

RESEARCH PAPER

Acquiring the distribution of null and overt direct objects in European Portuguese

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This article investigates the L1 acquisition of different types of direct objects in European Portuguese (EP). Previous research has revealed that although children have early syntactic and pragmatic knowledge of objects across languages, the adequate use of pronouns and null objects is protracted in the acquisition of EP (Costa et al. 2012). The present study shows that children acquiring the distribution of direct objects are aware of universal pragmatic hierarchies but struggle with the interpretation and feature bundles of null objects. Assuming that arguments are linked to left-peripheral C/edge linkers (Sigurðsson 2011), we argue that children need more time to discover the adult-like feature composition of null objects in EP because they involve phi-silent features. *Relative accessibility* (Ariel 1991) is universal and available early, whereas the *absolute accessibility* of null objects, i.e. their feature content, is acquired relatively late.

Keywords: European Portuguese; direct objects; accessibility hierarchy; animacy; null object stage

1. Introduction

This paper investigates the first language (L1) acquisition of different types of direct objects in European Portuguese (EP) by focusing on the factors determining the distribution of definite noun phrases (NPs), clitic object pronouns and null objects.

It has been shown that young children go through a stage where they widely omit object referents, independent of the language to be acquired. Pérez-Leroux, Pirvulescu and Roberge (2017) assume that this stage reflects a universally available syntactic null object construction. Starting from this construction, children have to adjust their grammar to the particular options of object realization available in their native language. The object omission stage has different timelines in different languages because the learning task also depends on these language specific options. For example, for children acquiring English the null object stage is relatively short (Wang, Lillo-Martin, Best & Levitt 1992), whereas children acquiring Polish or Portuguese still show a high amount of object omissions at the age of 5 years (Costa & Lobo 2007; Sopata 2016; Varlokosta, Belletti, Costa, Friedmann, Gavarró, Grohmann & Yatsushiro 2016) because the latter languages include, in addition to object pronouns and object noun phrases, referential null objects. This makes the acquisition of direct objects in null object languages more complex than in languages that do not have the null object construction.

According to Raposo (1986), null objects are syntactically linked to an empty topic in the specifier of CP. Sigurðsson (2011) extends this assumption to all kinds of (object) arguments and assumes that they have to be syntactically C/edge linked by a functional category in

their local C-domain. In addition, they are – like definite NPs and object pronouns – context bound, i.e. referentially valued by the discourse what ultimately determines their definite reference. Referring expressions like pronouns or definite NPs are specialized markers of accessibility of discourse referents (Ariel 1985, 1991). Because mental representations are not equally accessible to the addressee in discourse, different referring expressions mark different degrees of memory availability. Accessibility may be further differentiated between *relative* and *absolute accessibility*: *Relative accessibility* corresponds to the degree of accessibility of different markers in comparison to each other, whereas *absolute accessibility* refers to the different features associated with each expression. Ariel (1991) assumes that relative accessibility is universally available through the *accessibility hierarchy* whereas absolute accessibility is dependent on language specific lexical typologies.

In this paper, we will show that acquiring the different options of object realization proceeds in two steps. First, children show sensitivity to the variable accessibility of a discourse referent when they employ pronominal and non-pronominal objects, although they still omit objects in a non target-like way. In a second step, children acquire the particular features associated with null objects – their *absolute accessibility*. We will discuss how this observation can be related to the acquisition of the syntactic structure of null object constructions and how it contributes to explaining the general delay in the acquisition of objects in null object languages like EP.

2. Object realization in European Portuguese

Leaving aside wh-words, demonstratives and complement clauses, the following examples illustrate different types of object realizations in EP:¹

- (1) a. Full noun phrase object
Os empregados iam *buscar* os bolos.
the employees went pick up the cakes
'The employees went to pick up the cakes.'
- b. Clitic object
[Porque eles também levam os filhos para os colégios de manhã]
[Because they also take their children to the school in the morning]
E vão *buscá-los* à noite.
and go pick up-them at-the night
'And they pick them up in the evening.'
- c. Null object:
[Eles têm o seu carrinhos.²]
[They have their car(s).]
Ela vem *buscar* Ø e pronto e nós lá vamos.
she goes pick up (it/them) and prompt and we there go
'She picks it/them up and there we go!'

(all examples from the PSFB corpus, Barbosa 2014)

Example (1c) presents the null object construction in EP. Null objects, which have a definite and specific interpretation, have to be distinguished from so-called shadow arguments, which are also possible in non-null object languages like English. The latter are restricted to specific verbs and always interpreted as non-definite and non-specific (2).

¹ Also strong pronouns can occur in object position. However, this option usually requires the additional realization of a clitic. Since strong pronouns in object position are quite rare and present some variation in spoken registers, they will be excluded here.

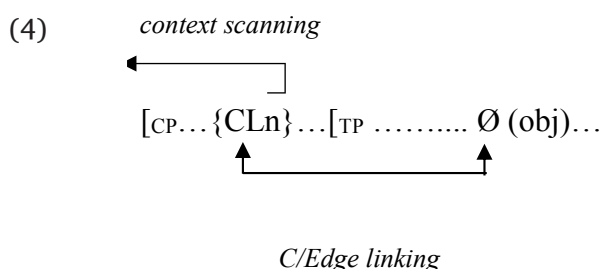
² The original corpus sentence contains this agreement error, which we will not further discuss.

- (2) *Consentem* _∅. Com esta idade têm que *consentir* _∅, não é?
 (they) consent with this age (they) have to consent not is
 ‘At this age, they have to consent, don’t they?’
 (example from PSFB corpus)

Raposo (2004) puts forward an analysis of the null object in EP in terms of an empty determiner embedding a null pronoun, *pro*. Since an empty determiner lacks features for gender and number and can therefore not contribute to the identification of *pro*, the empty pronoun *pro* is moved to a position close to its antecedent DP from where it can be directly identified. According to Kato and Raposo (2005), the relevant functional category is FP (cf. Raposo 2004; Uriagereka 1995).

- (3) (esse livro) [_{FP} *pro* + F [_{TP} eu só encontrei [_{DP} D *t*] na FNAC]]
 (this book) *pro* [I only found D in-the FNAC]
 ‘This book, I only found it at the FNAC shop.’

A similar, but slightly different analysis has been proposed by Sigurðsson (2011). Sigurðsson (2011) argues that all definite arguments are linked to a sentence peripheral position and, in turn, related to a referent in the discursive context. They have to be C/edge linked, i.e. their ϕ -features must be computed clause-internally and have to match the features of a C/edge linker in their local C-domain (Sigurðsson 2011: 282).³ Sigurðsson (2011, 2014) distinguishes between the mechanisms of C/edge linking, which takes place within narrow syntax and clause-external context scanning, which determines the definite reference of the argument (see example (4)):



With respect to null arguments, the author assumes that they are bundles of active but silent features, which have also to be linked with C/edge linkers (CLn) and valued in relation to prior discourse and pragmatic context. In both approaches, null objects are linked clause internally to an element in the left periphery and referentially valued by the discourse. Referential validation or identification of a null object can only be obtained by relating it to a referent that is explicitly mentioned or implicitly evoked in the preceding discourse. This is, however, also true for pronominal objects and – to some extent – for definite noun phrases. The choice between these different referential expressions depends on the degree of accessibility of the discourse referent (cf. Ariel 1985, 1991), but also on referential properties of the referent. This means that syntax interacts closely with pragmatics in the choice between different object types. The pragmatic constraints of the distribution of objects are well captured by Ariel’s (1991) distinction between *relative* and *absolute accessibility*. Relative accessibility refers to the degree of accessibility of different discourse markers in comparison to each other; absolute accessibility corresponds to the different features associated with each referential expression. Conceptual accessibility

³ Sigurðsson (2011, 2014) assumes that several features, such as *aboutness-shift topic*, *contrastive topic* and *familiar topic* are base-generated in the broad C-domain. He also proposes that the broader C-domain contains “speaker” (*logophoric agent*) and “hearer” (*logophoric patient*) features, which are silent but syntactically active.

has been defined as the ease with which the mental representation of the referent can be activated (Bock & Warren 1985). Following Ariel (1985, 1991), we assume that referring expressions (including null objects) are *accessibility markers* which mark different degrees of memory availability.

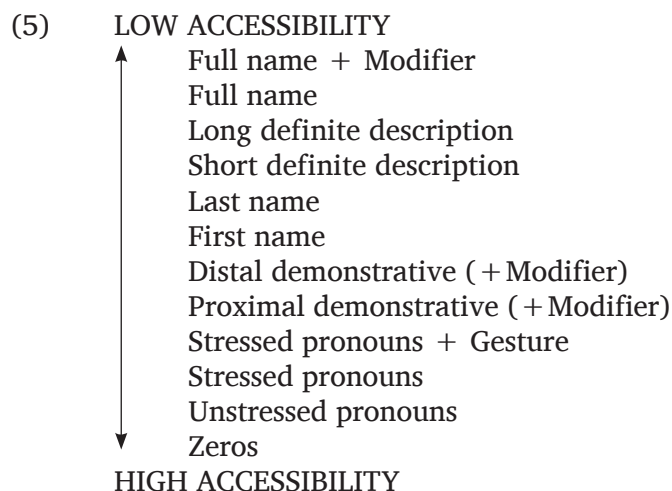
A variety of factors has been identified as determinants of the referent's accessibility. These include how recent and frequently a reference is mentioned in discourse. Furthermore, the structural position and the grammatical function of the antecedent in prior discourse are relevant. Further determinant factors are the referent's topicality, i.e. the extent to which it is prominent in the conversation, the presence of potential competitors in the previous discourse, the degree to which the referent is identifiable for a given group, the presence of the referent in the physical context, the degree to which the referent is in focus of attention and the semantic feature of animacy (Ariel 1990; Arnold & Griffin 2007; Fukumura et al. 2010; Fukumura & van Gompel 2011; Givon 1983; Gundel, Hedberg & Zacharski 1993).

According to Ariel (1991), three criteria are used in the linguistic codification of *accessibility*: *informativity*, *rigidity* and *attenuation*. Informativity relates to the semantic content of a referential expression, rigidity refers to its uniqueness or potential ambiguity and attenuation corresponds to the pronunciation of a referential expression. Ariel assumes that more informative, more rigid and less attenuated forms mark lower degrees of accessibility than less informative, more ambiguous and less highly pronounced forms.

To give some examples, according to this classification, overt pronouns are more informative than zero pronouns. Stressed pronouns are more attenuated than zero pronouns. And 1st and 2nd person pronouns are more rigid than 3rd person pronouns because speaker and addressee are predetermined in the context.

Comparing pronouns and definite noun phrases, the latter are used to refer to less accessible referents which are distant in the discourse, less salient or prominent (e.g., objects rather than subjects) and more ambiguous (e.g., because of intervening NPs). Pronouns mostly occur within the closest distance (the same or a previous sentence), more salient or prominent referents and are preferred if no intervening NPs occur.⁴ The more accessible the referent, the more reduced expressions can be used because a highly accessible referent can easily be retrieved from memory.

Ariel (1988, 1990) proposes the following *accessibility hierarchy*.



Ariel (1988, 1990)

⁴ Among the different factors, distance is crucial, as shown by Torregrossa, Bongartz and Tsimpli (2019: 586): "Although the weights differ across the groups, reference production is sensitive to the same hierarchy of factors in all four groups: distance and number of intervening characters have the strongest impact, followed by the linguistic features of the antecedent (grammatical role and syntactic position, respectively)."

The Accessibility hierarchy given in (5) expresses *relative* accessibility which is assumed to be universal across languages. This means that languages do not vary concerning the relative order of referential expressions within this hierarchy: definite noun phrases refer to less accessible referents than pronouns and overt pronouns refer to less accessible referents than zeros.

Nevertheless, languages may vary with respect to *absolute accessibility*, e.g., the properties of different types of pronouns. Absolute accessibility can be related to the referential properties of referring expressions in a given language. For example, it may be the case that zero pronouns are restricted to occur in certain contexts and excluded in others, e.g. because they relate to certain grammatical (person, number) or semantic ((in)animacy) features. One example for such a restriction are null objects in Brazilian Portuguese (BP). For BP, it has been observed that null objects refer only to *third person* antecedents and only to *inanimate* referents. Cyrino, Duarte and Kato (2000) propose that a referential hierarchy (cf. 6) is relevant for their distribution, synchronically and diachronically.

(6)	Referential Hierarchy			
	non-argument	proposition	[-human]	[+ human]
			3 p.	3 p. 2 p. 1 p.
			-spec.	+ spec.
	[-ref]	←----->		[+ ref]

According to the authors, the null object in BP has diachronically extended its distribution along the referential hierarchy from non-argumental and propositional objects to inanimate 3rd person referents. In BP, the most referential arguments (+ human, + spec, 1st/2nd person) are diachronically most resistant to this development.

Although it is disputed whether EP shows similar animacy effects (cf. Costa & Duarte 2003; Rinke, Flores & Barbosa 2018), there is a clear tendency to use a null object for referents placed at the left edge of the scale and for clitics at the right edge of the scale. Based on a corpus analysis, Rinke, Flores and Barbosa (2018) have shown that in EP, 97–100% of all propositional objects are realized as null objects but only 50–63% of non-propositional objects. Only 7–9% of null objects are animate. This shows that also in EP animacy of the referent plays a role: null objects refer more probably to inanimate referents than to animate ones.

To sum up, in EP direct objects can be realized as a NP, a clitic pronoun and a null object. Object arguments must be syntactically linked to a clause internal element in the left periphery (C/edge linking) and valued by the discourse. Knowledge of how to employ the different forms available in Portuguese implies therefore knowledge about the syntactic and pragmatic linking of null objects, pronouns and full NPs.

In the next section, we will briefly review what is already known about the way children acquire this knowledge. Because the amount of studies on the acquisition of objects makes an exhaustive literature review impossible, we will only briefly address general findings and mainly concentrate on previous findings concerning the acquisition of objects in null object languages like EP (cf. Pérez-Leroux et al. 2017, for a comprehensive overview of the literature).

3. Objects in child grammar

It is widely acknowledged that young children go through a stage where they omit object referents independently of their target language (cf. Pérez-Leroux et al. 2017).

According to Pérez-Leroux et al. (2017), this object omission stage is not related to performance or processing limitations (as proposed, for instance, by Bloom 1970; Mazuka et al. 1986; Valian 1991) but corresponds to a particular syntactic representation. More concretely, the authors assume that children, at the initial stages of first language acquisition, base their grammatical representation on a (universal) *Transitivity Requirement* (Hale & Keyser 2002) according to which every verb is transitive and involves a UG-given treelet in which it merges with a multipurpose null object. Hence, at the initial stages of child language acquisition, children universally dispose of a null object construction, which they in turn have to adjust to the particular properties of their native language. Depending on language-specific lexical typologies, children have to acquire the correct distribution of different types of silent and overt objects.

Pérez-Leroux et al. (2017) argue that acquiring the different options of object realization in a language and their distribution is related to i) learning of verb meaning (e.g., for non-specific/generic null objects (see sec. 2, ex. (2)) and to ii) acquiring the relevant recoverability mechanisms the language provides. As shown in section 2, acquiring the recoverability conditions of null objects implies that the children have to link the null object with C/edge linkers and value their reference in relation to the discourse (Sigurðsson 2011, 2014). Both requires to learn which features the null object is endowed with in their language.

Pirvulescu et al. (2014) assume that null objects have phi-silent features whereas null pronouns are phi-overt. The authors propose that children acquiring French have the following constructions available for the direct object argument:

- (7) a. $[_{CP} \dots C_{Ln} \dots [_{TP} \dots \emptyset \dots]]$ = object omission > phi-silent; in situ null object
 b. $[_{CP} \dots C_{Ln} \dots [_{TP} \dots Cl \dots \emptyset \dots]]$ = clitic construction > phi-overt; raising null object
 c. $[_{CP} \dots C_{Ln} \dots [_{TP} \dots DP \dots]]$ = overt DP object

Concerning children's sensitivity to the determinants of the referent's accessibility, many studies have shown that children demonstrate early pragmatic knowledge, i.e. sensitivity to referents' newness, their uniqueness status, their visual presence, and whether they are in focus of joint attention (Allen 2000; De Cat 2011; Hughes & Allen 2013, 2015; Serratrice 2008, 2013; Skarabela, Allen & Scott-Phillips 2013), although they may not always perform like adults in every context.⁵ Experimental studies have demonstrated that children around the age of three start to produce more (overt or null) pronouns and fewer NPs if both speaker and hearer can see the referent (Campbell, Brooks & Tomasello 2000). Even though children pay attention to the discourse features influencing the choice of argument expressions, there is a developmental trajectory in their sensitivity to different discourse features. Very young children react more sensitively to the question preceding the target sentence than to the visual presence of the referent (e.g., Serratrice 2013).

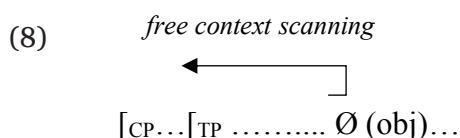
Although these observations show that young children can evaluate the accessibility of a referent and do have access to the relative accessibility of different referential expressions to some extent, the object omission stage has a different range and timelines in different languages. As shown by Grüter (2006), children acquiring French omit objects at lower rates than children acquiring a null object language like Chinese but at higher rates than children acquiring English, a language that exclusively allows for non-specific null objects.

⁵ That children until a certain age do not always show adult-like performance is demonstrated, for instance, by Schaeffer and Matthewson (2005: 53), who argue that children acquiring English overuse definite articles because they "initially lack a pragmatic concept requiring them to distinguish systematically between their own beliefs and the belief state of their interlocutor."

Other studies comparing English and French children have confirmed this result (cf. Pérez-Leroux, Pirvulescu & Roberge 2008). Pérez-Leroux, Pirvulescu and Roberge (2008) argue that, in comparison to English-speaking children, children acquiring French “retain the referential reading of the null cognate object longer because they are exposed to a wider variety of null object contexts.” In Schaeffer’s (1997) study on Italian, a language that also has a restricted use of null objects, object omissions decline early. The rate of null objects drops from 64% in two-year old children to only 15% in three-year olds.

In null object languages like EP and Polish, however, the rate of illicit omissions is much higher and attested until later stages of development than in non-null object languages (cf. Costa & Lobo 2009; Sopata 2016; Varlokosta et al. 2016). This shows that the acquisition task for the child seems to be particularly complex. Varlokosta et al. (2016), comparing 16 different clitic languages, show that children acquiring EP have much higher rates of object omissions than children acquiring all other languages in their study. Based on an elicited production task, the authors observe that 5-year-old children acquiring EP show 51.6% object omissions and only 19.3% clitic realizations whereas children acquiring Catalan, Italian or French at this age hardly show any object omissions (up to max. 2.5%) and realize clitic pronouns between 90 and 99% of all cases.

Sopata (2016) accounts for the overuse of null objects in the acquisition of Polish. Assuming Sigurðsson’s (2011) idea that referential definite null objects have to be linked with C/edge linkers that are valued in relation to prior discourse and pragmatic context, the author argues that young Polish children assign interpretations to null objects by free context scanning and bypass the syntactic channel for discourse and pragmatic context access to some extent. Sopata’s (2016a) study on Polish L1 acquisition shows a high number of null elements in the child data in contexts in which null objects are not allowed in adult language because they are not recoverable from discourse and they are not highly salient in the pragmatic context. As Polish children’s null elements appear in contexts in which they may not be appropriately matched with C/edge linkers, they may not be adult-like bundles of silent syntactic features, which have to be linked in order to be interpreted. The reference of the missing elements may be guessed on the basis of further context and visual perception, but it may not be computed on the basis of C/edge linking. Hence, according to Sopata (2016), Polish children overuse null objects because they have not yet fully acquired the linking mechanisms relevant for their interpretation (see 8).



This argumentation goes well with the conclusions reached so far for EP. Based on several experimental studies concerning the production and comprehension of clitics and null objects in EP, Costa, Lobo and colleagues (cf. Costa & Lobo 2007, 2009; Costa et al. 2009; Costa et al. 2012, among others) conclude that children overuse null objects because they have difficulties in the assignment of the correct interpretation associated with different types of object omissions available in the target grammar (*pro*, *variable*, *VP-ellipsis*, cf. Costa et al. 2012).

In a nutshell, the results of studies on EP can be summarized in the following way: Costa and Lobo (2007) show that children acquiring EP omit objects to a higher degree and for a longer period of time than children acquiring other Romance languages. They argue that the omission of clitics in child language is related to the complexity of the EP clitic system. At the same time, children acquiring EP know relatively early that their target language

is a null object language. As shown by Costa et al. (2009), they differentiate between contexts in which null objects are licit and contexts in which they are not licensed. As expected from the adult language, children produce significantly more object omission structures with 3rd person antecedents than with 1st and 2nd person antecedents and they produce more null objects in main clause contexts and fewer null objects in islands. Nevertheless, comprehension experiments also show that they overextend the null object option to island contexts in which a clitic would be required.

Despite these deviations from the adult language, children have early pragmatic knowledge. In a pragmatic context where the antecedent is given in the immediate sentence (i.e. in the question of the interviewer), children produce null objects and clitics and adequately avoid NPs and strong pronouns (Costa et al. 2009).

Discussing the nature of the empty category and building on previous research on VP-ellipsis (Santos 2009), Costa et al. (2012) argue that children know the syntax of null object constructions, and that “the only problem they have is in the assignment of the correct interpretation” (Costa et al. 2012: 127). According to the authors, this problem can be overcome when children learn to distinguish operator variable relations from pronominal binding.

Assuming that the interpretation of null objects requires C/edge linking to a clause internal linker in the left periphery, we hypothesize with Sopata (2016) that children may overextend the null object in EP because C/edge linking is not yet fully established. This can be due to the fact that children still need to discover the adult-like feature composition of the empty category.

To sum up the relevant findings for the present study: previous studies have shown that children acquiring EP have early syntactic knowledge of null object constructions and are relatively early able to pragmatically distinguish between contexts of low and high accessibility (NPs vs. clitics/null objects). However, they overuse null objects for an extended period of time. This has been explained as a reflex of children’s difficulty with the interpretation of null objects or, more concretely, with establishing the feature matching relation with a C/edge linker in the local C-domain. Coming back to the notions of relative and absolute accessibility, this may be interpreted as some early knowledge concerning relative accessibility on the one hand and difficulties concerning absolute accessibility of pronominal objects on the other.

4. The present study

4.1. Research questions

From what we have said so far, the following research questions arise concerning the acquisition of object realization by children acquiring EP as their first language:

- I. *Do our data confirm early pragmatic knowledge concerning relative accessibility? When are children acquiring EP as L1 able to differentiate between pronominal and non-pronominal contexts?*

From what has been discussed in sections 2 and 3 and following Costa et al. (2009), it is expected that children have access to *relative accessibility* very soon, because the accessibility hierarchy is linguistically universal. Thus, we predict that three-year old children are already sensitive to relative accessibility and differentiate between contexts in which the referent is more distant (= tend to use definite nominal phrase) and contexts in which the referent is immediately accessible (= tend to use overt or null pronouns).

- II. *When do children start to be sensitive to the absolute accessibility of null objects and distinguish the referential properties associated with null and overt pronouns?*

Focussing only on specific and non-propositional contexts where both clitics and null objects are licit, we expect that children acquiring EP need an extended period of time to learn that animacy is also a relevant constraint of object realization, namely that animate referents are more likely to be realized by clitics and that null objects are more likely to refer to inanimate referents.

In sum, we hypothesize that abandoning a universal null object stage and acquiring the recoverability conditions of silent objects proceeds in two steps: in a first step, EP children distinguish between pronominal and non-pronominal contexts (relative accessibility) and, in a second step, between different types of pronominal objects (null vs. clitics, acquiring their features and relating them to their absolute accessibility).

4.2. Participants

We recruited 41 children in the age span of 3 to 9 years. In order to better fit the children's age to the generalized linear mixed model, where age is coded as continuous variable, their age will be counted in months, ranging from 45 to 116 months (mean: 67.9; SD: 19.5). The distribution of the 41 children per age is presented in **Figure 1**, revealing a steady distribution along the age scale.

All children grew up in a monolingual setting in northern Portugal. They were tested in their kindergarten or in a learning center. Parents gave their written consent and answered to a background questionnaire with questions about the children's family constellation, their age and contact with other languages. Only children from (European) Portuguese-speaking households, who never lived abroad, were selected for the study.

In addition to the child participants, an adult group of 14 Portuguese L1 speakers was included in the study (age range: 23–66 years, mean: 34.9, SD: 12.7). All adults grew up in a monolingual setting, but they learned other languages at later ages.

4.3. Materials and Procedure

Data were obtained by using an elicited production task, which targeted the production of direct objects. The design was adapted to Portuguese from Sopata (2016), Mykhaylyk and Sopata (2016) and Mykhaylyk and Ytterstad (2017). During the experiment, the participants saw several series of pictures on a computer screen. The experimenter told them the story depicted (see one picture set in **Figure 2**) and made sure that all stories included an explicit mention of a possible discourse antecedent for the target direct object. In all items of the experiment, the referents of the direct objects are therefore visually present, previously mentioned and in focus of joint attention (see Hughes & Allen 2013, 2015 for the relevance of these factors). After a brief introductory narrative for each

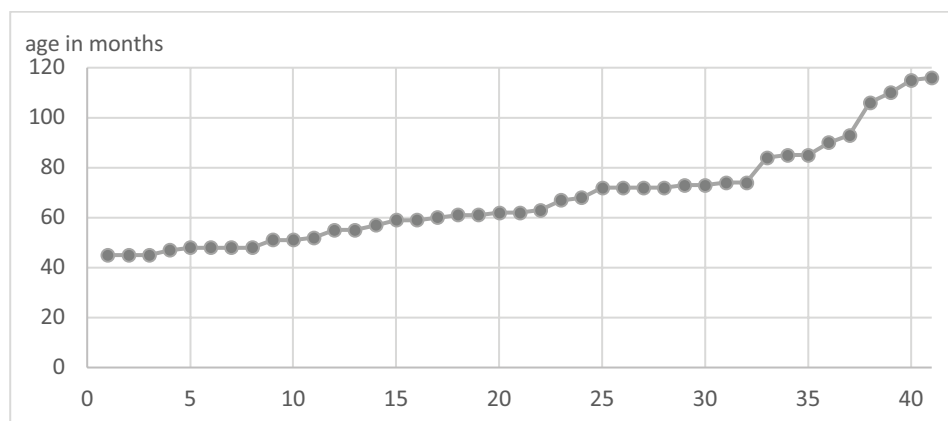


Figure 1: Distribution of the child participants per age (in months).



Figure 2: Experiment item.

scene, a puppet asked the child a question, which contained – or did not contain – the referent of the direct object that the child had to use in the answer. The children's answer, which was recorded, was a short statement about the narrative.

The main concern in using the elicited production task was to control the discourse and pragmatic context as well as to examine the sensitivity of children to three conditions depending on the accessibility and the animacy of the target object's referent. In order to test for the child's sensitivity to accessibility, we contrasted a condition in which the inanimate referent was not mentioned in the context question (condition 1) with two conditions in which the referent was mentioned in the context question (condition 2 and 3). In order to test for the children's sensitivity to animacy in the pronominal context, the latter two conditions with an accessible referent differed concerning the animacy of the referent. The following three conditions were used:

(9) Test conditions

Condition 1 – the inanimate referent is not immediately accessible (NIA),

- The inanimate referent of the target object is mentioned in the prior discourse but it does not appear in the immediately preceding question.

Story: *No pomar da avó havia uma macieira com uma maçã vermelha muito apetitosa. O João queria muito provar aquela maçã.*

(In the garden of the grandmother there was an apple tree with a red and very appetizing apple. John wanted very much to taste this apple.)

Puppet: *O que fez o João?* (What did John do?)

Expected Answer: *Comeu a maçã.* (He ate the apple.)

Condition 2 – the inanimate referent is immediately accessible (IA inanimate),

- The inanimate referent of the target object is mentioned in the prior discourse and it also appears in the immediately preceding question.

Story: *O João estava a brincar no jardim quando viu uma flor linda. Ele pensou que a mãe iria gostar de ver a flor numa jarra.*

(John was playing in the garden when he saw a beautiful flower. He thought that his mother would like to see the flower in a vase.)

Puppet: *E o que é que o João fez então à flor?*

(And what did John do to the flower?)

Expected Answer: *Arrancou _.* null object
Arrancou-a. clitic pronoun
 (He picked it.)

Condition 3 – the animate referent is immediately accessible (IA animate),

- The animate referent of the target object is mentioned in the prior discourse and it also appears in the immediately preceding question.

Story: *O guloso do João queria comer um rebuçado, mas a irmã também queria esse rebuçado e agarrou-o primeiro. Então o João zangou-se, porque queria o rebuçado para si, e fez algo que não devia. E a irmã começou a chorar.*

(The lickerish John wanted to eat a candy but his sister also wanted this candy and grabbed it first. Therefore, John was angry and – because he wanted the candy back – did something that he shouldn't have done. And his sister started to cry.)

Puppet: *Oh não! O que é que o João fez à irmã?*
(Oh no! What did John do to his sister?)

Expected Answer: *Mordeu-a.*
(He bit her_{CL}.)

A summary of the three conditions is given in **Table 1**.

Condition 1 differs from Condition 2 and 3 concerning the distance of the discourse referent, i.e. its accessibility. We expect that previous mention in the question (condition 2 and 3) makes the referent more accessible and prompts a pronominal expression (clitic or null object). More distance (Condition 1) should make the use of a full definite noun phrase more likely.

Furthermore, Conditions 2 and 3 differ with respect to animacy. Given that null objects are less likely to occur in animate contexts we expect that condition 3 clearly favours the use of a clitic pronoun. For Condition 2, both constructions, with a null object and a clitic pronoun, are equally possible. Nevertheless, we expect that more null objects occur in condition 2 than in condition 3, although null objects are in general more favoured in spontaneous speech and may be avoided in a more controlled speech context as elicited by the present experiment (especially by the adults and older children).

The task includes 18 items, 6 for each condition which were presented in a pseudo-randomised order. The participants were given two prior training items. The words in immediately preceding questions were carefully chosen with respect to their morphological and syntactic properties. The same subject was used in all items and the verb forms were past tense.

Table 1: Summary of the conditions under study.

Referent of the target direct object	Condition 1:	Condition 2:	Condition 3:
	NIA	IA inanimate	IA animate
Visual presence	+	+	+
Joint attention	+	+	+
Mention in the prior context	+	+	+
Presence in the immediately preceding question	-	+	+
Animacy	-	-	+

5. Results and discussion

The children produced a total of 680 relevant items (out of 738 possible answers; 92.1%). 58 (7.9%) items were excluded because the child gave an answer that did not contain the target verb (and neither a lexical equivalent). The adults produced 240 valid answers (95.2%, out of 252 possible answers).

For data analysis, we ran two separate generalized linear mixed models (GLMMs) with multinomial dependent variables, executed in SPSS 23, one for the child data and another one for the adult data.

In the GLMM for the child data, the child's *Answer* is the dependent variable with three values (null, clitic, NP). As fixed effects, *Condition* (Not immediately accessible/NIA, Immediately accessible inanimate/IA in, Immediately accessible animate/IA an) and *Age* (as continuous variable, counted in months) were entered into the model. Note that for the presentation of the results per condition the children's responses will be displayed according to four age groups: 45–52 months (about 4 years old), 55–62 months (about 5 years old), 63–74 months (about 6 years old) and 84–116 months (7 years or older), in order to better display acquisition stages. In fact, the statistical model analyses the children's age continuously on a scale from 45 to 116 months, with no further internal subdivision. *Subjects* and *Items* were entered into the model as random effects.

For the child data, the model showed significant main effects both for *Condition* ($F(4,672) = 9.175, p < .001$) and for *Age* ($F(2,672) = 22.060, p < .001$).

Table 2 presents the fixed coefficients for *Age* and *Condition* for the child group by contrasting the selected answer (NP) with the other two answer types (null and clitic).

The results displayed in **Table 2** indicate that the children's age significantly predicts the use of NPs in contrast to null objects ($p < .001$) and in contrast to clitic pronouns ($p = .037$).

The GLMM for the adult data includes the same fixed and random variables as in the child group, but, in this case, *Age* is coded in years.⁶ For the adults, as expected, the model shows significant main effects for *Condition* ($F(4,232) = 4.546, p = .001$), but not for *Age* ($F(2,631) = 0.802, p = .450$).

As for the three conditions, we will start by taking a look at the NIA condition. **Figure 3** shows the participants' mean responses in this condition, organized by the four age spans and the adult controls.

The adult data reveal that, in contexts in which the topic is salient but not immediately mentioned in the previous utterance, the adult participants show, as expected, a clear preference for the use of definite NPs in order to refer to the object (78.9%). Clitic pronouns are used in 18.4% of the contexts and null objects are not an option (2.6%).

Table 2: Fixed coefficients for NP as selected target in the different conditions.

Answer	Model Term	Coefficient	Std. Error	t	Sig.
null	Intercept	2.425	.4184	5.796	.000
	Age	-.024	.0056	-4.221	.000
	Condition 1 NIA	-.972	.2457	-3.955	.000
	Condition 2 IA in	.061	.2620	.233	.816
	Condition 3 IA an	0	.	.	.
clitic	Intercept	-.069	.4166	-.166	.868
	Age	.011	.0052	2.090	.037
	Condition 1 NIA	-1.251	.2614	-4.789	.000
	Condition 2 IA in	-.166	.2717	-.613	.540
	Condition 3 IA an	0	.	.	.

⁶ In the analysis of the adult data, age was included as fixed effect because the age range of the tested participants is very wide (23–66 years).

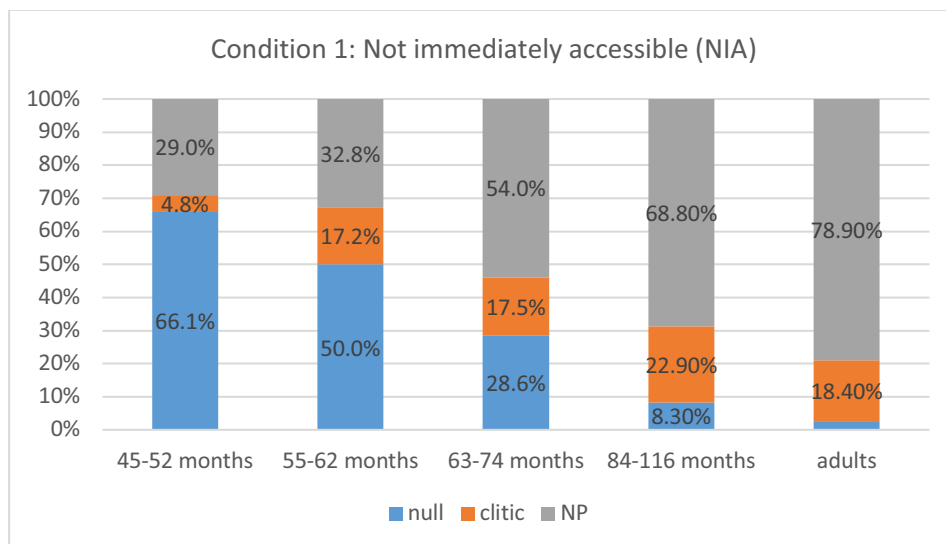


Figure 3: Distribution of null, clitic and NP objects in Condition 1 (NIA).

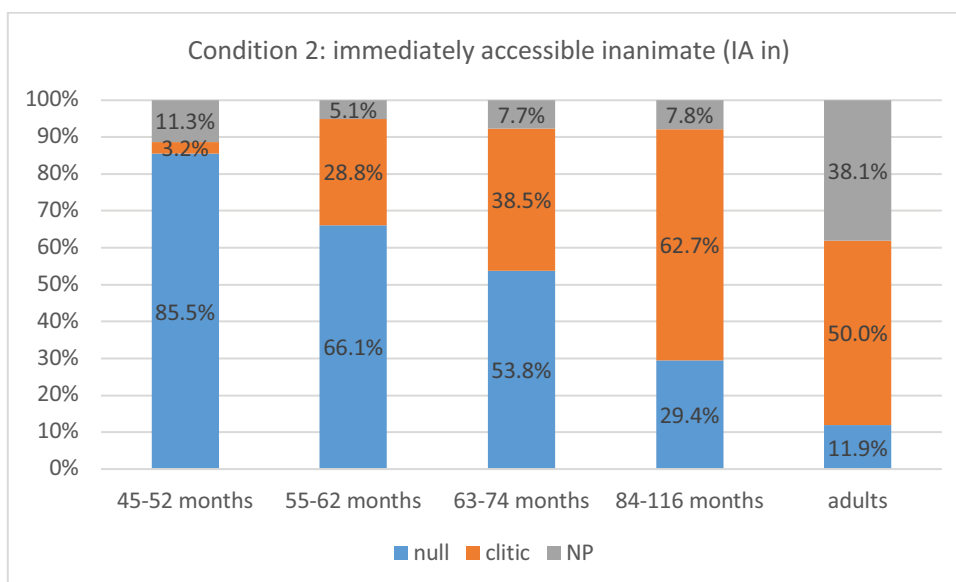


Figure 4: Distribution of null, clitic and NP objects in Condition 2 (IA in).

These results contrast with the preferences demonstrated by the children in the age span of 45 to 74 months (4 to 6 years). As shown also by other studies (Costa et al. 2009), at initial stages of acquisition, EP children predominantly resort to silent objects. However, there is a very clear tendency for the children to continuously decrease the omission of objects in the NIA contexts. Missing objects are the preferred option for the youngest children (45–52 months, 66.1%), while the oldest ones (84–116 months) clearly favor the use of NPs (68.8%) to a similar extent as the adults. The use of adult-like null objects in these contexts is manifested by the age of 6 years. In contrast, clitic pronouns are almost absent in the production of the youngest group (4.8%) and amount to values around 20% in all other groups, similarly to the adults.

The distribution of the children’s responses in the second condition (IA in) is shown in **Figure 4**.

The second condition (IA in) indicates a very different picture compared to the previous one. Overall, the rate of object omissions is considerably higher in this condition from the youngest age groups on, compared to the NIA condition. The youngest group produces 85.5% null objects. This value decreases to 66.1% and 53.8% in the 55–62 months and in the 63–74 months old children, respectively. Again, a significant performance difference between the children is seen only in the oldest child group (84–116 months, i.e. 7 years or older), where the rate of null objects is 29.4%. The use of clitics is almost absent in the youngest age span (3.2%), emerges clearly in the 55–62 months group (26.4%) and reaches 38.5% in the 63–74 months group. The oldest children produce a very high rate of clitics (62.7%), which is even higher than the adults' rate (50%). Importantly, the use of NPs is overall reduced in all child groups (5.1%–11.3%), which contrasts with the use of NPs in the previous NIA condition. This shows that even the youngest children are very sensitive to the accessibility of the object referent. They clearly distinguish between immediately accessible and not immediately accessible referents.

At this point, a word on the adult results is in order. In fact, the rate of NPs used by the adults in this context is unexpectedly high (38.1%). Since the lexical object is mentioned in the previous utterance, the use of a NP is redundant and pragmatically odd, even though it is grammatical. Sopata (2016) noted exactly the same performance in the adult data of her Polish experiment (31.5% NPs in the condition with a referent mentioned in the preceding question) and explained this as an effect of the experiment, which is designed for children. Knowing that they are in a test situation designed for children, some adults tend to be over-explicit and overuse lexical information in order to adapt their responses to child-directed speech. As noted by Sopata (2016), adults use more lexical NPs in speech directed to children than to adults. The overuse of NPs by the adults may also explain the very low rate of null objects (11.9%). The designed context with a salient, previously mentioned topic allows for both the use of clitic pronouns and null objects. Thus, null objects are a valid option, particularly with inanimate referents and we therefore expected a higher rate of null objects in this condition in the adult group.

Figure 5 shows the participants' responses in the contexts where the object referent is immediately accessible and animate (IA an).

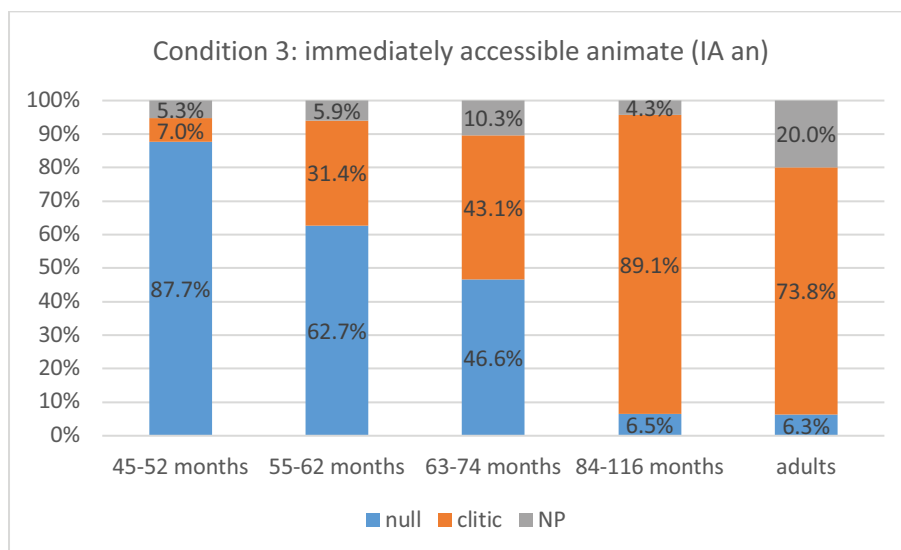


Figure 5: Distribution of null, clitic and NP objects in Condition 3 (IA an).

In this third condition, the distribution of the participants' responses is similar to the previous one (where the object is inanimate), but there are also interesting differences. Confirming the children's sensitivity to the immediate presence of the topic in the preceding utterance (IA), they produce much higher rates of null objects than in the NIA contexts (ranging from 87.7% to 46.6% in the 45 to 74 years-old children), while the use of NPs is reduced (5.3%–10.3%). As for the oldest children (84–116 months), similarly to the adults, they almost do not use null objects (6.5%, and 6.3% for adults) in this condition. If we compare the rate of null objects in the animate (**Figure 5**) with the inanimate conditions (**Figure 4**), we see that the children in the age span of 45 to 74 months (younger than age 6) are not sensitive to animacy effects, since the rate of object omission is very similar in conditions 2 and 3 in these age spans. However, this sensitivity emerges after the age of six years, where the rates of omission in Conditions 2 and 3 are distinct (6.5% against 29.4% in the 84–116 months group; 6.3% against 11.9% in the adult group⁷).

In order to have a clearer picture of animacy effects in the use of null object constructions, we ran another GLMM with the null pronoun as target answer (instead of the NP) and excluding the NIA condition. *Subject* and *Item* were, again, coded as random factors and the fixed factors were entered in the model as *Age-Condition* interaction, since it is noticeable that the sensitivity to animacy emerges at a later age stage. The results show, indeed, an age-condition effect on the use of null objects ($F(4,443) = 8.973, p < .001$).

To sum up, the first relevant observation to be drawn from our results is that, in accordance with the findings presented by Costa and Lobo (2007) and Costa et al. (2009), EP children produce high rates of silent object constructions in early stages of first language acquisition.

Until the age of four (52 months), children predominantly omit objects, independently of contextual factors (e.g., distance) and independent of referential features (e.g., animacy). They overwhelmingly resort to silent objects to refer to low accessible referents (66.1% in NIA condition), which is pragmatically anomalous. This can be explained by the proposal by Pérez-Leroux et al. (2017), that children dispose of an 'all-purpose empty category' which is used independently of the discourse context. The overuse of null objects in NIA contexts in the early stages is however not due to a complete ignorance of the children vis-a-vis the null object. As shown by Costa and Lobo (2009) for comprehension, children are able to interpret verbs with a null object as transitive.

We argue that children's production of relatively high amounts of null objects in NIA contexts at this stage of acquisition can be attributed to their yet incomplete acquisition of C/edge linking of null objects because they still need to acquire the (phi-silent) features of the empty category, as postulated by Sopata (2016) for L1 Polish.

Generally speaking, children using null objects in contexts where the antecedent cannot be easily retrieved are *under-explicit*. This concurs with studies on egocentric errors in child language (e.g., De Cat 2011, 2013; Maratsos 1976; Schaeffer & Matthewson 2005), which have shown that children overuse definiteness as an effect of their tendency to assume higher accessibility of referents in comparison to adults. It is argued that children assume a wider implicit common ground between the interlocutors and have difficulties to monitor their addressee's perspective.

It is crucial to point out that the overuse of null objects at the early stage of acquisition does not reflect a general pragmatic deficit (in line with Costa et al. 2009). Although the children in the present study overextend the use of null objects, they clearly produce

⁷ As noted above, in the adult group this tendency is not so salient due to the pragmatically odd tendency to resort more to NPs than expected.

different rates of NP objects depending on the immediate availability of the antecedent in the preceding sentence. Even in the youngest age group, the children use more null forms in the IA in-Condition than in the NIA-Condition (85.5% vs. 66.1%) and fewer NPs (11.3% vs. 29%). Around the age of five years, EP children produce fewer null objects and start to clearly distinguish between immediately accessible and not immediately accessible referents (Condition 1 vs. Conditions 2). In less accessible contexts (NIA), they prefer definite noun phrases over pronouns (32.8% DPs vs. 17.2% clitics). In highly accessible contexts (IA in), they prefer clitics over NPs (5.1% DPs vs. 28.8% clitics). Children may avoid clitics until the age of 52 months – probably because of the complexity of the system in EP – but they seem to employ NPs and clitics in a pragmatically correct way, once they produce them. We interpret this performance as evidence for sensitivity to the accessibility hierarchy of referential expressions, showing knowledge of linguistically universal *relative accessibility*.

Nevertheless, the proportion of object omissions is still quite high until the age of 74 months and differs from the adult's production in two ways: first, children still use to some extent null objects in contexts where the referent is not accessible (NIA), whereas the adults don't. Second, the children, in contrast to the adults, do not distinguish between inanimate (IA in) and animate (IA an) antecedents until this age span.

As already argued above, the first observation can be related to the ongoing acquisition of C/edge linking. The second observation shows that the children need some time to discover the adult-like tendency to, preferentially, use an empty category with an inanimate and a clitic with an animate object referent. The second GLMM showed that animacy in interaction with age significantly predicts the use of null objects in the highly accessible contexts. It is only at the age of 80–117 months (around seven years), that children recognize that the use of a clitic pronoun is much more adequate than the use of a null object to refer to a salient animate object. We interpret this finding as evidence for the acquisition of *absolute accessibility*, which occurs after having acquired *relative accessibility*. Overall, this last step of acquisition is fostered very late (i.e. after age seven).

Both the overuse of null objects at an early age and the late sensitivity of animacy may be explained as reflecting that EP L1 children need more time to acquire the feature composition of null objects, clitics and NPs. A tentative explanation for the later acquisition of feature composition of null objects in comparison to that of definite NPs could be that the computation of phi-silent null arguments, i.e. null objects in EP, is more complex than that of definite NPs, which are phi-overt. C/edge linking presupposes the acquisition of the features of an argument but the phi-silent features of null arguments are more opaque than phi-overt-features, and therefore, their computation is more demanding for children. At the same time, the prolonged stage of null objects also reflects the challenge that clitic pronouns represent in the L1 acquisition of EP. Due to their variability in form and position, clitics are hard to acquire in EP, despite being phi-overt.

The results of the present study are in line with the findings on L1 Ukrainian and L1 Polish obtained by Mykhaylyk and Sopata (2016). The authors observed no effect of animacy for the three-/four-year-group. Around the age of five-six, however, Ukrainian and Polish children start using more pronouns than null objects for animate referents.

Still, the low rate of null objects in the adult group and in the oldest child group, in contexts where the referent is immediately accessible and inanimate (Condition 2), is somehow intriguing. Condition 2 is the experimental context that freely allows for both pronominal options: null objects compete with clitic pronouns, if immediate accessibility, low distance, high saliency and inanimacy are given. In fact, the study by Rinke, Flores and Barbosa (2018) shows that in free conversation null objects are frequent structures of oral EP, when the referent is specific and inanimate. The low rate of null objects in the present experiment shows that the use of null objects is highly sensitive to the discursive

situation. In free and spontaneous conversation null objects are much more frequent than in an experimental context where production is elicited.

6. Conclusions

The present study corroborates the idea that children acquiring EP go through a protracted stage where they widely omit direct objects.

Nevertheless, our data confirm early pragmatic knowledge concerning relative accessibility in the sense that the children show sensitivity to the accessibility hierarchy approximately at the age of four, when they tend to use definite NPs in contexts of low accessibility and overt or null pronouns in contexts of high accessibility. This shows that they start to differentiate between pronominal and non-pronominal contexts by this age.

Regarding the second research question concerning the age when children are sensitive to the absolute accessibility of null objects, we conclude that the tendency to use more clitics with animate and more null objects with inanimate (specific and non-propositional) objects is only acquired approximately at age seven.

Although children show pragmatic knowledge when they employ overt NPs and clitics in distinguishing adequately between contexts in which the antecedent is immediately accessible and context where it is not, they overextend null objects to contexts in which they are not appropriately linked.

We have argued that this observation speaks in favor of an ongoing acquisition of the linking mechanism related to null objects (Sigurðsson 2011; Sopata 2016). The latter requires that children discover the adult-like feature composition of the empty category, their language specific *absolute accessibility*. In EP, this involves the knowledge that null objects are avoided and clitics are preferentially employed in contexts where a salient object refers to an animate antecedent. In our study, this differentiation is only attested from the age of 80–117 months (around seven years) on.

In conclusion, the present study shows that relative accessibility is available before absolute accessibility, especially if phi-silent empty categories are involved. Children acquiring the distribution of objects in a null object language like EP are aware of universal pragmatic hierarchies but need some time to acquire the feature bundles of null objects and their subsequent linking to the left periphery and the pragmatic context.

Ethical and Consent

This study was approved by the Ethics Committee for Research in Social and Human Sciences of the University of Minho (reference CEICSH 044/2019).

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Competing Interests

The authors have no competing interests to declare.

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