

In Control or Not? Acquisition of Non-Finite Adjunct Clauses in Romanian vs. English

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1. Introduction

This study focuses on non-finite temporal adjuncts (as in (1)), and their implications for children's language acquisition.

- (1) The cat₁ chased the dog₂ before PRO_{1/*2/*3} running outside.

In (1) the adjunct subject of *running* is not pronounced. Rather, it is analyzed as PRO, with obligatory control by the main clause subject *the cat*. As a result, this *adjunct control* structure gets a “strict subject” interpretation, i.e. that the cat, but not the dog or anyone else ran outside.

In languages with non-finite clauses, this strict subject control is generally consistent in non-finite temporal adjuncts – particularly in neutral discourse contexts.¹ A universal correspondence between frame (non-finite adjunct) and interpretation (strict subject) would raise the possibility of some innate link between these elements; such a link would have broader implications for acquisition.

However, non-finite clauses in Romanian have free reference interpretations – not strict subject:

- (2) Pisica₁ a urmărit câinele₂ înainte de pro_{1/2/3} a alerga afară.
cat-the has chased dog-the before of to run outside
'The cat chased the dog before running outside.'

Unlike in (1), the adjunct subject in (2) can be interpreted as the main clause subject (*the cat*), object (*the dog*), or as an external referent (e.g. *a mouse*). Therefore, rather than big PRO, non-finite adjunct subjects in Romanian are

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¹Adults allow a non-subject interpretation under certain pragmatic conditions; see Gerard & McDaniel (2025) for further discussion.

analyzed as small *pro* (Dindelegan, 2013; Avram & Coene, 2010; Dobrovie-Sorin, 1994; Alboiu, 2007; Cotfas, 2016a, 2016b). Crucially, this contrasts with *pro*-drop languages like Spanish and Italian, which still have big PRO in infinitives like (2).

The *pro* subject in (2) runs directly counter to a universal link between strict subject and non-finite adjuncts. Moreover, this cross-linguistic variation poses a puzzle for acquisition: big PRO and small *pro* have the same phonological form (silent), and can occur in the same syntactic context (non-finite adjuncts). How does a child acquire the target form for their language?

In this study, we take an initial step to answering this question by asking *when* the respective forms are acquired. Our results suggest that by 4-5 years old, English-speaking children already have PRO while Romanian-speaking children have *pro* in non-finite adjuncts. We consider the implications of this timeline for *how* these elements are acquired.

2. Literature review

Previous research has focused largely on children's acquisition of English, where non-finite adjuncts involve PRO, and children often fail to show the adult-like strict subject interpretation. By contrast, little is known about the acquisition of such structures in languages like Romanian, which analyzes null subjects in non-finite adjuncts as small *pro*, and which therefore offers crucial insight into their acquisition.

2.1. Acquisition in English

A range of previous studies have explored adjunct control in children's acquisition, particularly in English (Goodluck, 1981; Hsu et al., 1985; McDaniel et al., 1991; Goodluck & Behne, 1992; Cairns et al., 1994; Broihier & Wexler, 1995; Goodluck, 1998, 2001; Adler, 2006; Gerard et al., 2017, 2018; Gerard, 2022; Gerard & McDaniel, 2025). A consistent observation across these studies is that 4–6-year-old children do not always give strict subject interpretations. While the specific rates of interpretations have varied, children often give object and even external interpretations, in addition to the subject (in (1): the dog, or someone else, in addition to the cat).

Many previous accounts have explained this pattern of behavior in English with a “non-adultlike” free reference grammar that generates non-subject interpretations - although none involving a small *pro* analysis as in Romanian (McDaniel et al., 1991; Goodluck & Behne, 1992; Cairns et al., 1994; Broihier & Wexler, 1995; Goodluck, 2001; Adler, 2006).

2.2. Small *pro* in Romanian

The analysis of *pro* in non-finite clauses in Romanian has substantial support from previous studies (Dobrovie-Sorin, 1994; Alboiu, 2007; Avram & Coene,

2010; Dindelegan, 2013; Cotfas, 2016a, 2016b). One argument in favor of this analysis is that the adjunct clause subject can be co-referent with any antecedent (subject, object, or external antecedent):

- (3) Băiatul a spălat-o pe fată înainte de a deveni trist
 boy-the has washed-CL.F PE girl before DE to become sad-M
 ‘The boy washed the girl before becoming sad.’ = the boy is sad
- (4) Băiatul a spălat-o pe fată înainte de a deveni tristă
 boy-the has washed-CL.F PE girl before DE to become sad-F
 ‘The boy washed the girl before becoming sad.’ = the girl is sad

In (3), the adjective *trist* (*sad-M*) agrees with the adjunct subject; the masculine agreement indicates that this subject is coreferent with the masculine main clause subject *băiatul* (*boy*), resulting in the interpretation that the boy became sad. The object interpretation is also available, however, as demonstrated by (4) with the feminine adjective *tristă* (*sad-F*) (Gerard & Bleotu, 2025).

Another argument in favor of the small *pro* analysis comes from the behavior of subjects in non-finite adjuncts. Romanian, as a pro-drop language (see 5), allows non-finite adjuncts to have either null subjects (6a) or overt subjects (6b). In contrast, English, which uses PRO in non-finite clauses, allows a null subject (7a) but not an overt one (7b). Since *pro* can alternate with overt subjects, the fact that Romanian permits both strongly suggests that the null subject in (6a) is *small pro* rather than PRO (Dobrovie-Sorin, 1994; Alboiu, 2007; Cotfas, 2016a, 2016b).

- (5) a. Ion a mâncat.
 John has eaten
 ‘John ate.’
- b. A mâncat.
 has eaten
 ‘*pro* ate.’
- (6) a. Ion a mâncat. înainte de a pleca.
 John has eaten before DE to go
 ‘John ate before going.’
- b. Ion a mâncat. înainte de a pleca mama.
 John has eaten before DE to go mother
 ‘John ate before mother went away.’
- (7) a. John ate before ____ going.
- b. *John ate before mother going.

Given these notable differences between non-finite adjunct structures in Romanian and English, it is particularly revealing to investigate the acquisition of these structures in Romanian-speaking children compared to English-speaking children.

2.3. Current study

In this study, we focus on 4-5-year-old children's interpretations in English and Romanian non-finite adjuncts to ask: when do children acquire the respective form for their language (PRO or *pro*)? If this is not yet acquired, then we expect the same behavior across both languages:

- if children at this age analyze the adjunct subject as *pro*, then we expect free reference in English and Romanian 4-5 year olds
- if children at this age analyze the adjunct subject as PRO, then we expect strict subjects in English and Romanian 4-5 year olds

On the other hand, if children by this age have acquired the language-specific properties of this structure, then we expect their responses to differ depending on the language, i.e. free reference in Romanian and strict subject in English. We compare the children with adult controls, who should show the respective pattern from their language, i.e. free reference in Romanian and strict subject in English.

3. Experiment

We test the predictions outlined in the previous section using a Truth Value Judgment Task (TVJT) with 4-5-year-old monolingual Romanian-speaking and English-speaking children. In this section we present the study design, which uses a static picture context for the TVJT adapted from Gerard (2022) to introduce true and false contexts for the test sentences.

3.1. Participants

Participants were 34 English-speaking children (4;1-5;11, mean=5;0) and 42 Romanian-speaking children (4;0-5;6, mean=4;7). To confirm the expected adult-like pattern, we also tested adult speakers of each language (Romanian N=32, English N=31). English-speaking children were recruited from the University of Maryland Child Studies database and from preschools in the Washington DC area, and Romanian-speaking children were recruited from kindergartens in Bucharest; Romanian-speaking adults were students at the University of Bucharest, and English-speaking adults were recruited from Prolific and received compensation at a rate of \$9.50 per hour. The study received ethical approval from the Ulster University Research and Ethics Committee, as well as from the University of Bucharest Ethics Committee.

3.2. Design and materials

For the TVJT, participants viewed picture contexts like in Figure 1, and judged sentences in English (in (8)) or Romanian (in (9)) as true or false, with respect to the picture context.

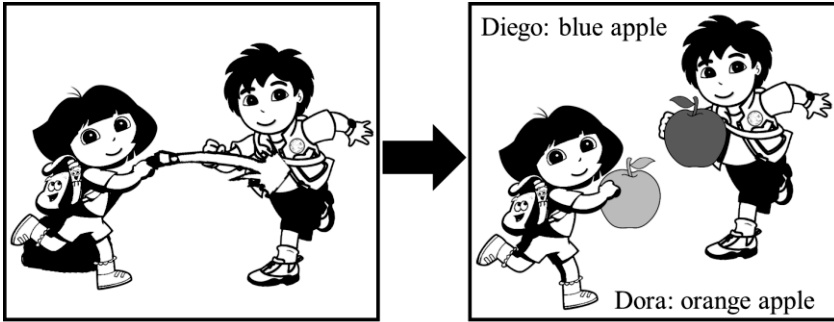


Figure 1: Truth Value Judgment context for (8) and (9)

(8) English:

Dora washed Diego before eating the blue apple.

(9) Romanian:

Dora l-a udat pe Diego înainte de a mânca mărul albastru
Dora cl.M-has washed PE Diego before of to eat apple-the blue
'Dora washed Diego before eating the blue apple.'

In (8) and (9), the interpretation of the adjunct subject determines the truth value response. With a subject interpretation (Dora ate the blue apple), the sentence is false, because Dora's apple in Figure 1 is orange. However, with an object interpretation (Diego ate the blue apple), the sentence is true.

Participants also heard sentences with the reversed truth values, as in (10):

(10) Dora washed Diego before PRO eating the orange apple.

In (10), a subject interpretation is true in Figure 1, while an object interpretation is false. The *object-true* condition in (8)/(9) and *subject-true* condition in (10) were manipulated within-subjects to balance the number of expected true and false responses.

In addition to the test sentences, control items were included with a finite adjunct and an overt pronoun subject, as in (11).

(11) a. Dora washed Diego before she ate the blue apple. (subject)

b. Dora washed Diego before he ate the blue apple. (object)

With an overt pronoun referring to the main clause subject (11a) or object (11b), the control sentences provided an unambiguous check on the availability of both interpretations for the context in Figure 1.

For the experimental design, the test-sentence conditions *subject-true/object-true* were crossed with language (Romanian/English) to compare the expected response patterns across languages, and with group (child/adult) to compare children's responses with the expected adult pattern. In the following section, we review the predictions for these responses in a TVJT context.

3.3. Predictions for strict subject and free reference patterns

Regarding adults, the target grammar in Romanian with small *pro* predicts a free reference pattern of interpretation, while the target grammar in English with big PRO predicts a strict subject pattern. In the TVJT, these two patterns correspond to distinct responses across the test sentence conditions.

For a free reference pattern of interpretation, both the subject and object interpretations are acceptable; for the test sentences in (8)/(9) and (10), this means that either Dora or Diego can be interpreted as the adjunct subject. According to the Principle of Charity (Hamburger & Crain, 1984), when a sentence allows both a true and a false interpretation, participants are expected to choose the interpretation that makes the sentence true. Therefore, a true response is expected for both the *subject-true* and *object-true* conditions with a free reference grammar, i.e. with small *pro*.

In contrast, a strict subject grammar only generates the subject interpretation; this predicts a true response for the *subject-true* condition but a false response for the *object-true* condition. For the adult participants, these contrasting patterns are expected across languages, i.e. the free reference pattern in Romanian and the strict subject pattern in English. This predicts an interaction between sentence condition (*subject-true/object-true*) and language. Therefore, the same interaction is predicted for the children, if acquisition of the language-specific aspects of these structures occurs by age 4. Otherwise, their responses should reflect the properties of their initial grammar: if the initial grammar is strict subject (PRO), both English and Romanian are expected to show a strict subject pattern; if the initial grammar is free reference (*pro*), both languages are expected to show a free reference pattern. We present the results in the following section.

4. Results

In this section, we compare children's responses in Romanian and English. We find that children's responses are already contrasting across languages by age 4-5. Moreover, these patterns are generally consistent with adults' interpretations – with some key exceptions that have further implications for the developmental trajectory. We explore these implications in the discussion.

The results for this study are presented in Figure 2 for children and adults, with the proportion of “true” responses by *subject-true/object-true* sentence

condition (within-subjects) and language (English/Romanian). For adults, the predictions outlined in the previous section (3.3) are partially borne out: English-speaking adults show the expected strict subject pattern, whereas Romanian adults do not exhibit the predicted free reference pattern across both conditions; rather, a subject bias emerges, as small *pro* selects its referent from the discourse. The pattern for children adds further complexity to the picture: English-speaking children give more subject responses than object responses, similar to the pattern for English-speaking adults. Meanwhile, Romanian children show the expected pattern for free reference, with similar acceptance rates for both test sentence conditions.

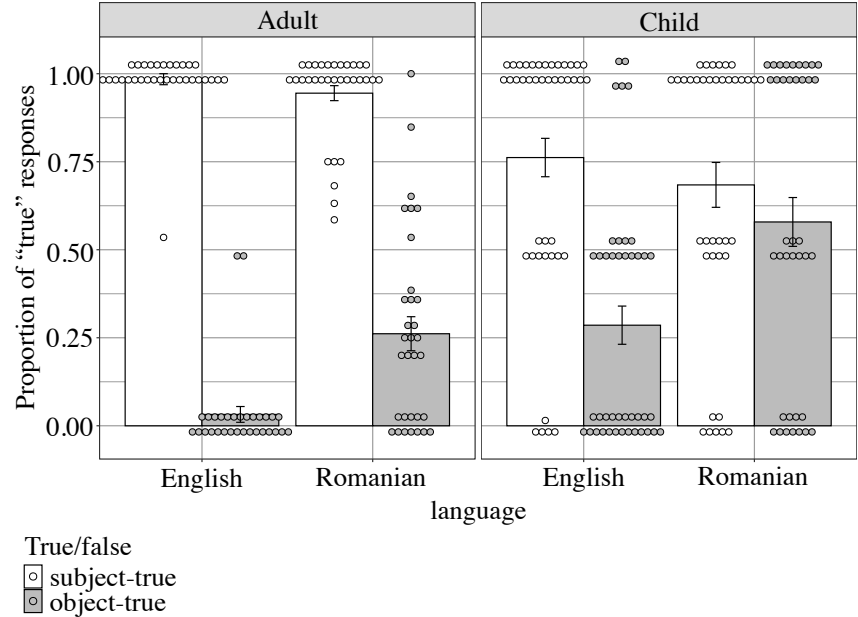


Figure 2: Responses by true/false sentence condition, for adults (left) and children (right) in English and Romanian

To analyze children’s and adults’ responses across languages, we used R (R Core Team, 2015) and lme4 (Bates et al., 2015) to perform a mixed effect logistic regression models with test sentence condition (subject-true/object-true), language, and child/adult as fixed effects, as well as random effects for participant and item with random slopes for test sentence condition. The model summary is presented in Table 1, with significant effects in bold.

While several interactions are observed in Table 1, these collapse across the specific groups from our predictions in Section 3.3. Specifically, we predicted an interaction for adults between language and sentence condition (subject-true/object-true), and the same interaction in children if they have already

acquired the respective form for their language. In Table 1, the interaction between language and subject-true/object true is only marginal ($p = 0.053$), meaning that this interaction may be driven by just one population (adults or children). However, the three-way interaction between all three factors is not significant ($p = 0.479$), which would be consistent with the same language by sentence type interaction for adults and children.

Table 1: Model summary – significant effects in bold

Fixed effects	β	Z	p
(Intercept)	5.44	3.41	0.001
child/adult	-3.39	-2.06	0.039
subject-true/object-true	-9.34	-5.12	<0.001
language	-1.19	-0.68	0.497
child/adult : subject-true/object-true	6.08	3.24	0.001
child/adult : language	0.31	0.17	0.868
subject-true/object-true : language	3.83	1.94	0.053
child/adult : subject-true/object-true : language	-1.48	-0.71	0.479

To tease apart these possibilities, we used emmeans (Lenth et al., 2022) to perform post hoc tests with the fitted model. The interaction between language and sentence type was only marginal for adults ($\beta = 3.83$, $Z = 1.94$, $p = 0.052$), due to the tendency for both groups to give a subject response – despite their contrasting underlying grammars. We return to this result in the discussion. Meanwhile, the interaction was significant for children ($\beta = 2.35$, $Z = 2.90$, $p = 0.004$), reflecting the striking contrast between children’s responses in English and Romanian. As seen in Figure 2, English-speaking children gave more subject responses, with a strong tendency to accept *subject-true* sentences and reject *object-true* sentences. As in previous studies, English-speaking children also sometimes accepted an object interpretation, and in fact these were just as – if not more frequent as Romanian adults’ object responses.

However, the Romanian children’s responses provide a key insight into the source of these responses – both in Romanian and in English. Specifically, Romanian children show the predicted pattern for a free reference grammar based on the Principle of Charity, i.e. they accepted both *subject-true* and *object-true* conditions. This also contrasts with the subject preference exhibited by Romanian adults, but, importantly, it allows for key inferences about language acquisition in both Romanian and English. We consider these next, in the discussion section.

5. Discussion

In this study, we compared children’s and adult’s interpretations of non-finite clauses in English and Romanian, as in (1) and (2), repeated below in (12):

(12) a. English:

The cat₁ chased the dog₂ before PRO_{1/*2/*3} running outside.

b. Romanian:

Pisica₁ a urmărit câinele₂ înainte de pro_{1/2/3} a alerga afară.

cat-the has chased dog-the before of to run outside

‘The cat chased the dog before running outside.’

We found that English-speaking adults and children show a strict subject pattern for the interpretation of big PRO, with children occasionally giving object responses. Romanian adults have a free reference grammar for non-finite adjuncts (analyzed as having a *pro* subject); however, they exhibit a subject bias, favoring subject interpretations. Romanian children, by contrast, accept both subject-true and object-true sentences, indicating early acquisition of free reference, but no subject bias.

In the following sections, we discuss the interpretation of these results, focusing on the interactions discussed in the previous section. We consider the implications of these results for children’s representations at the ages under investigation in the current study, and for the broader trajectory for acquisition.

5.1. The subject discourse bias: implications

We start with the more subtle contrast between English- and Romanian-speaking adults’ response patterns. While English-speaking adults showed the expected strict subject pattern, Romanian adults’ responses reflected a discourse subject bias alongside their free reference grammar. This discourse bias is responsible for the reduced contrast between languages for adults, and demonstrates how multiple factors can interact in producing the behavioral response.

5.1.1. Implications for TVJT interpretations

Although we had predicted a free reference pattern from Romanian adults, this subject bias is not entirely unexpected: small *pro* takes a discourse antecedent, and the discourse context for the test sentences tends to have a subject bias (e.g. Arnold et al., 2019; Johnson & Arnold, 2021). In the *subject-true* condition, this bias aligns with the Principle of Charity. However, the *object-true* condition involves direct competition between the Principle of Charity and the subject discourse bias as interpretation strategies. The general subject preference for Romanian adults indicates a strong preference for the subject discourse bias; however, variation in the response pattern suggests that this subject preference may also vary across participants.

5.1.2. Implications for children's representations

Romanian adults have a free reference grammar (with small *pro*) and a subject discourse bias. The pattern for Romanian children can tease apart these two separate factors that determine adults' responses. Our results indicate that by 4-5 years, Romanian children have already acquired the former, but not the latter. In fact, this result aligns with previous studies on children's interpretations of referentially ambiguous pronouns in English as in (13), that find an inconsistent or just emerging discourse bias (Arnold et al., 2007, 2019; Hartshorne et al., 2015).

- (13) Puppy₁ is having lunch with Panda Bear₂. He_{1/2/3} wants some milk.
(adapted from Arnold 2007)

This suggests that Romanian children's representation of *pro* in non-finite adjuncts is similar to English-speaking children's representation of overt pronouns like in (13), in relation to the discourse referent.

In contrast, English-speaking children show a markedly different pattern in non-finite adjuncts. Therefore, even though English-speaking children's responses included some object interpretations, these cannot be linked to a free reference grammar: if so, the English response pattern would look like the pattern in Romanian.

5.2. Implications for the acquisition trajectory

Our results indicate that the contrast between small *pro* and big PRO in non-finite adjuncts is already acquired by age 4-5. This means that evidence for this contrast must be available in children's linguistic experience before this age. This raises two possibilities:

1. Children start with a default small *pro* in non-finite adjuncts (Romanian-type grammar)
2. Children start with a default big PRO in non-finite adjuncts (English-type grammar)

If we assume that there is a default small *pro*, there would be nothing left to acquire for Romanian, while in English, we would need to transition from the superset grammar (free reference) to the subset grammar (strict subject reference) (Gerard, 2021; Omaki & Lidz, 2015; Lidz & Gagliardi, 2015). This is problematic for multiple reasons. First, a small *pro* grammar should be ruled out for English-speaking children once they have determined that English is not a null subject language. Additionally, even though the input might only contain subject interpretations, children might still perceive null subjects as allowing both subject and object readings.

On the other hand, if we assume that there is a default PRO, then no further evidence for subject interpretations would be needed for English. However, in the

case of Romanian, positive evidence would be needed for free reference. This might pose challenges for children given that, even though the input has free reference, children might nonetheless interpret null subjects strictly as subjects.

Importantly though, the input may provide cues that children could rely on to figure out the free reference pattern associated with small *pro* in adjunct non-finite clauses in Romanian. As we pointed out in Section 2.2, one cue could be the fact that, unlike in English, in Romanian, *pro* can alternate with overt subjects, as can be seen in (6a) vs. (6b), repeated below as (14):

- (14) a. Ion a mâncat.înainte de a pleca.
 John has eaten before DE to go
 ‘John ate before going.’
 b. Ion a mâncat.înainte de a pleca mama.
 John has eaten before DE to go mother
 ‘John ate before mother went away.’

Another cue Romanian children could rely on would be the availability of object agreement. If, for instance, the non-finite adjunct clause contains adjectives that agree with the subject, as well as with object, as shown in (3), repeated below as (15), then children could pick up on this cue to infer that the null subject in Romanian is not PRO, as the latter only allows a strict subject interpretation. Instead, the interpretation of the null subject in Romanian is free.

- (15) Băiatul a spălat-o pe fată înainte de a deveni {trist/tristă}
 boy.the has washed-CL.F PE girl before DE to become sad-M/sad-F
 ‘The boy washed the girl before becoming sad-M/sad-F.’

These cues could help children first establish the free reference pattern. Additionally, children also need to acquire a discourse bias pattern, whereby, while allowing both subject and object interpretations, there is a preference for the subject. The adult input is crucial here in helping children learn that subject interpretations are more frequent and should therefore be prioritized, if possible.

5.3. Conclusion

The current study has investigated the acquisition of null subjects in non-finite adjuncts in Romanian in comparison to English, i.e. free reference *pro* versus strict subject PRO. We have shown that English-speaking children acquire strict subject PRO in non-finite adjuncts by ages 4–5, and that Romanian-speaking children acquire free reference small *pro* around the same age. Interestingly, Romanian adults show the same grammar but show a subject discourse bias, which suggests that grammatical knowledge of free reference precedes discourse-driven preferences. Our study thus provides important crosslinguistic evidence that seemingly similar structures with null subjects are associated with different acquisition paths. Moreover, the acquisition data can be argued to reinforce the

view that these structures involve two different types of null subjects (*pro* vs. *PRO*).

Our findings may be accounted for if we assume that Romanian children's acquisition of the free reference pattern depends on exposure to evidence for small *pro* in non-finite clauses. If this is the case, we would expect children to encounter both types of evidence in the input before the age of four. One of our future goals is thus to conduct a comprehensive corpus study in order to identify the cues available in naturalistic input.

Additionally, we plan to extend our investigation to 3-year-olds, motivated by the goal of identifying a default interpretation for null subjects in non-finite adjunct clauses. If such a default exists, then we would expect to see the same behavior across languages at an earlier age.

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