construction, and some trials required the production of past forms of SUBJ, which Blake himself (1980:139) recognizes to be difficult for young children and thus could account for IND usage among the younger groups.

new in a given discourse context. Previous research suggests that adultlike abilities to calculate implicatures and interpret presupposed information in complement clauses develop by the age of 6 or 7 (de Villiers & Roeper 2016:27).

One possible reason for the earlier acquisition of SUBJ in the Presupposition condition is the model used to evaluate the embedded proposition. The factive emotive predicates in the matrix clause (e.g., *lamentarse* ‘to be sorry about,’ *alegrarse* ‘to be happy about,’ *estar triste de que* ‘to be sad that,’ etc.) in the presupposition context express whether the subject’s desire has been satisfied or remains unsatisfied. Hence, the model employed to evaluate the embedded proposition is a bouletic model, which has already been mastered for SUBJ with volition or in deontic modality. Indeed, the relative modal simplicity in the model used to evaluate the embedded proposition could be a significant factor in the early acquisition of SUBJ in the presupposition context. In conclusion, the children’s arrival at adultlike use in the presupposition context at age 6–7 possibly corresponds with improvements in their ability to process complementation and calculate implicatures.

5.2.2. Nonassertion condition with negated epistemic *no creer*

Unlike the Presupposition condition, mood selection in the Nonassertion condition with *no creer* was variable. Overall the adults selected SUBJ 77% of the time. This variability among the individual adults is again attributable to the fact that IND and SUBJ use in the Nonassertion condition depends on the semantic intention of the speaker (see (6) and (7)), which can vary from speaker to speaker. Children’s mood selection was also variable. In each child group there were participants who produced the expected SUBJ response categorically, participants who were variable, producing both moods, and participants who categorically produced IND.³ However, only the oldest child group resembled the adult group in that the majority of the participants selected SUBJ categorically.

Overall, the children’s SUBJ choice displayed a “U-shaped” pattern, as seen in Figure 1. Interestingly, only the 6–7-year-old group performed significantly differently from the adult group with their lower use of the SUBJ ($\bar{X}_1 - \bar{X}_2 = 1.677$, $SE = .567$, $p = .025$). That is, the 9–10-year-old group is not significantly different from the adult group ($\bar{X}_1 - \bar{X}_2 = .437$, $SE = .544$, $p = 1.000$), nor is the 4–5-year-old group ($\bar{X}_1 - \bar{X}_2 = .934$, $SE = .562$, $p = .603$). To better understand these results in the Nonassertion condition, we provide further analyses to examine what participants’ alternative responses consist of when they do not produce the expected SUBJ response.

Alternative responses (other than the expected SUBJ) following *no creer* consisted of four types: Negation (11a), Preterit Indicative (11b), Present Indicative (11c), and Future (*va a* ‘is going to’ + *infinitive*) (11d).

- (11) Experimenter: El entrenador no cree (IND) que el chico ...
‘The coach does not believe that the boy ...’
- (a) Participant (P3.ST): no juega (IND).
won’t play.
- (b) Participant (P9.ST): se lastimó(IND).
got injured.
- (c) Participant (5.ST): puede (IND) jugar el partido.
can play the game.
- (d) Participant (P11.ST): va a jugar (IND) al fútbol.
is going to play football.

³Here we report the percentage of participants who categorically selected SUBJ, categorically selected IND, and variably selected both SUBJ and IND for the 4–5-year-old group, the 6–7-year-old group, the 9–10-year-old group, and the adults. Categorical SUBJ: 19%, 15%, 56%, and 70% respectively; categorical IND: 14%, 45%, 24%, and 15% respectively; both SUBJ and IND: 67%, 40%, 20%, and 15% respectively.

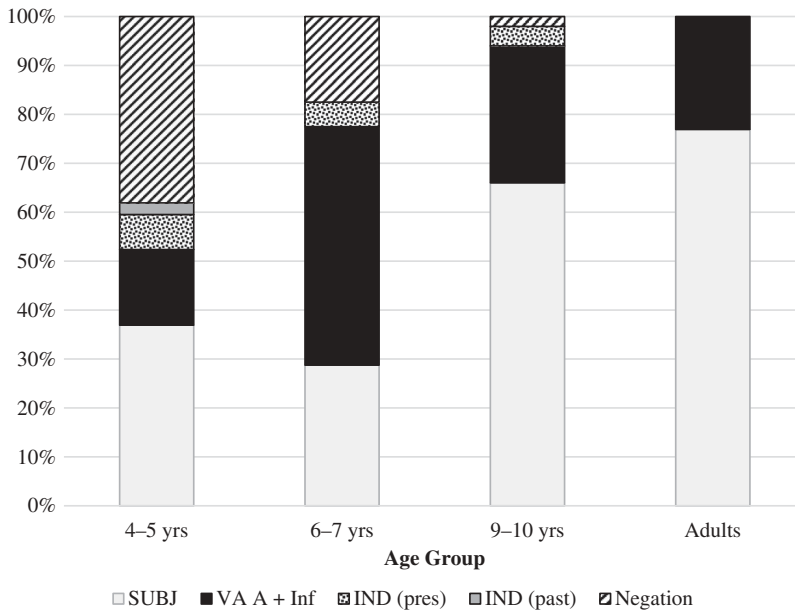


Figure 2. Percentage of response types with *no creer* in the nonassertion condition.

Figure 2 illustrates the distribution of these alternative responses (exemplified in 11a–d) as compared to adultlike SUBJ use across the groups.

Starting with the adult responses, Figure 2 shows that in addition to the expected SUBJ response, adults used one alternative response: *va a* + infinitive construction in the IND (d). There are a number of possible reasons for this alternative *va a* + infinitive response. First, the nonassertion trials did center around prospective events, and *va a* + infinitive and the SUBJ are common ways to semantically capture future or prospective events (Real Academia Española 2009:24.1a). Second, as seen in Table 1, the experimenter uses a *va a* + infinitive construction in the IND in the prompt, so the participants' usage of a corresponding construction could, at least in part, be the result of priming. Third, the contrast between IND and SUBJ used in negative polarity clauses marks out a semantic difference between cases in which the speaker expresses her own belief in the embedded proposition in spite of the matrix subject's lack of belief in the proposition (i.e., IND) and cases in which the speaker aims to express the same beliefs as the subject and remains neutral on the embedded proposition. That is, the use of IND *va a* + infinitive in the trials could represent instances in which the participants are resorting to a default epistemic model (i.e., their own epistemic model), and the use of present SUBJ could represent instances in which the participants switch to the subject's epistemic model. Henceforth, the SUBJ and *va a* + infinitive construction alike are considered adultlike.

In addition to the *va a* + infinitive construction, the children produce a number of distinct alternative responses that are not adultlike. Two of these alternative responses are present IND and preterite IND, which deviate from the future/prospective quality of the prompt and are thus considered nonadultlike. More interesting, the majority of alternative responses in the 4–5-year-old group and a considerable amount of alternative responses in the 6–7-year-old group involved producing negation in the embedded clause. Included under the classification “negation” here are any responses consisting of the negative adverb *no* followed by the IND or SUBJ form of the verb (as in 11a). Despite the mood the child used, these utterances create a double negative construction with a cognitive verb, which is not adultlike. This nonadultlike behavior in the younger groups has also been attested in Blake (1980), who characterized it as a true developmental error (p. 158). We will discuss “negation” in more detail in the following.

With the adultlike and nonadultlike responses in view, it becomes evident that the children exhibit a steady progression toward adultlike use of SUBJ in the nonassertion condition. By analyzing responses other than the expected SUBJ response, we found that, although it appears that the 6–7-year-olds are less adultlike than the 4–5-year-olds in that their use of SUBJ decreases, the 6–7-year-old group looks more adultlike based on their increased use of the *va a + infinitive* construction. In fact, the 6- and 7-year-olds actually produce considerably more adultlike forms (i.e., the SUBJ or IND *va a + infinitive*) with *no creer* to express Nonassertion than the 4–5-year-old group. By 9–10 years of age, almost all of the children's alternative responses (with the exception of two responses) were adultlike involving *va a + infinitive*. Thus, this alternative response analysis provides good evidence that with age, children become more adultlike in terms of the types of responses that they entertain.

The alternative response analysis is corroborated by a one-way ANOVA that excludes SUBJ responses that are nontarget following *no creer* (i.e., uses of SUBJ preceded by negation), $F(3,75) = 5.671, p = .001, \eta_p^2 = .19$. Pairwise comparisons using the Bonferroni correction show that in this analysis including only *target* SUBJ use, the 4–5-year-old group (37% target SUBJ use) does perform significantly differently from the adult group, $\bar{X}_1 - \bar{X}_2 = 1.60, SE = .577, p = .042$, which was not the case in the original statistical analysis counting all SUBJ verb forms. The 6–7-year-old group (29% target SUBJ use) also clearly remains significantly different from the adult group in this analysis, $\bar{X}_1 - \bar{X}_2 = 1.93, SE = .582, p = .009$. Since the 9–10-year olds (66% target SUBJ use) did not produce any nontarget SUBJ responses with negation, they continue to look adultlike in this analysis, with no significant differences in their target SUBJ use from that of adults (77% target SUBJ use), $\bar{X}_1 - \bar{X}_2 = .44, SE = .559, p = 1.000$. By examining the alternative responses exhibited by the participants, it becomes clear that the children exhibit a steady progression toward adultlike performance in the Nonassertion condition by exhibiting a progressive retreat from nontarget responses.

Having described the general path of acquisition in the nonassertion condition, we can now discuss various factors that may be conditioning the acquisition of the SUBJ in this context. First, the negation nonadultlike alternative response could derive from syntactic complications revolving around the negation with negative polarity SUBJ. For example, although the experimenter produced negation in the matrix clause, the younger children may have produced it again because they have yet to master negation raising. That is, it could be that the younger children may not have learned that negation has raised from the lower clause, which is where negation is proposed to have originated in the case of SUBJ in negated epistemic contexts (Rivero 1971, see also Harrington & Pérez-Leroux 2016 for a discussion).⁴ Additional evidence for children's difficulty with negation comes from the finding that English-speaking children can overextend the negative interpretation of the main predicate into the complement predicate and that this difficulty continues until 6;00–7;11 (Hopman & Maratsos 1978). Alternatively, the negative responses exhibited by children could be further evidence for the difficulties processing complementation discussed previously. If the child does not process the sentential complement as inside the scope of the matrix clause and thus does not evaluate the complement from the perspective of the subject in the matrix clause, they will likely restructure the complement clause as an independent clause. This would predict an IND response and, if the child intends to preserve the negation presented in the matrix clause, a negated IND response.

Second, factors relating to the semantic character of mood selection with nonassertion could condition acquisition of SUBJ in this context. As discussed in section 2, IND and SUBJ mood selection in the Nonassertion condition with *no creer* depends on whether the speaker chooses to evaluate the embedded proposition as true or false in relation to the default epistemic model of the speaker (IND) or in relation to the epistemic model of subject in the matrix clause (SUBJ). Since mood selection depends on the speaker's semantic intention, SUBJ use in this context is not

⁴It is unclear, though, how negation raising could account for the fact that some children also produced negation with IND in the lower clause, where negation raising is not expected to occur. Additionally, Blake (1980:146) fails to find a global effect of negation in mood selection when comparing negative with positive polarity matrices.

categorical, and individual speakers might select mood differently in the same context (as seen in our data). This variability could present obstacles for acquisition. Moreover, the semantics of epistemic models is complex. The epistemic modeling at work in the Nonassertion condition requires a belief base that is, in turn, capable of evaluating propositions as true/false, necessary/possible, and probable/improbable. Accordingly, like the SUBJ uses falling under epistemic modality, SUBJ use in the nonassertion context will require the ability to evaluate propositions in relation to possible worlds, an ability acquired by 6;11 (Pérez-Leroux 1998). Additionally, to mark a contrast between the epistemic model of the speaker and the subject in the sentence, a speaker must have learned that there are epistemic models other than her own as well as have the ability to recognize and inhabit these distinct ways of evaluating propositions, and these complexities may inhibit adultlike SUBJ use in the Nonassertion condition. In conclusion, the children's arrival at adultlike use in the Nonassertion context at age 9–10 is possibly constrained by difficulties with negation, abilities to process complementation, the variability of the input, and the child's ability to grasp, contrast, and inhabit distinct epistemic models.

6. Conclusion

Our study asked how Argentine Spanish-speaking children acquire adultlike mood selection in two sentential complements contexts connected to epistemological modality: mental state adjectives (Presupposition condition) and the negated epistemic verb *no creer* 'not believe' (Nonassertion condition). Results reveal that there is a protracted development even within epistemological modality, with each context exhibiting its own pattern of development.

For the Presupposition condition, the children in this study exhibited adultlike SUBJ use at ages 6–7, and the course of acquisition is marked by a steady elimination of IND responses and increasing use of SUBJ responses. Factors identified as possibly constraining acquisition in this condition include a child's ability to process complementation and calculate implicatures. In contrast, for the Nonassertion condition, the children in this study exhibited adultlike use of SUBJ at ages 9–10, and the path of acquisition involved the progressive elimination of several types of alternative responses terminating with an adultlike distribution of SUBJ and IND responses. Factors that may influence acquisition in this condition include difficulties with negation, abilities to process complementation, the variability in the input, and the relative modal complexity of the model employed to evaluate the embedded proposition.

An unpredicted result in our study was the observation that SUBJ with presupposition is acquired at an age closer to the acquisition of SUBJ with volition than to SUBJ with nonassertion. We hypothesize that the differences between the model used to evaluate the sentential complement best accounts for the different stages of acquisition. As discussed previously, the SUBJ in the Presupposition condition works with a bouletic model that is already mastered in the Volition condition, but the SUBJ in the Nonassertion condition requires not only the ability to evaluate propositions in relation to possible worlds but also the ability to grasp, contrast, and inhabit distinct epistemic models, which likely requires conceptual and possibly cognitive advancements on the child's part. Yet, this study is unable to test this hypothesis. To do so, future research should isolate and independently assess the various factors that could condition SUBJ acquisition in a given context to determine what factors explain or most strongly condition the acquisition of SUBJ in contexts related to epistemological modality and other uses of SUBJ.

In conclusion, this study's observation of protracted development within epistemological modality suggests an acquisitional corollary of Fabregas's (2014) semantic analysis of SUBJ in Spanish. Just as there is no single umbrella meaning contributed by the SUBJ in Spanish, our study suggests that acquisition of the SUBJ in Spanish requires learning many things, with each broad context of SUBJ use in Spanish potentially having its own unique path of development that is conditioned by the syntax and the semantics. Accordingly, future research will achieve a more full description and account of acquisition of the Spanish SUBJ by limning each SUBJ meaning's developmental path one by one.

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Declaration of interest

The authors report no conflict of interest. The authors alone are responsible for the content and writing of this article.

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