

*BUCLD 35 Proceedings*  
*To be published in 2011 by Cascadilla Press*  
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## **Early Inflected Infinitives and Late V-to-C Movement**

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### **1. Introduction**

In previous work, we experimentally tested knowledge of inflected infinitives in young monolingual speakers of European Portuguese (EP), ages 6 through 12 years of age (Pires, Rothman and Santos 2011a, b). These studies examined morphosyntactic and syntax-semantics interface properties that differentiate non-inflected and inflected infinitives (e.g. Pires 2006), using a grammaticality judgment and a context-picture matching tasks. These experiments were especially apropos in light of previous work on the acquisition of Brazilian Portuguese (BP) in which it was shown that different syntactic and semantic properties of inflected infinitives emerge extremely late (Pires and Rothman 2009b). Pires and Rothman (2009a,b) concluded that inflected infinitives emerge only after the age of 10-12 in BP not because inflected infinitives are inherently late emerging properties, but rather because they are not abundantly available in BP primary linguistic data until a later age, when children have sufficient exposure to standard BP, where inflected infinitives are productive. Their argument was in line with independent syntactic change arguments that inflected infinitives are being lost in colloquial dialects of BP, akin to the loss of third person clitic pronouns and other structures, as a natural consequence of diachronic change (see Pires 2006 and references therein). It was obvious that if Pires and Rothman's conclusions were on the right track, the pattern for EP children should be markedly different, considering similar experimental tasks, since there is no question that inflected infinitives are productive across dialects of EP. Pires et al. (2011a,b) results on the acquisition of EP show that children as young as 6 have clear knowledge of the syntax and semantics of inflected infinitives, even if it is not entirely adult-like in specific respects. These results lent support to Pires and Rothman's (2009 a,b) arguments regarding the source of late emergence in BP, although Pires et al.

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did not have results from children below age 6 to show the path of development of inflected infinitives when they first emerge in the acquisition of EP. Moreover, since we only examined inflected infinitives as complements of matrix verbs, we were unable to investigate whether different uses of inflected infinitives emerge asymmetrically.

The present study picks up where our previous experimental work left off, investigating the use/emergence of inflected infinitives in early production of three European Portuguese (EP) children's spontaneous speech. With this in mind, the present study is motivated by the following research questions:

- 1) When and how do EP children first acquire inflected infinitives? More precisely, does production data from children below age 4 show whether acquisition of inflected infinitives happens prior to the school years (in the case of EP)?
- 2) Is there any ordering in the emergence of inflected infinitives across different structures?
- 3) If there is any ordering, can one explain it under the hypothesis that these structures are distinct regarding their complexity for acquisition?

We examined speech files of these children from age 1;6 through ages 3 to 4. The data reveal that well before the age of 4, EP children already use inflected infinitives, although they only occur in restricted contexts, namely as complements of purpose clauses (*para* 'for' + inflected infinitives). Such observations further underscore previous results showing that inflected infinitives per se are not an inherently late property for L1 acquisition (see references above). Furthermore, we will argue that the attested developmental pattern, that is, why inflected infinitives first emerge in *para* purpose clauses, follows from the relative underlying syntactic complexity of different contexts of inflected infinitives. We will argue that inflected infinitives first emerge in *para* purpose clauses and not in other grammatical cases, such as complements of declarative, epistemic and factive predicates, because only in the former do inflected infinitives derive from External Merge (see e.g. Chomsky 2008), whereas the other cases derive from V-to-C movement (Internal Merge). Adopting Jakubowicz's (2005) Derivational Complexity Hypothesis, we will argue that cases of inflected infinitives requiring V-to-C movement are more costly for children than cases that do not require movement, explaining why the latter are attested much earlier in EP child production.

## **2. Inflected Infinitives: Syntax and Semantics**

EP has inflected and uninflected infinitives, both lacking overt specification for tense distinctions. However, they are distinguished by the presence vs.

absence of overt person/number agreement. In table 1, agreement markers for inflected infinitives are compared to the ones found in present indicative forms.

**Table 1 – Inflection in infinitives**

Uninflected infinitive	Inflected infinitive	Present Indicative
	1sg: fal+a+r+Ø	fal+(a)+o
	2sg: fal+a+r+es	fal+a+s
Fal+a+r (to speak)	3sg: fal+a+r+Ø	fal+a+Ø
	1pl: fal+a+r+mos	fal+a+mos
	3pl: fal+a+r+em	fal+a+m

Raposo (1987) argues in a Government & Binding analysis that the existence of inflected infinitives is a consequence of the interaction between two parameters: the Null Subject Parameter (i.e. in null subject languages Agr may be specified for Case) and the Infl Parameter (in some languages, Infl, even if specified as [-T], may be specified as [+Agr] and carry Case licensing properties). "In the absence of [+Tense], Infl (or Agr in Infl) is capable of assigning nominative Case to a lexical subject only if it is itself specified for Case." (Raposo 1987: 92) Under Raposo's analysis, inflected infinitives only occur in contexts where Agr on the Infl head gets Case.

Raposo's analysis, despite the questions it raises under recent theories (especially within Minimalism), attempted to predict the empirical distribution of inflected infinitives in embedded domains – as complement clauses selected for by declarative, epistemic (1a) and factive verbs (1b), by Ps (3), but not by volitional predicates (2):<sup>1</sup>

- (1) a. Ele declarou/pensou concluir os investigadores o  
 he declared/thought **conclude-INF-3pl** the researchers the  
 relatório amanhã.  
 report tomorrow.
- b. Ele lamenta os investigadores não concluir  
 he regrets the researchers not **conclude-INF-3pl**  
 o relatório amanhã.

<sup>1</sup> According to Raposo, complement clauses of volitional predicates have dependent tense (a), and inflected infinitives only occur in clauses with independent tense (b):

- (a) \*Eles quiseram [dançar amanhã].  
 they wanted **dance-INF** tomorrow
- (b) \*Eles quiseram [dançarem amanhã].  
 they wanted **dance-INF-3pl** tomorrow.

A complement clause has dependent tense when the temporal perspective point of the situation described in the embedded clause is the interval where the situation described in the matrix clause is located (see Gonçalves, Cunha & Silvano 2009).

- the report tomorrow.
- (2) \*Eles querem ir **go-INF-3pl** à praia hoje.  
 they want to+the beach today
- (3) Agradou-lhe a proposta de irmos ao cinema.  
 pleased-him the proposal of **go-INF-1pl** to-the cinema.  
 ‘It pleased him the suggestion that we go to the movies.’

In addition, inflected infinitives occur in subject clauses and in adjunct clauses introduced by a preposition:<sup>2</sup>

- (4) É melhor irmos ao cinema.  
 is better **go-INF-1pl** to.the movie.
- (5) a. A Maria ficou em casa para eles irem ao teatro.  
 the M. stayed at home for they **go-INF-3pl** to+the theatre  
 b. Apesar de os meus irmãos viverem longe,  
 in-spite of the my brothers **live-INF-3pl** far,  
 falo muito com eles.  
 speak-pres-1sg a lot with them

Under Raposo’s (1987) approach, one is forced to assume that factive verbs (1b) and prepositions introducing inflected infinitival clauses (3, 5) select for IPs when the subject is preverbal, but also for CPs if the subject is postverbal (see Raposo 1987:89, (7b)). However, we depart from Raposo (1987) in assuming that inflected infinitival clauses are always headed by C (see also Longa 1994, for Galician). In fact, in infinitival clauses where no C is present, inflected infinitives are not allowed, *e.g.*, in complements of modal verbs (7), in restructuring constructions (8) – see Gonçalves (1999), Wurmbrandt (2003), among others:

- (7) Eles podem brincar(\*em) no jardim à tarde.  
 They may play-**INF(\*-3pl)** in-the garden in the afternoon
- (8) Ela mandou comer(\*em) a sopa aos filhos.  
 She ordered eat-**INF(\*-3pl)** the soup to-the children.

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<sup>2</sup> Raposo (1987) also attempted to deal with such cases, but did not address the grammaticality of inflected infinitives in non-*wh* exclamative and in interrogative root clauses:

- (a) Fumares desta maneira!  
**smoke-INF-2sg** of-this way!  
 (b) E vestirem-se depressa, não?  
 And **dress-INF-3pl-self** quickly, not?

In this paper we assume that inflected infinitival clauses share the following properties:

- (i) C has independent T features (Stowell 1982; Landau 2000)
- (ii) The functional head T in the projection of the infinitival clause carries  $\phi$ -features accounting for the person-number morphology shown in the verb.
- (iii) Infinitival T also carries defective T features (defective T does not value nominative Case on its own – e.g. Chomsky 2001, 2004).

Assuming (i)-(iii), we predict that inflected infinitival clauses can only be realized in one of the two following contexts in EP:

- (9) a. **A null complementizer is merged in C.** Then either **T moves to C** and the T features of C-T value nominative Case (see (10a), (11a)) or **the DP subject may raise to Spec-CP**, if C has D features as it is the case with factive predicates (11b), and an Agree chain is created between that DP, C and T, which values nominative Case) – see Duarte, Gonçalves & Miguel (2005). These cases correspond to a derivation by *Move* (Internal Merge).
  - b. **An overt complementizer with T features** is merged in C, valuing nominative Case through Agree – derivation by *Merge* (External Merge).
- (10) a. O director afirmou [CP **concluírem** [TP os detectives the director stated conclude-**INF-3pl** the detectives a investigação em breve]].  
the investigation in soon
  - b. \*O director afirmou [CP [TP os detectives **concluírem** a investigação em breve]].
- (11) a. O director lamentou [CP **pararem** [TP os detectives a the director regretted stop-**INF-3pl** the detectives the investigação em breve]].  
investigation soon
  - b. O director lamentou [CP os detectives [TP **pararem** a investigação em breve]].

In complement clauses, only a derivation by *Move* is available. However, what happens to inflected infinitives in purpose clauses and in other adjunct clauses which need to be introduced by simple or complex prepositions? Adopting a proposal by Magro (2005), we can assume that some of these “prepositions” are ambiguous between true prepositions and complementizers. According to her, “prepositions” that favor enclisis are of category P, whereas

“prepositions” that induce proclisis are of category C. As the contrast between (12a) and (12b) shows, the “preposition” introducing purpose clauses (*para* ‘for, in order to, to’) is a complementizer, given its co-occurrence with proclisis:

- (12) a. Eu espero para os meninos **lhe telefonarem.**  
 I wait in order to the children **CL.DAT.3sg call-INF-3pl**  
 b. \*Eu espero para os meninos **telefonarem-lhe.**  
 I wait in order to the children **call-INF-3pl CL.DAT.3sg**

Therefore, since *para* is an overt complementizer merged in C, and C has independent T features, in purpose clauses the inflected infinitive is derived by an (External) Merge derivation.

### 3. Early inflected infinitives

In order to determine when and how children start producing inflected infinitives, we examined children’s spontaneous speech, starting at the onset of multiword production, as described in the following section.

#### 3.1. Methodology

We examined the speech transcription files in Santos’ (2006/2009) corpus for European Portuguese. These files contain spontaneous speech produced by three children, starting at 1;5 / 1;6 (see table 2). Each file contains the transcription of 45 to 55 minutes of child-adult interaction, treated according to the CHAT format (MacWhinney, 2000).

**Table 2 – The spontaneous production corpus (Santos 2006/2009)**

Child	Age	MLUw	Number of files	Number of child’s utterances
INI	1;6.6 – 3;11.12	1.527 – 3.815	21	6591
TOM	1;6.18 – 2;9.7	1.286 – 2.954	16	6800
INM	1;5.9 – 2;7.24	1.315 – 2.370	15	5101

All infinitives produced by adults and children were coded. Only unambiguous cases were coded as inflected infinitives; all the other forms were counted as non-inflected infinitives. Two criteria were used to identify unambiguous inflected infinitives: (i) overt person-number inflection, as in (13); (ii) an overt subject, as in (14). In certain cases, both criteria were met.

- (13) MAE: olha # eu acho melhor fazeres aqui # puxa se isto.  
 look I think better do-INF-2sg here pull CL that

(14) ALS: então escreve aqui Inês # para **eu** ver.  
 so write here Inês for **I.NOM** see-INF.1sg

Of course, given the morphological properties of inflected infinitives described in section 2, 1<sup>st</sup> (14) and 3<sup>rd</sup> singular forms of inflected infinitives, which lack overt  $\phi$ -features, can only be identified by an overt subject.

### 3.2. Results

The analysis of the spontaneous data showed very early production of inflected infinitives. Two of the three children (TOM, INI) produce unambiguous inflected infinitives, starting at 1;11 and 2;1. First productions are signaled by an overt subject - see (15) and (16):

(15) MAE:vão buscar papa? (1;11.12)  
 Go.3pl get daddy  
 MAE: para quem?  
 for who  
 TOM: pó [: para o] u(r)so come(r).  
 fo(r)[:for the] **bear** eat-INF-3sg

(16) INI: acend(e) a luz. (2;1.10)  
 turn.on the light  
 MAE: mas porquê ?  
 but why  
 INI: pa(ra) a nenê@f ver bem.  
 for **the nenê<sup>3</sup>** see-INF-3sg well.

First productions with overt inflection also occur before the age of 3: at 2;2 in the case of INI (18) but only at 2;4 / 2;6 for TOM (17). The majority of the cases are indeed cases of inflected infinitives marked by an overt subject (only 12 cases bear inflection).

(17) TOM: ponh(o) aí pa(ra) faze(re)s [?] # (es)tá? (2;8.9)  
 put there for do-INF-2sg is

(18) INI:it [//] # <é p> [//] # é pa(ra) comer(es). (2;2.1)  
 is is for eat-INF-2sg

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<sup>3</sup> Familiar form that the family used to refer to the child (Inês).

As far as the contexts in which inflected infinitives are found are concerned, two main findings should be highlighted: first, inflected infinitives produced by the two children (n= 52) occur in structural contexts that are expected, considering the adult grammar (only two exceptions, <5%); second, 98% of inflected infinitives produced in expected contexts are restricted to *para* ‘for’ purpose clauses (with one exception only, a prepositional infinitival construction produced by TOM in his last file – see (19)).

(19) TOM: (es)tá (a)qui.  
          is      here  
TOM: os bonecos todos a fugi(r)em.          (2;9.7)  
      the dolls   all   to flee-**INF-3pl**

These data raise several questions to which we propose answers to in the next section:

- Why are first inflected infinitives marked only by an overt subject? Are these true inflected infinitives?
- Why do only two of the children produce inflected infinitives?
- How can we explain the early restriction of inflected infinitives to *para* ‘for’ purpose clauses?

#### 4. Discussion

As shown above, first inflected infinitives are signaled only by an overt subject. This of course raises the question whether these are true inflected infinitives.

First, we should recall that both 1<sup>st</sup> and 3<sup>rd</sup> singular forms do not carry overt inflection, although these are indeed the first verbal forms that children use productively. Gonçalves (2004), studying four children (1;8.21 to 3;01.15) acquiring European Portuguese, shows that the contrast between 1<sup>st</sup> and 3<sup>rd</sup> singular is acquired between ages 1;10 and 2;7. This is in agreement with our data: the first inflected infinitives are indeed 1<sup>st</sup> and 3<sup>rd</sup> singular; both in the child and adult grammars they do not carry overt inflection and must therefore be signaled by an overt subject. In the first files, children do not productively use forms overtly marked by inflection (e.g. 1<sup>st</sup> or 3<sup>rd</sup> plural; 2<sup>nd</sup> singular), neither in the case of inflected infinitives nor in the case of indicative forms.

Therefore, the first unambiguous inflected infinitives produced by children are identified by an overt subject. An overt subject is impossible with non-inflected infinitives, which already constitutes evidence for the acquisition of the relevant structure. But since we expect subjects to be marked with nominative, we can actually add another argument in favor of the acquisition of inflected infinitives. 1<sup>st</sup> singular personal pronouns show an overt Case distinction: *eu* (nominative) / *me* (accusative / dative) / *mim* (oblique). Children in the current

corpus produced 18 cases of 1<sup>st</sup> singular inflected infinitives marked by an overt subject (a pronoun). All of them were instances overtly marked as nominative subjects (see (20)).

(20) TOM: pa(ra) [l] # pa(ra) **eu** corre(r). (2;5.3)  
fo(r) fo(r) **I.NOM** run-INF

Only in two cases in the corpus did the child produce unexpected forms: overt pronouns with the distribution of subjects but marked as oblique. These two cases were not counted as inflected infinitives, and may be explained by the ambiguous nature of *para*, which in this instance would be a preposition valuing oblique Case (and not a complementizer – see section 2), followed by a non-inflected infinitive.

(21) INI: pa(ra) mi(m) xx # le(r) liv(r)os. (2;5.24)  
fo(r) **me.OBL** read books

Another relevant argument in favor of early mastery of inflected infinitives comes from their distribution and from the distribution of non-inflected infinitives. The three children produced around 1300 cases of infinitives lacking both overt inflection and an overt subject. All these cases were coded as non-inflected infinitives, even though some of these cases are in fact ambiguous between a non-inflected infinitive with a controlled PRO subject and a 3<sup>rd</sup> singular inflected infinitive with a *pro* subject. However, the majority of the contexts where we find infinitives with no inflection and no overt subjects are indeed contexts in which only a non-inflected infinitive is possible, namely:

- (i) the complement of semi-auxiliaries *ir* ‘go’ (future (22)) and *estar a ‘be to’* (progressive (23)): 514 cases;
- (ii) the complement of the modal verb *poder* ‘can’ (25): 62 cases;
- (iii) the complement of the volition verb *querer* ‘want’ (24): 104 cases

In all the 1300 cases, and particularly in these contexts where inflected infinitives are not licensed, we observed expected productions, including cases with plural raised/controller matrix subjects and the expected absence of inflection or an overt subject in the embedded domain:

(22) INM: vamo(s) b(r)inca(r) com i(s)to. (2; 6. 19)  
go-**1pl** play-INF with this

(23) TOM: aqui (es)tã(o) [l] # (es)tã(o) toca(r) # música. (1;11.12)  
here are are play-INF music

(24) TOM: que(re)s ve(r) ? (2;9.7)  
want-2sg see-INF

(25) INI: xxx senho(res) [?] podem ir embora. (2;10.20)  
gentlemen may-3pl go-INF away

The fact that these children recognized (i) the distribution of inflected and non-inflected infinitives and (ii) their properties related to inflection and licensing of nominative subjects constitutes evidence in favor of early acquisition of inflected infinitives.

Still, why is it that only two out of the three children produced inflected infinitives at the age range considered above? In section 2, we argued that licensing of an inflected infinitive necessarily implies a lexically overt C (filled through External Merge or as the result of Move/Internal Merge). As a possible explanation, we would like to suggest that the onset of inflected infinitives is related to the onset of production of a lexically overt C.

Santos (2006/2009) discussed the onset of production of overt C in complement clauses in this corpus, based on the emergence of an overt complementizer *que* ‘that’. It is interesting to notice that the onset of production of overt C in complement clauses for INI and TOM is at 2;1. In parallel, INI produces her first inflected infinitive at 2;1 and TOM produces his first one at 1;11 and the second one only at 2;1. On the contrary, INM, the child who does not produce inflected infinitives, starts producing overt complementizers only at 2;6. Since the data for this child only covers the period between 1;5 and 2;7, it is possible to explain the later onset of inflected infinitives in this case if the emergence of inflected infinitives and overt complementizers is indeed related in child EP.

The last question that we should answer concerns the very restricted distribution of inflected infinitives in the first stages: inflected infinitives are restricted to *para* ‘for’ purpose clauses (with only one exception, see section 3.2).

The first fact we should take into account is frequency in the input. In order to evaluate the availability of relevant input, we coded all infinitives produced by adults in the corpus. Adults produced 374 inflected infinitives; 307 out of these (82%) were indeed produced in the context of *para* purpose clauses. This means that the first acquired structure is indeed the most frequent one. However, the input (or its absence) could not explain by itself the complete absence of other inflected infinitives in early child speech: adults produce 67 inflected infinitives in structures other than *para* purpose clauses. These structures include (i) other prepositional inflected infinitives; (ii) clauses selected by predicates such as *achar melhor* ‘to believe (to be) better’ / *ser melhor* ‘to be better’; (iii) adjunct temporal clauses (introduced by *depois de* ‘after’ / *antes de*

'before'); (iv) complement clauses selected by *proibir de* 'prevent from' / *lembrar-se de* 'remember to' / *ver* 'see' / *pensar* 'believe' / *mandar* 'order'.

In section 2, we argued that an inflected infinitive may be derived when (i) there is a null C and either V-T move to C or the subject DP moves to Spec, CP or when (ii) an overt complementizer is directly merged in C. This means that either we fill C through Move (Internal Merge) or we fill C through (External) Merge, respectively. The Derivational Complexity Hypothesis, put forward by Jakubowicz (2005), Jakubowicz & Strik (2008) (see also Soares 2006) suggests that "less complex derivations are input convergent (i.e., correctly spelled out and 'pronounced' at the interfaces) before more complex ones" (Jakubowicz & Strik 2008: 106); complexity is measured by their Derivational Complexity Metric, which determines that "merging  $\alpha_i$   $n$  times gives rise to a less complex derivation than merging  $\alpha_i$  ( $n + 1$ ) times" (Jakubowicz, 2005; Jakubowicz & Strik, 2008: 106). Applied to our case, this hypothesis makes a prediction: the emergence of inflected infinitival structures that involve movement to C or to Spec,CP should occur later than inflected infinitives in contexts where C is filled by an overt complementizer, since the (External) Merge derivation, which implies less Merge operations than Move (Internal Merge), is the less complex one.<sup>4</sup>

Our results provide additional empirical evidence to this prediction. *Para* 'for' purpose clauses are cases in which a complementizer is directly merged in C. We have argued that, in these structures, *para* behaves as a true complementizer. We can therefore hypothesize that children first produce inflected infinitives in structures in which C is filled through (External) Merge and only later will produce inflected infinitives in structures requiring V-to-C or DP-to-Spec,CP movement.

Finally, these specific findings concerning the distribution of early inflected infinitives also provide independent support for previous findings by Soares (2006) and Santos (2006/2009): there is no clear evidence of V-to-C in early EP root clauses, for instance in wh-questions (differently from the adult grammar), in contrast with what has been shown to happen for instance in V2 languages (see e.g. Poeppel & Wexler, 1993).

## 5. Conclusions

In this paper we have provided results regarding child production data showing that: (i) inflected infinitives are productive in child European Portuguese/EP as early as the age of 1;11 - in most of these cases inflected

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<sup>4</sup> One would be tempted to relate this approach to Merge-over-Move (e.g. Chomsky 2001), but notice that the Derivational Complexity Metric adopted here does not imply comparison of two derivations with identical numerations. The overt complementizer does not occur in the derivations in which there is movement to C or to Spec, CP.

infinitives are unambiguously identified only by an overt subject, although some unambiguous cases also bear overt inflection; (ii) almost all inflected infinitives produced at this early stage are already used in expected structures. However, 98% of inflected infinitives produced in expected contexts in the early child EP data we analyzed here are restricted to *para* ‘for’ purpose clauses.

These results are relevant in multiple respects. First, they add to the experimental results in Pires, Rothman & Santos (2011a, b), by showing clear evidence of early acquisition of inflected infinitives in EP. Second, these results offer independent support for arguments by Pires & Rothman (2009a, b) that the late acquisition of inflected infinitival structures in Brazilian Portuguese is not due to the possibility that these structures would be intrinsically late acquired properties in general, but rather results from effects of diachronic change in the language by which inflected infinitives are no longer fully productive in colloquial BP dialects, differently from EP.

Third, the current results raise important questions regarding what aspects of early child grammar would restrict the production of inflected infinitives to *para* ‘for’ purpose clauses in child EP. We adopted an analysis in which *para* constitutes an overt complementizer (see Magro 2005). We then proposed an explanation for the path of development of inflected infinitives in child EP by which structures with External Merge of an overt complementizer (in *para* infinitival clauses) are the first to emerge due to the application of the Derivational Complexity Hypothesis (Jakubowicz 2005, Jakubowicz & Strik 2008), by which structures with the application of External Merge should emerge earlier (or at least not later than) structures involving Move (Internal Merge). This approach provides an explanation for why inflected infinitival structures requiring the application of V-T movement to C or DP-movement to Spec, CP, which are part of adult EP, are not attested in early child EP (at least in the stages represented in the corpus considered here, until around age 3). It remains to be seen whether similar structures with *para* purpose clauses also occur in child BP production data with similar properties to the ones found here for child EP, which was not investigated in the experimental studies by Pires & Rothman.

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