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Patterns in clitic pronouns: assessment of clitics in Italian in typical and non-typical populations

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XXXIII Cycle

“Life is short, Vivi, but it is wide”.

To anyone who has ever told me I could do it

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Abstract

Clitic pronouns are linguistic elements which stand at the crossroads between different areas of the language faculty. They have specific morphology, syntax, and discourse functions. Use of this element requires the management of several aspects that draw from these areas of language. Clitics have been shown to appear early in typical acquisition, but to require longer for all aspects to be correctly managed, and they proved effortful in other modes of acquisition and atypical language, where they are clinical markers of impairment.

In this work, we implement a comprehensive assessment of clitics aiming to investigate in what way different occurrences of this structure highlight different patterns of linguistic performance. To do so, we focus both on accuracy across conditions and on answer strategies, with an experimental protocol testing the following: comprehension of reference in binding constructions, production of clitics in two argument positions (direct object and indirect object), production of clitics in two sentence positions (preverbal and postverbal), production of clitics with different person features (1^{st}/2^{nd} and 3^{rd}), and pragmatic abilities in the alternation with the lexical noun phrase and in perspective shift contexts. The assessment was tested on the following groups of native speakers of Italian: a group of pre-school and primary school typically developing children (Study 1), a group of adult heritage speakers of Italian living in the UK (Study 2), and four (pre)adolescents with a diagnosis of ASD (Study 3).

Results found in this work showed that a comprehensive assessment of clitics can highlight similarities as well as differences in linguistic profiles according to different groups. Specifically, comprehension was not a discriminating factor in the populations: all populations tested showed to have access to abstract representations of clitics in binding constructions, as

comprehension of simple clitics was generally unproblematic. An exception was found in the pre-schoolers, but this may have been due to task-related factors. In line with previous results on typical, atypical, and bilingual populations, production of Italian 3rd person direct object clitics with finite verbs showed different patterns across populations: in our data, typical children of all ages and ASD pre-adolescents showed to correctly produce this instance of the clitic the majority of the time, while heritage speakers of Italian showed poor production rates on this instance of the clitic. Importantly, our data shows similar results for indirect objects, showing that if the cliticization process is accessible, it is accessible regardless of the argument position occupied by the cliticised object. Another crucial result is that our studies find different patterns to be highlighted by the production of clitics on non-finite verbs as opposed to those on finite verbs: accuracy is similarly high in one high-performing ASD pre-adolescent and in the group results of 8-year-old children, but 4-year-old and 6-year-old children, as well as some ASD participants show chance or below chance performance in enclisis. The same was true for production of clitic combinations, although it was the least accurate structure across all groups, particularly in non-finite constructions. Here, heritage speakers and a few ASD speakers produce little to no instances of this construction, while those who produce it the most are the highest performing ASD participant and the oldest group of children. It is plausible to assume that the derivation of both enclitics and clitic combinations may require harder computation.

These results allow us to conclude that if an individual or a population has issues on single DO and IO clitics with finite verbs, they will have issues with all other instances in the assessment. If an individual or a population shows no issues on single DO and IO clitics with finite verbs, they show typical language. In this, single clitics are coherent to their role of clinical markers. However, this study

highlights the power of other instances of clitics, namely enclitics and clitic combinations, to unearth vulnerabilities to complex language.

Types of non-target response also showed to be in part characterizing of different populations. The most striking result in this sense is the production of a lexical NP in place of the clitic. In typical development, this answer type only becomes the most used alternative answer in the hardest constructions, namely in enclisis; on the other hand, heritage speakers systematically use this construction as the alternative to clitics and use it more than they use clitics across all conditions. In our results, errors that are usually associated with impairment, particularly in younger participants, were marginally present in all groups. These are errors on the ϕ-features of the clitics, omissions, and misplacements (of which we found no instances), and they were limited to the youngest TD group, the heritage speakers, and the lowest-performing ASD participant. A recurrent alternative structure employed in conditions eliciting enclitics was the production of a simplified, finite verb structure.

To summarise, accuracy and error analysis through a comprehensive assessment of clitics unearths different linguistic profiles. This is particularly important in clinical populations, where a detailed description of language abilities is crucial for clinical purposes.

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Part I

General overview

Over the course of this thesis, we are going to explore how a linguistic element as tiny as a two-letter word, but crucial in the languages that express it, can be descriptive of different language profiles.

Of the several elements that languages may exploit to talk about external referents, clitic pronouns are typically described by the property of "lacking". They lack phonological stress, they lack referentiality, they lack layers in their syntactic composition. At a first glimpse, one might be tempted to think that such a "deficient" element may be disfavoured by speakers in most contexts in order to avoid ambiguity in the search for their external referents. On the contrary, the principle of economy of language makes an element such as this one very useful and favoured precisely to avoid ambiguity: the higher an element is accessible in the discourse, the better it is to use the most deficient element you have available to refer to it. Clitics on their part have many ways to help with not being ambiguous: they have some information about their referent, such as gender and number (so-called ϕ-features), and, because they cannot be used unless their referent (or antecedent, in case it is linguistic) is prominent, this will be close to the clitic. If it is in the same sentence as the clitic, there are even structural properties that guide interpretation of clitics, by determining what they can and cannot be coindexed together with. These are governed by the Binding Theory, which determines the behaviour of referring expressions with respects to their antecedent. In Part I of this work, we will be looking at the properties that make clitics what they are, and what determines their behaviour in terms of surface structure, occurrence, and interpretation.

It is necessary to be able to pick up on the signals mentioned above to be able to benefit from use of this category of referring expressions, both in its comprehension and in its coherent and non-ambiguous use. Thus, while it may be a frequently used structure in adult language, the clitic has nonetheless got many aspects to be managed for it to be mastered. Child language gives us good examples of the extent to which learning about these elements may be demanding. At the level of comprehension, when a clitic and its antecedent are not in the same sentence, a child must resort to disentangling the ϕ-features of the clitic itself to be able to disambiguate its referent. If the clitic has been used correctly by the speaker, in fact, it should not have an ambiguous reading between two or more plausible referents, and features should be sufficient to manage reference. If they only have to rely on these, however, accuracy in the selection of the antecedent is still low in the younger children (at around 3-4 years of age) and it improves if other, non-syntactic cues are added. This is also true when the antecedent and the clitic are in the same sentence but separated by an embedding: here, children tend to miss the relation and reflexivise the pronoun. If the clitic and the antecedent are in the same sentence, however, specifically in a c-commanding configuration where the antecedent c-commands the pronoun, the syntactic relation between the two (namely binding) is highly detected by even the younger children. At the level of production, while clitic use appears early in the child (with clitics already present at 2), the first stage of use is accompanied by a phenomenon of omission, which is indicative of an understanding of the appropriateness of clitic in certain discourse situations, but a struggle in the actual production of them. That clitics are vulnerable elements in language has been shown in non-typical populations, both in clinical populations and in L2 acquisition. For Developmental Language Disorder, this element has been selected as an early marker of language impairment, but other populations have also been shown to be affected in their proficiency with this

element. What is interesting, and crucial for our purposes, is that there seems to be a specificity not only in the patterns of accuracy for every population, but also in the pattern of avoidance strategies. We will be concerning ourselves with the topics of clitics in typical acquisition and non-typical development in Part II of the present work.

The purpose of the experimental part of this work is to continue to investigate the differences that shape the patterns of clitic pronouns. Particularly, by exploring several instances of clitics that require different levels of computation and involve different areas of language, we want to explore the idea that the clitic, as well as being a marker for impairment, can identify both impairment (when early occurrences are not in place) and difficulties in harder computations (when later occurrences are not in place).

For this purpose, we designed a comprehensive assessment of clitics that, with some variations, is applied to the following categories: in a group of pre-school and primary school typically developing children (Study 1), in a group of adult heritage speakers of Italian living in the UK (Study 2), and in four older children with a diagnosis of ASD (Study 3). The aspects of the clitic that we test are: comprehension in binding constructions, production of clitics in two argument positions (direct object and indirect object), in two sentence positions (preverbal and postverbal), in different persons (1^{st}/2^{nd} and 3^{rd}), single or in combination, and pragmatic abilities in the alternation with the lexical noun phrase and in perspective shift contexts. The experimental design and the studies will be covered in Part III. Overall results will be commented in Part IV.

Chapter I: characterisation of clitic pronouns

1.1 Introduction

In this chapter we describe the main protagonist of the studies presented in this work, namely the clitic pronoun. This linguistic element has been at the centre of many discussions spanning from discourse to phonetics to syntax and more and is possibly one of the elements that is most at the crossroads between all areas of the language faculty. We will try and give a thorough characterisation of this element in the areas that will be more relevant for the purposes of the study, namely syntax and discourse/pragmatics. At the syntactic level, this element is peculiar because unlike other pronouns it occupies the head position of a functional phrase and appears to be in a strong connection with its host verb, more specifically with the functional head containing the verb. This clitic-specific property gives rise to several defining characteristics of the clitic itself, such as its impossibility to appear in absence of the verb, to be coordinated or modified, and to move on its own within the clause. The clitic also shows a peculiar derivation, in that it does not remain in its base position but rises in the structure to reach a final position which in most languages in on the left of the verb, with some languages also permitting a postverbal position, specifically if the verb is non-finite. It follows that the positioning of the clitic is strict and only limited to those positions.

At the interpretive level, clitics must have a relevant antecedent in the discourse for their external referent to be correctly identified. This is because clitics alone do not have sufficient descriptive value to give access to the identification of a referent. For this reason, they must be bound to an antecedent for reference to be correctly managed. At sentence level, the antecedent of the clitic pronoun must not be in the immediate clause (Sara **la** saluta, Sara says hi to her *la ≠ Sara*), but it must be in a position that does not c-command the pronoun itself (il bambino prende la rana e **la** bacia, the boy picks up the frog and kisses it *la = la rana*). This phenomenon is referred to as Principle B of the Binding Theory (Chomsky, 1981), and it concerns all pronouns. At discourse level, clitics are used non ambiguously only if the element they refer to is prominent for both the addresser and the addressee. This entails that, when there are no linguistic cues that guide it, proper use of clitics requires correct navigation of the common ground.

The chapter is organised as follows: first, we will be discussing pronoun typology, mostly based on Cardinaletti and Starke (Cardinaletti & Starke, 1999), and then we will zoom in into the specificities of clitics. Then, we will look at how clitics work within the sentence.

1.2 Pronoun typology and the specificities of clitics

1.2.1 On the nature of clitics

When describing the properties, makeup and derivation of clitics, it is worth acknowledging that the term *clitic* is an umbrella term comprising different linguistic phenomena. Thus, the term is used in a *narrow* sense and in a *wide* sense. According to the wide definition, clitics include all linguistic elements which are characterised as phonologically weak forms. The main property this definition draws upon is that these elements are not inherently stressed and

cannot receive stress under any circumstance[1], thus relying on the stress of the word before or after them. For this reason, clitics under this perspective are generally referred to as "phonological clitics". This definition based on the phonological characterisation of the elements includes the reduced forms of corresponding strong pronouns, thus comprising Romance subject and object clitics and Germanic reduced forms (such as English 'em for him), and non-pronominal elements that share the phonological characterization such as partitive clitics (Italian *ne*), impersonal clitics (Italian *si*), and so on. In the *narrow* sense, clitic pronouns are only those elements that, together with the phonological characterizations, share specific syntactic properties that will be seen in detail in the following pages.

Another issue revolving around the definition of the nature of clitics regards their status within the gamut of grammatical constructs, which has been long debated. The "Zwicky criteria", developed in Zwicky and Pullum (Zwicky & Pullum, 1983) and Zwicky (Zwicky A. M., 1985)[2] in order to determine whether an element may be classified as an affix or a word do not place clitics as one or the other in a clear cut way. In fact, they claim that these elements seem to have characteristics that liken them to words in some cases, and affixes in others. For example, the characteristic discussed above, namely their absence of intrinsic phonological stress, is typical of affixes, while words always have tonic syllables. On the other hand, like words, and unlike affixes, many instances of clitics have been shown to be subject to phonological processes such as liaisons, like in French *ils iront* /i(l)zirõ/[3].

[1] It has been argued that French enclitics *can* be stressed, as well as clitics in some Italian dialects, which may bare or dislodge stress (Pescarini 2016 for review). Under this perspective, clitics can bare contrastive stress in some contexts, which will be described later in the chapter.

[2] See (van Riemsdijk, 1999) for a complete application of the Zwicky criteria to clitics.

[3] Notice that this is a case of subject clitic. Other research has pointed out that clitics do not always function as part of the phonological word, for example in Italian the phonetic rule of intervocalic *s* voicing applies within word but not between a clitic and the following verb: resistenza /z/ */s/, lo sapevo /s/ */z/.

The affix/word dichotomy does not seem to explain the status of phonological clitics, unless we are prepared to say that some of these behave like affixes, and some like words. The difficulty is partly due to the fact that a single element may shift from one category to another. A way of bridging this problem is to think of clitics as a third type of elements: if words are elements that combine with other words or phrases to form phrases, and affixes are elements that combine with (part of) a word to form a word, then clitics may be assumed to be elements which are bound, like affixes, but that combine with words and phrases to form phrases, like words (Castairs-McCarthy, 1991). Another solution that partially bridges the debate over the nature of the clitic is to classify clitics according to the narrow definition which identifies as clitics proper only those elements that, together with the phonological properties also part of the wide definition, have a specific syntactic make that is only characteristic of this class and of no other pronoun. This way, only a subset of these phonologically weak pronouns needs to adhere to certain characteristics to be considered as instances of one specific type of linguistic element, while those that, much like strong pronouns, seem to behave like proper words, are out of the definition. This subset is referred to as "syntactic clitics" (henceforth "clitics"). That these are phrasal affixes is now widely accepted in the literature (Gerlach & Grijzenhout, 2000).

1.3 Strong and deficient pronouns

The suggested split of clitics from other forms of weak pronominal elements gives rise to a three-way categorisation of pronouns, namely strong pronouns, weak pronouns (the residue of the phonological clitics that do not fit the narrow definition), and clitics. Usually, one language does not have all three types of pronouns available, but their distribution is consistent. The tripartition has been described in terms of structural deficiency by Cardinaletti and Starke in their

pivotal work on pronoun typology (Cardinaletti & Starke, 1999). Examples in this section are taken from the work under discussion.

Pronouns create, as such, synonymous pairs (as the Italian *lei* and *la*, for instance). Even when they are homophonous, as it often happens, it is clear that regardless of the synonymity they are underlyingly different grammatical elements. Consider (1)

(1) Elles [+human] et celles d'à coté sont trop grandes

They$_{FEM}$ and those to the next are too/very tall

They and the ones next to them are too/very tall

If the pronoun is coordinated, as it is in 1, the referent of the pronoun can only have a [+human] reading, and [-human] interpretation is banned. If we leave out coordination, the referent suddenly can bear both [+human] and [-human] reading:

(2) Elles [±human] sont trop grandes

They$_{FEM}$ are very/too tall

Cardinaletti and Starke argue this to be a clear indication that their underlying properties are different and the two belong to different classes of pronouns. In cases of non-homophony this difference is overtly visible, like in Italian subject pronouns, where pronoun *esse* cannot bear coordination but can be [±human], and (subject) pronoun *loro* may bear coordination, but is only [+human][4]. This distinction is part of a large array of surface asymmetries in syntax, semantics, and phonology, and constitutes the first major distinction

[4] The Italian form of the subject pronoun *loro* is in itself homophonous to the dative pronoun. As a dative, it has a [±human], no coordination form (*loro*), and a [+human], coordination bearing form (*a loro*).

between two classes of pronouns, namely strong pronouns on one side (like *loro* in Italian), and the macro-class of deficient pronouns on the other (*esse*), which in turn contains two separate pronouns of different level of deficiency, namely mild (*weak pronouns*), and severe (*clitics*).

At the level of phonology and prosody, a distinction between the classes of strong pronouns and deficient pronouns regards contrastive or corrective stress[5]. While both can bare it, strong pronouns can do so with any referent they may introduce (3a), while deficient pronouns can only allow it if their referent is prominent in the discourse, namely if it has a retrievable antecedent (3b,c). Capital letters indicate stress.

(3) a. ✓ Jean voit ELLE.

b. *Jean LA voit

Jean sees her

c. A: Ieri ho visto Marco e domani la rivedo

A: Yesterday I saw Marco and tomorrow I see CL-her again

✓B: Domani LO rivedi

B: Tomorrow you CL-him see

Another semantic asymmetry between the two types is brought to light by their behaviour when the pronoun is inserted in a context where its referent should be non-specific, namely when a generic or impersonal interpretation is required: while both types of pronouns are by definition not strictly referential,

[5] This asymmetry regarding stress arguably stems from the ability of each element to refer to external referents that have not been mentioned before, namely their ability to introduce a new referent (or guise) in their own. See (Heim, 1993) and subsequent works for discussion.

impersonal interpretations are allowed for both a deficient and a strong pronoun, while generic interpretations are limited to deficient pronouns. What draws the line between these two contexts (as well as others where this semantic asymmetry surfaces) is the property of *range restriction*: strong pronouns have a range restriction on the referent they refer to, namely the entities it can be coindexed with are limited, and for this reason they cannot be used in contexts where a complete absence of a restriction is required; deficient pronouns on the other hand are incapable of bearing their own range restriction, and so can be used in contexts where the range is potentially infinite. This makes them good candidates for any non-specific referential identification.

At the syntactic level, the two types show differences in their surface pattern. The asymmetries in the syntax are always of the kind that whereas one pronoun has more alternatives available for its construction (namely the strong pronoun), the other has more limited (or deficient) alternatives (namely the deficient pronoun). One such case we have anticipated: deficient pronouns cannot be coordinated. Their low tolerance for modification also shows up in their impossibility of bearing c-modification (4).

(4) Anche/Solo {*essa; lei; Maria} è bella.

Even/Just {} is beautiful.

Another crucial distinction at the syntactic level is that, while strong pronouns have all positions of the corresponding NP available, (a part of the) deficient pronouns can only occupy specific positions and are thus limited in their placement, a factor we will return to when observing the behaviour of the weakest of the deficient pronouns.

In summary, the first distinction in pronoun classes surfaces in a series of differences that seem to be generally described as either an optionality that

determines a change in meaning, or an asymmetry whereby one of the two classes has stricter semantic use, but has a wide syntactic liberty, while the other has less restrictions on the semantics, but very controlled occurrences in the syntax.

1.3.1 Specificities of clitic pronouns

Upon closer inspection, the "deficient pronoun" category shows different patterns within itself. The partition between types of pronouns thus becomes a three-way partition, where the deficiency (DC) pattern is the following:

$$DC(strong) \subset DC(weak) \subset DC(clitic)$$

with DC(strong) = Ø by definition. The tripartition of the pronominal system is frequently attested cross-linguistically, and it always abides by the one strong – two weak partition patterns. While some of the internal differences between weak pronouns and clitics show up at surface level, most noticeably in their phonological characterisation the most distinctive characteristic lies in their syntactic makeup. Before progressing with the discussion on the properties of these pronouns and specifically their constructions, let us give an overview of the most prominent surface characteristics.

A major contribution to the characterisation of clitics is that by Richard Kayne (Kayne, 1975), who for his PhD thesis worked on an in-depth analysis of the behaviour of French clitics and their underlying structure. In doing so, he identified a series of identificational characteristics that describe the status of clitics, which still underpin most of the work on clitics. A few of the characteristics that Kayne identifies as being descriptive of clitics also hold for weak pronouns:

- No modification

- No conjunction
- No inherent stress

The other characteristics describe the special positioning criteria that have been found to be specific to clitics:

- Special position
- Obligatoriness
- Fixed and special order

While what we said about strong pronouns also holds for weak pronouns, namely that they can appear in all positions available to full noun phrases, clitics appear in special dedicated positions which are not available to other pronouns and noun phrases, and that are typically distinct from the argument position. In declarative sentences, they usually appear in preverbal position instead of occupying the canonical postverbal object position. This position is obligatory.

(5) Maria conosce *ci/noi/Giovanni

Maria ci/*noi/*Gianni conosce.

Maria knows us_{cl} /us/ Gianni

Clitics may appear in combinations, usually referred to as double-object clitics or clitic clusters. When they do, Kayne observed that they must appear in a fixed and special order. Very often, this order deviates from the preferred order of the corresponding noun phrases.

(6)a. Jean donnera le $livre_{DO}$ à moi_{IO} seul

Jean will-give the book to me only

b.Jean me_{IO} le_{DO} donnera

Jean to-me it will give

It is important to note that this rule, while generally valid within the same language, is an area where substantial variation is found cross-linguistically, leading to a debate on the restrictions on clitic ordering. We will go back to this in 1.4.3.2.

The remaining characteristics are an overt manifestation of the relationship of the clitic with what we will describe as its host, namely the verb it is an argument of.

- adjacency to V and
- obligatory presence of the verb

Clitics must be adjacent to their host, and this proximity cannot be interrupted by other linguistic material. Furthermore, the availability of the clitic is dependent on the presence of the verb, as it cannot survive without it.

(7) a. Jean a pris le couteau et Marie a pris la fourchette

Jean has taken the knife and Maria has taken the fork

b. *Jean l'a pris et Marie la

Jean it has taken and Marie it

1.3.2 The Italian clitic system

Unlike the other elements of Romance languages, pronominal clitics are usually the only elements to present a rich case inflection paradigm. There are: accusative, dative, genitive, partitive, locative, and nominative clitics. The cross-

linguistic pattern of distribution of clitics in any Romance language has been captured in the following generalisations, taken from Benincà and Poletto (Benincà & Poletto, 2005:227):

a) If a Romance language (Rl) has clitics, it has direct object clitics.

b) If a Rl has dative clitics, it has direct object clitics.

c) If a Rl has partitive or locative clitics, it has dative clitics.

d) If a Rl has subject clitics, it also has direct and indirect object clitics.

e) There is no implication between locative/partitive and subject clitics.

f) Adverbial clitic forms for elements that are never selected by a verb are much rarer and imply the presence of argument clitics.

Case is usually morphologically marked, especially on the third persons. Furthermore, object clitics exhibit gender and number morphology. Usually, they are formed by a person morpheme and a so-called thematic vowel (Harris, 1994), which is either an agreement marker carrying morphosyntactic information, or an oblique ending with no morphosyntactic value ((Pescarini, 2016) and citations there for review). Number may have a dedicated suffix (*-s*) or be fused with the gender feature in one single component.

The pronominal clitic system available for Italian is given in Table 1 (taken from (Russi, 2008)). For the sake of completion, we include locative, reflexive, and partitive clitics in Table 2, though we will not be concerning ourselves with their paradigm and properties. The forms in parentheses are allomorphic forms which surface in clitic sequences (example in 9). Final vowel deletion applies regularly when the first phoneme of the following word is a vowel (example in 10).

NUMBER	PERSON	DIRECT OBJECT	INDIRECT OBJECT
SINGULAR	1	*mi*	*mi (me)*
	2	*ti*	*ti (te)*
	3	*lo M, la F*	*gli M, le F*
PLURAL	1	*ci*	*ci (ce)*
	2	*vi*	*vi (ve)*
	3	*li M, le F*	*[gli]*

Table 1 Italian direct and indirect object clitics

LOCATIVE	*ci (ce), vi*
REFLEXIVE	*si (se)*
PARTITIVE	*ne*

Table 2 Other Italian clitics

(8) *Me$_{IO1S}$ lo$_{DO3SM}$ dà Carlo*

To-me it gives Carlo

Carlo gives it to me

(9) *L' (=lo) ho preso al mercato*

It aux get to-the market

I got it from the market

The third plural indirect object is between parentheses because it is not the prescriptive standard Italian realisation, which would feature arguably the only remaining weak pronoun in Contemporary Standard Italian (CSI), namely the

dative pronoun *loro*. Much like the other weak pronouns available in Italian, however, namely the weak masculine and feminine nominative form *egli* and *ella* and the plurals *essi* and *esse*, dative *loro* is becoming obsolete and is now being substituted both in informal and in formal Italian by the clitic homophonous to the masculine singular.

Examples (8) and (9) also feature two other properties of Italian clitics, namely clusterisation (8) and past participle agreement of the verb with the features of the clitic (9).

1.4 Clitic syntax

1.4.1 Deficient structure

Kayne's original proposal (Kayne 1991) described the relationship that the clitic entertains with the host as a left-adjunction of the clitic itself to the functional head containing the verb. Given that left-adjunction is understood as head adjunction, the proposal entails that clitics are heads themselves. This is supported by the behaviour of the clitic when the verb must move higher for structural purposes. For example, in French interrogatives (example in 11) and Italian hypotheticals (example in 12), the verb moves to a higher position than the subject. When it has a clitic argument, this follows the verb's movement and crosses over the subject with it This constitutes the major structural distinction with other (weak) pronouns, which are arguably not occupying a head position, but a specifier position, thus consisting in maximal projections (Cardinaletti & Starke, 1999).

(10) a. Tu **l**'as vu.

You it_{CL} have seen

b. **L**'as tu [*t*] vu?

it$_{CL}$ have you seen

(11) a. Se Gianni **l**'avesse programmato in anticipo, ...

If Gianni it$_{CL}$ had programmed in advance, …

b. **L**'avesse Gianni [*t*] programmato in anticipo, ...

it$_{CL}$ had Gianni programmed in advance…

[taken from (Cardinaletti & Starke, 1999)]

Therefore, one of the questions that arises on the specific structural makeup of clitics is what their derivation is, namely what syntactic operation underlies their linear order. This will be addressed in 1.4.2.

The second question that arises regards the structural status of deficient pronouns. Cardinaletti and Starke propose that at the structural level the deficiency of pronouns is determined by the number of heads they realise, assuming that morphemes are heads of discrete syntactic projections.

morph(clitic) < morph(weak) < morph(strong)

struct(clitic) < struct(weak) < struct(strong)

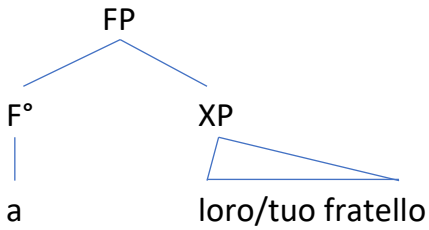
The relationship is not always visible is due to the opaque morphology of pronouns, but sometimes it is particularly clear, like in the case of Italian plural indirect objects, which can arguably be realised through all three pronoun classes:

a loro < loro < [gli]

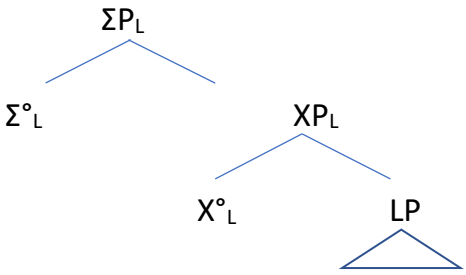
strong weak clitic

Strong pronouns occupy the highest functional projection, so they realize the most heads. Clitics on the other hand occupy the lowest. This order in the structure is apparent in languages that overtly express an element like the Italian *a*, a semantically empty morpheme which functions as a syntactic support (and may or may not be expressed) and occupies the head of a functional projection which expresses referential features (12a). Lower functional heads incorporate other features, such as polarity and focus. In weak pronouns, these are realized (12b). In clitics, on the other hand, the superior level of the weak pronoun (Σ° according to Laka (1990)) is missing (12c).

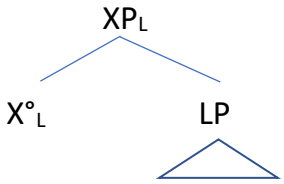
(12)a. strong



b.weak pronoun



c. clitic pronoun



[extracted from (Cardinaletti & Starke, 1999)]

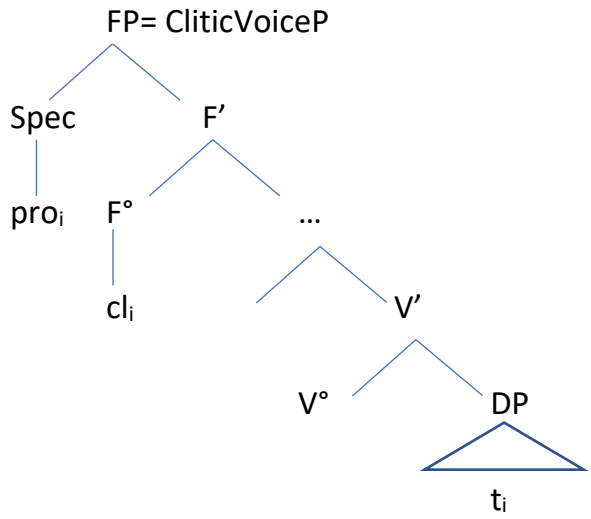
1.4.2 Clitic derivation

Structurally, pronominal clitics are nominal elements appearing on a special head position of the verbal functional domain in the highest part of the structure. The fact that they are deficient determines that clitics must occur in a local relation with features-assigning heads; at the same time, their lack of case requires them

to enter into agreement with a case-assigning head. Two main accounts deal with this derivation. One is base-insertion (Borer, 1984; Sportiche, 1996), the other is movement (Kayne, 1975; Belletti, 1999; Burzio, 1986; Rizzi, 1982).

In base-generation accounts, clitics are base-generated in a dedicated position ("clitic voice" in Sportiche) attached to their host verb outside the VP. A null category *pro* is generated in complement position and moves to the Specifier of the clitic voice phrase, entering Spec-head agreement with the clitic, as schematised in 13. According to other accounts stemming from Sportiche, no movement is involved, and clitics are generated where they surface following a specific clitic hierarchy (Manzini & Savoia, 1998; Manzini & Savoia, 2004).

(13)



[extracted from (Sportiche, 1996)]

In movement accounts (schematised in 15), clitics are assumed to be generated in complement position, and to move to a functional head high in the structure. In argument position, the clitic receives its Θ-role. Then, the checking of ϕ-features triggers movement. The checking of Case triggers movement of the clitic to a landing site where DPs check their case features (AgrO in Belletti (1999)). Before getting to its landing site, however, the clitic must check

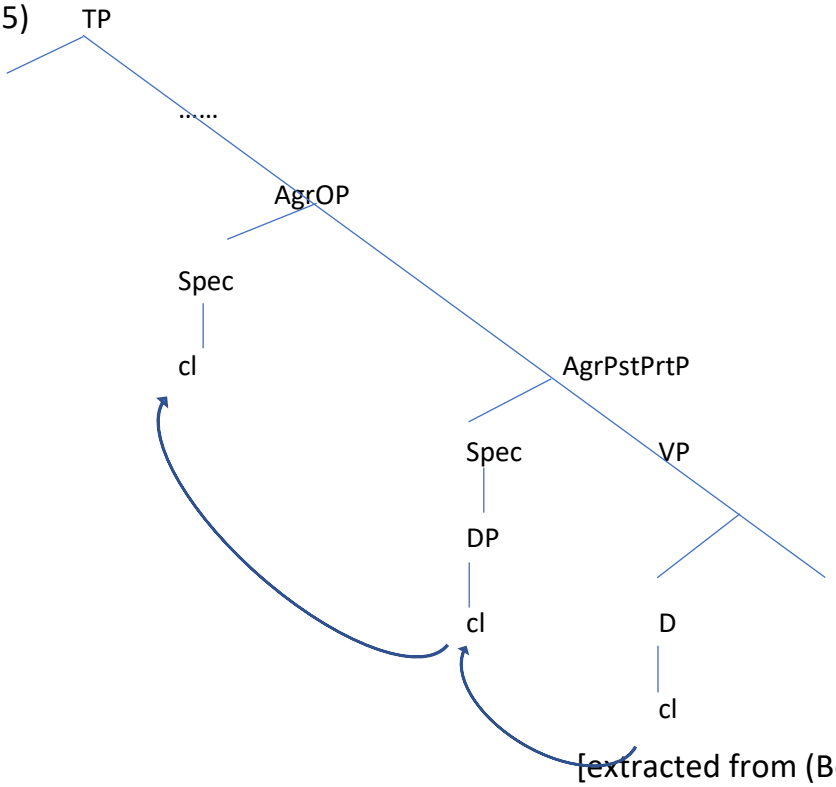
Agreement[6]. The evidence for this is in the presence of agreement on the past participle of a complex tense featuring cliticization (14).

(14) Le ho salutate

them$_{CLfem,plur}$ pro have greeted$_{fem,plur}$

I have greeted them

(15)



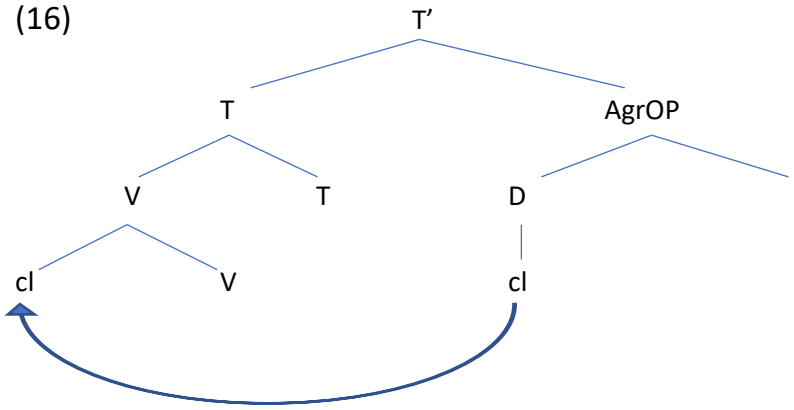
[extracted from (Belletti, 1999)]

The clitic then joins the verb in its final and surface position, to which it must adjoin as a head. When head movement is not filling an empty category, it is assumed to be left adjunction (16). This yields a proclitic surfacing, which we

[6] Under the assumption that Agreement checking is obtained through movement to Spec position of an Agr head, in this case AgrPstPrt, this movement of the clitic is A-movement as a maximal projection. It is claimed that this second movement to AgrO, where it will finally check case, can be either another XP-movement or an X°-movement, and variation between languages is expected at this level. In Italian, it is assumed to start moving as a head at this point in the derivation (Belletti, 1999).

have indicated as the canonical clitic position with finite verbs in Romance languages.

(16)



[extracted from (Belletti, 1999)]

1.4.3 Other surface phenomena

1.4.3.1 Postverbal position

We have been considering clitics in the so-called proclitic position, which is arguably the most common in Romance languages; some languages, including Italian, allow for another surface order, with the clitic immediately following the verb instead of preceding it (enclisis). In Italian, this is required with non-finite verbs and iussive clauses:

(17) a. vederle.

to see-them $_{Cl,fem\ plur}$

b. Averle viste

to have-them $_{Cl,fem\ plur}$ seen $_{fem\ plur}$

c. Avendolo già letto…

having-it$_{Cl,\ masc\ sing}$ already read…

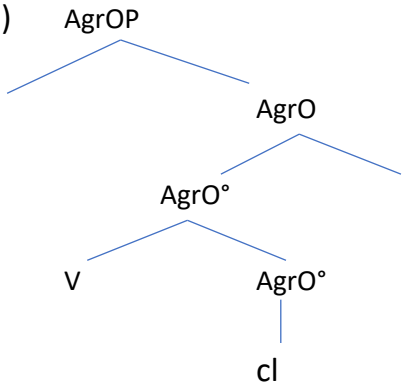
d. Leggilo!

read- it$_{Cl,\ masc\ sing}$

[examples from (Belletti, 1999)]

Under the assumption that adjunction is left-adjunction, for the yielding of the proclitic structure the clitic adjoins to the verb, while for enclisis the verb adjoins to the clitic. This is plausible if we assume that the non-finite verb moves towards a high position in the structure (which is presumed to be as high as AgrS for Italian non-finite verbs, V-to-C movement is postulated for imperatives as triggered by illocutionary features on C° (Rivero, 1994), and somewhere lower than C for gerunds). This movement across the head containing the clitic (at the level of AgrO) would allow the verb to adjoin and merge with it, taking it with it from that point of the derivation onwards. While finite verbs check morphological features higher in the structure, non-finite verbs are assumed to check for infinitival morphology lower in the structure (in a dedicated Inf functional head (Kayne 1991)), plausibly lower than AgrO. Thus, non-finite verbs stop in the functional head where the clitic is checking its features while moving to their final position. Because adjunction to a non-empty head is left-adjunction, the verb appears to the left of the clitic, as in (18).

(18)



[extracted from (Belletti, 1999)]

The derivation explained above is not in contrast with the few examples of Romance languages where the clitic is placed in proclitic position with infinitivals as well as with finite verbs, as is the case for French (19). These differences would be a by-product of the position of feature checking for the verb. In fact, the infinitival in French is -independently from clitics (Kayne (1989), Pollock (1989))- assumed to not raise as high as T° in the overt syntax, as is shown by the fact that, contrary to e.g. Italian, it can be modified (20).

(19) Lui parler serait un erreur

To-him$_{Cl}$ to speak would be an error

(20) En bien parler …

Of-it well to speak…

This derivation fits in nicely with another phenomenon that has been observed at surface level, namely the tighter relationship that seems to occur between verb and clitic in the enclitic constructions. As Benincà and Cinque (Benincà & Cinque, 1993) note, this is manifest for example in the fact that in some constructions involving morphologically related verbs speakers accept omission of the second

clitic when it is in proclitic position (21a), whereas this is strongly rejected with an enclitic pronoun (21b) (their examples).

(21)a. Lo [leggo e rileggo] in continuazione

pro it [read and re-read] continuously

b. *per [leggere e rilegger]lo

to [read and re-read]-it

Furthermore, that the clitic and the verb cannot be interrupted in enclisis is confirmed by the occurrence in some variations of Romance languages of linguistic material between the proclitic and the verb, but no instances of the appearance of linguistic material between the verb and the enclitic.

(22) a. ma dacché vi pur piace... (Old Italian)

but since [it] to-you indeed pleases

but since you do like it…

b. pour le bien faire (Literary French)

for it well do

to do it well

Benincà and Cinque draw the conclusion that in enclisis, contrary to proclisis, the adjunction of the verb to the clitic gives rise to a new word at the morphological level. This is overtly visible in languages like Italian, where the adjunction is graphically represented as a single word in enclisis, but not in proclisis. Morphing to the verb, enclitics in Italian also undergo morphological changes, as (23):

(23) Carlo dice di dar***melo***

Carlo says to give-to-me-it

Carlo says to give it to me

1.4.3.2 Double object construction

Another construction that several Romance languages allow for is the cliticisation of two (or more) arguments of the verb, thus yielding double-object or cluster constructions. Cluster constructions behave like single clitics in their placement, usually preceding the verb in finite clauses and following the non-finite, imperative, and gerund verb. A crucial issue arises with clusters is that of their linear ordering. While in general it is the case that each language sticks to one fixed order (as would follow by the requirement of fixed ordering in clitics), others seem to present a "mixed" paradigm of clusters, showing some within-language variation. Furthermore, the cross-linguistic variation on the elements that take precedence is vast, unlike in other factors concerning clitics. This variation has been proposed to derive from diachronic shifts in the orders, which were not homogeneous in all languages. In Old Romance languages, in fact, the only attested order is ACCUSATIVE > DATIVE (also referred to as ILLUM MIHI). Most modern Romance languages have shifted to a DATIVE > ACCUSATIVE order through time (MIHI ILLUM), but the shift was not homogeneous. Similarly, with respect to person, the 3rd > 1st/2nd order which was more common in Old Romance shifted to 2nd/1st > 3rd, again with consistent variation. Modern languages thus present paradigms that operated the shift both in case and in person (e.g. Spanish), some for case (e.g. Italian), but others display mixed orderings (e.g. Modern French, Modern Greek). While there is variation on the orderings the languages present, there seem to be only a few plausible licit orderings, as we shall see. For instance, 1st>3rd DAT ACC sentences such as (24)

are grammatical both in French and in Spanish, 1st>3rd DAT ACC sentences such as (25) are ungrammatical in both languages, and 2nd>3rd DAT ACC sentences such as (26) are grammatical in Spanish but not in French. This distinction already gives a hint that the discussion to come will mostly revolve around pronoun features. Examples are taken from de la Fuente (de la Fuente, 2012).

(24) a. Il **me le** présentera à la fête.

He1.SG.DAT 3.SG.ACC introduce-FUT at the party

b. Él **me lo** presentará en la fiesta.

He 1.SG.DAT 3.SG.ACC introduce-FUT in the party

'He will introduce him to me at the party'

(25) a. *Il **me lui** présentera à la fête.

He1.SG.ACC 3.SG.DAT introduce-FUT at the party

b. *Él **me le** presentará en la fiesta.

He 1.SG.ACC 3.SG.DAT introduce-FUT in the party

'He will introduce me to him at the party'

(26) a. *Tu **te m**'es présenté à la fête.

You 2.SG.ACC 1.SG.DAT-PST introduced at the party8

b. Tú **te me** presentaste en la fiesta.

You 2.SG.ACC 1.SG.DAT introduced at the party

'You introduced yourself to me at the party'

Accounting for these surface phenomena is no easy task, and many accounts were put forward that propose templates accounting for all the exact linear orders in which the clitics surface when they are combined and assume ungrammaticality when the template is not respected. Some of these accounts capitalise on morphology to encompass the restrictions on clitic combinations, others on syntax. Another variable which changes from template to template is the feature that is taken to be most relevant in licit ordering, person or case, as well as animacy[7].

One of the first attempts to systematise surface ordering is that by Perlmutter (Perlmutter, 1971). In his template based on Spanish, he proposes a fixed order which arranges clitics by person:

(27) *se* > II > I > III

Spanish in fact has a strong preference for person ordering, with combinations that do not respect it being ruled out as ungrammatical, and licit combinations being in ambiguous reading between the DAT-ACC and the ACC-DAT ordering for some speakers. Bonet (Bonet, 1991) proposes a generalised and, in her view, universal constraint on combinations which is known as the Person Case Constraint (henceforth PCC). Language variation is a consequence of languages being subject to Strong PCC or Weak PCC:

(28) Person Case Constraint:

a. Strong PCC: "In a combination of a weak direct object and an indirect object, the direct object has to be third person." (Bonet, 1991:182)

[7] See De la Fuente (2012) for a complete review of the accounts put forward for clusterisation order.

b. Weak PCC: “In a combination of a weak direct object and an indirect object, if there is a third person it has to be the direct object.” (Bonet, 1991:182)

Thus, Weak PCC languages accept combinations of 1st/2nd person, while Strong PCC languages reject them.

Proposing an alternative to fixed linear order models, whilst still maintaining a morphological-feature approach to explain surface ordering, Heap (Heap, 2005) builds a model which predicts linear ordering on the basis of morphological features, which he assumes to be organised hierarchically according to their feature markedness (in a hierarchy referred to as Feature Geometry). He proposes that clitics combine according to this geometry following his proposed Least Leafy to the Left constraint:

(29) Arrange clitics from the morphologically least specified to most specified.

The more “nodes” a feature has, the less likely it is to be in first position. This model explains the preference for 1st and 2nd person to precede 3rd, as in (31), because 3rd person has a further node, namely case, while 1st and 2nd person are case-syncretic. The model also explains the preference for singular to precede plural. In fact, plural contains an additional node, namely “group”, and is thus “leafier”.

(30) a. ¿Por qué **te nos** pones tan triste?

Why 2.SG.REFL 1.SG.DAT put so sad

‘Why are you getting so sad (on us)?

b. *¿Por qué **os me** ponéis tan tristes?

Why 2.$_{SG.REFL}$ 1.$_{SG.DAT}$ put so sad

'Why are you (pl) getting so sad (on me)?

The models presented thus far capitalise on the structure on the clitic, namely its feature specification via its morphological makeup. Other models account for surface ordering on the basis of the structure of the clitic in the syntax. Albizu's structural account (Albizu, 1997) relies on c-command and locality constraints to account for these phenomena. Starting from an analysis of the syntactic hierarchy of case, where dative arguments c-command accusative arguments, and ergatives in turn c-command datives, Albizu proposes his version of the PCC, reproduced in (31):

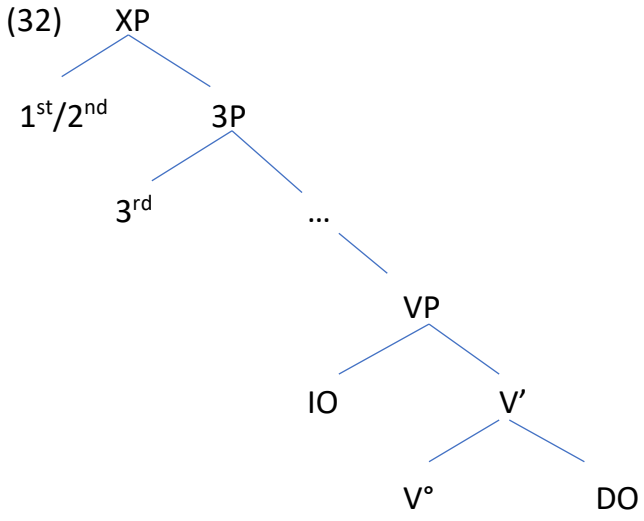
(31) A Person-morphosyntactic feature P_1 must be less referential than, or as equally referential as, a Person-morphosyntactic feature P_2 that locally c-commands it.

As for the 1st/2nd and 3rd person asymmetry, Alzibu adopts a morphological approach similar to the ones discussed earlier, whereby 1st and 2nd person are less marked than 3rd persons. A structural approach to the person asymmetry is given in Anagnostopoulou (Anagnostopoulou, 2005), who sees it as a by-product of the Agreement operation. The author argues that, because it is higher and thus closer to the relevant functional head, the IO moves for feature checking before the DO does, checking for Person first. If the DO is a 3rd person and thus does not need to check for person (under the assumption that the 3rd person lacks person specification), the derivation is grammatical; if the DO is a 1st or 2nd person checking for person, both the IO and the DO enter into competition for the person feature and the derivation crashes. This competition, Anagnostopoulou claims, is responsible for the universal ban on 3rd person + 1st/2nd person combinations.

Furthermore, the fact that weak PCC languages accept 1st-2nd person combinations is again justified by structural constraints: whereas in strong PCC languages these two persons compete to check for features on the same head, weak PCC languages allow for Multiple Agree and thus the two can check their features simultaneously without leading to a crash in the derivation.

Another account of the phenomena of PCC is given in Bianchi (Bianchi, 2006), where these are considered as effects of animacy. Specifically, the author proposes that there is an animacy hierarchy that determines the prominence of arguments. Bianchi proposes that the "1st/2nd above 3rd person" phenomenon is explained by the universal fact that 1st and 2nd person have higher animacy than 3rd persons. As for case, Bianchi argues that the DO cannot outrank the IO on the animacy hierarchy. In general terms, the higher position in the structure is dedicated to the elements with a higher degree of animacy. Person features are encoded in the structure, namely different persons are licensed under different heads. The order of these heads is mirrored in the licit surface order: 1st and 2nd persons are on a higher head than 3rd persons, as shown in (33).

(32)



[extracted from Bianchi, 2006]

Apart from linguistic variation in the surface order, we also mentioned the availability in some languages of more than one order on case. We find a syntactic account of this phenomenon in Terzi (1999) for Modern Greek, where clusters only surface as DAT-ACC when they precede the verb (33), but either order is possible when they follow it (34) (examples by Terzi, 1999):

(33) a. Mou_{DAT} to_{ACC} diavase

to-me it read3s

b. *To_{ACC} mou_{DAT} diavase

it to.me read.3s

s/he reads it to me

(34) a Diavase mou_{DAT} to_{ACC}!

read2sIMP to-me it!

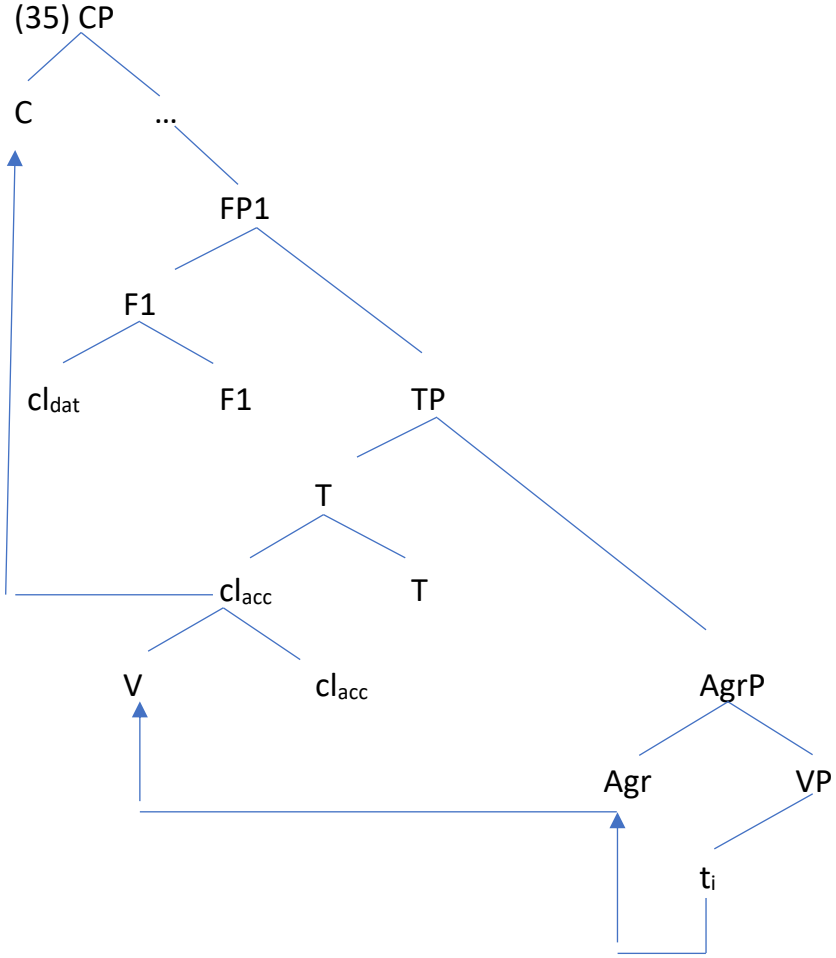
b. Diavase to_{ACC} mou_{DAT}!

read2sIMP it to-me!

Read it to me!

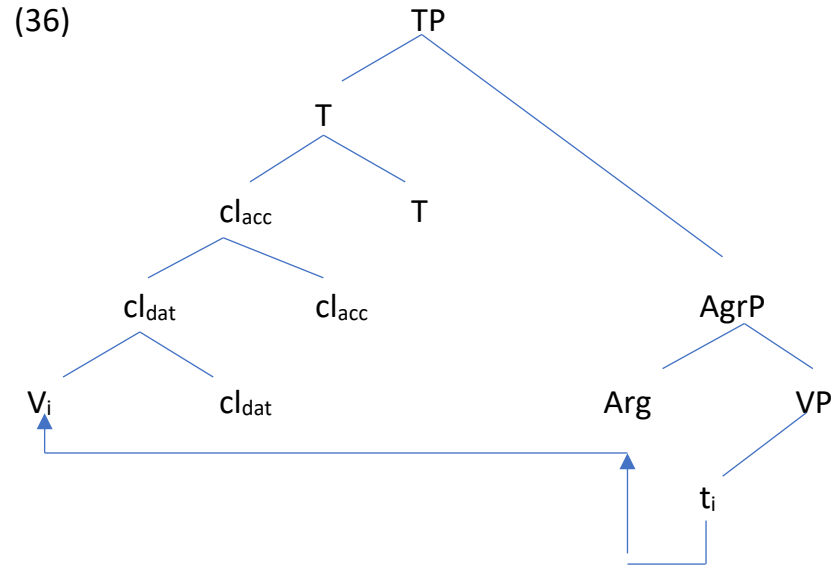
The author proposes a derivation of double object clitics which features two separate functional heads for the two clitics (35). This structure allows for the clitics to surface in the ACC-DAT order. She further proposes that in Greek a second derivation is also available for postverbal clitics, where one clitic adjoins to the other (36). This derivation creates a DAT-ACC order. The author claims that this is the only structure available to languages that show only one pattern for preverbal and postverbal clitics.

(35) CP



[extracted from Terzi 1999]

(36)



[extracted from Terzi 1999]

In imperatives during its V-to-C movement the verb stops in TP, thus checking its features while adjoining to the clitic that adjoins to T° (cl_{dat}). This yields the ACC-DAT order, as the two adjoined elements move together to C° surpassing cl_{acc} (structure in 35). In structure in (36), adjunction of the verb to the accusative clitic is impossible, as it would result in multiple adjunction (of the verb and of the cl_{dat} to cl_{acc}), which is assumed to be banned. So, the verb adjoins to cl_{dat} before moving towards C°, so the DAT-ACC order remains unaltered.

Chapter II: clitic pronouns in use

2.1 Introduction

2.2 Clitics in discourse: coreference

We have thus far discussed of the properties of pronouns, particularly of clitics, in the way they surface and their derivation. Once pronouns are part of a string, they must be assigned a referent. Because they are not intrinsically referential, in the case of pronouns reference assignment must pass through an established relation with an antecedent in the linguistic context. In order to formally mark anaphoric relations of the type antecedent-referring expression, Chomsky (1981) and subsequent literature make use of a simple coindexing system which assigns to each NP one and only one index, which is represented by an integer or a letter. We will be using letters. If two arguments are assigned the same letter, then they are coindexed. If they are coindexed, then they *co-refer*.

When the coindexing of two elements is not linguistically encoded, as in (37) below (taken from Reuland 2011), the sort of relation that is established is referred to as *coreference*.

(37) a. [*The white rabbit*$_i$]$_a$ jumped from behind the bushes. [*It*$_i$]$_b$ looked around and then [*pro*$_i$]$_c$ ran away to avoid the angry queen.

Coreference, as such, is a possibility available in any symbolic system with referring expressions and it is a *discourse-level* relation (Reuland, 2011). As such, reference management becomes a pragmatic matter, where coindexation is

given through ‘speaker intention’, and the addressee is tasked with determining what coreference was intended by the addresser and what the antecedent of the produced linguistic expression is. So, in order for the linguistic act to be successful, addresser and addressee need to cooperate following a set of pragmatic/discourse rules. Levinson (Levinson, 1987 a,b) describes this cooperation by calling into question Gricean maxims, in particular the maxim of Quantity, which he reformulates as follows: speakers must provide as much information as is required for the current purposes of the conversation (Levinson's Q-principle), but not volunteer too much information (Levinson's I-principle). Both addresser and addressee will have rules to follow for each principle. Ariel (Ariel, 1990, 1994) shares this framework with Levinson, but expands the role of referring expressions in the interpretation of coreference relations. According to her Accessibility Theory, referring expressions function as Accessibility markers, and encode specific and different degrees of mental Accessibility. Thus, when the addresser chooses a specific expression, this expression will signal to the addressee the mental representation they need to access in order to pick the correct referent.

Both frameworks share the fundamental intuition that there is an order in the choice of referring expression, and that this order is such that the most lexically dense elements mark the least accessible referents, and the least lexically dense elements mark the most accessible referents. Levinson summarises the order as in (38).

(38) Lexical NP > Pronoun > 0 ((5) in (Levinson, 1987b)

Ariel expands this ordering by including the full range of possible referring expressions, but the core order is the same. We can see this order replicated in (37) above, where the same referent is assigned three different linguistic expressions according to how accessible it progressively becomes.

This form-function correlation is neither arbitrary nor coincidental, and it is strongly correlated with the concept of Saliency, in Ariel's terms. If an element is salient in the discourse it is mentally highly accessible, and thus it requires little to no lexical material to be retrieved. We could say that the more an element needs to be identified, the more reference requires lexical material; the more an element is already easily identifiable, the less lexical material reference needs. The heavier the form is, the less a coreferential reading is favoured. It follows from this hierarchy that the order of *choice* when producing a referring element must be the opposite of the one in (38): if a speaker wants to establish coreference, she should use the most 'minimal' (or deficient) element. As per Levinson's I Principle, using a more lexically dense material than what is required in the hope to help the addressee find the antecedent will have the opposite effect, as the more lexical cues a linguistic expression has the less it is likely to be prominent and thus to have an antecedent.

If we zoom in to Ariel's Accessibility Scale (Ariel, 1990) on the elements we are concerning ourselves with in this work, we find them ordered as follows:

(39) Stressed pronoun + gesture > Stressed pronoun > Unstressed pronoun > Cliticised pronoun (Ariel 1990:73)

This is coherent with what we know about pronoun typology from Cradinaletti&Starke's framework (Cardinaletti & Starke, 1999), with full pronouns (here referred to as 'stressed') being the 'strongest' and clitics the most deficient. In fact, the authors also discuss *choice* and claim that the universal trend is precisely:

(40) clitic > weak pronoun > strong pronoun

namely the pattern of choice is the reverse of the pattern of accessibility. Interestingly, in addition to the pragmatic interpretation of choice based on the

analysis of discourse, this pattern also mirrors a syntactic (and morphological) Principle of Economy, requiring that we use the least amount of construction (in this case the least amount of heads) we can use without being ambiguous.

2.3Clitics in their local domain

2.3.1 Binding Theory

Coreference alone cannot account for the difference between (41a) and (41b), where coreference is possible, and (41c), where it is not:

(41) a. Zelda$_i$ adores her$_i$ teachers

b. Those who know her$_i$ adore Zelda$_i$

c. *She$_i$ adores Zelda$_i$'s teachers

Furthermore, it cannot account for the difference in well-formedness of sentences where the antecedent of the pronoun is a quantificational one: in sentences such as (42b), where the elements are placed across an embedding, a coreferential interpretation seems to work just as well as in (42a), whereas the same does not hold across sentences, as in (42).

(42) a. John$_i$ has a gun. Will he$_i$ attack?

b. Everyone$_i$ has a gun. *Will he$_i$ attack?

(43) a. John$_i$ was convinced that he$_i$ would be welcome

b. Everyone$_i$ was convinced that he$_i$ would be welcome

These different outputs can only be explained if we admit that coreference as we have described it until now, namely a discourse mechanism of assignment of reference driven by speaker intention and not linguistically encoded, has

another route for connecting elements to antecedents, one that *is* linguistically encoded and is thus subject to structural conditions. This specific route is referred to as *binding* since it was first discussed in Chomsky's *Lectures on Government and Binding* (1981), and the fundamental structural relation it is subject to is c-command. While it can be argued that binding is an instance of coreference in the literal sense, the two phenomena are generally divided for clarity and under the assumption that they work on different levels.

Whereas coreference at the linguistic level needs nothing more than the assignment of the same value to two (or more) expressions, binding represents a fundamentally different type of process: it is not the process of giving a value, but that of "comput[ing] the interpretation [of an expression] by linking it to another expression and determining the interpretation of the latter" (Reuland 2011:29). It is a type of relation which is encoded in the language, and results in assignment of reference. In this context, two linguistic elements may share a referent only if a variable α, be it a pronominal or a full NP, is bound to its antecedent, namely if it is in its c-commanding domain. If it is not, α is said to be free.

(44) α is X-bound by β if α and β are coindexed, β c-commands α, and β is in an X-position.

(45) A is X-free iff it is not X-bound.

The constraints that result from binding regulate the interpretation of the elements as bound to possible antecedents, and they go under the name of Binding Theory (Chomsky 1981). The nominal expressions between which structurally encoded coindexing can take place are of three types, and are here represented with the specification of their primitive features:

(i) anaphors (also referred to as reflexives) [+anaphoric, –pronominal, -R(eferential independence)]: *himself, yourself, etc*

(ii) pronominals (also referred to as pronouns) [–anaphoric, +pronominal, -R]: *he, him, lo, la, etc*

(iii) R-expressions [–anaphoric, –pronominal, +R]*: the white rabbit, Poirot, etc*

Specifically, R-expressions have a lexical specification and thus are independently valued, pronouns typically carry ϕ-features, and anaphors are typically void of lexical and referential value.

The Binding Theory as outlined by Chomsky stipulates three formal constraints which regulate the interpretive dependencies between phrases in A(rgument)-positions containing a nominal expression and they are stated as follows (Chomsky 1981):

(46) Binding Theory

(A) An anaphor is bound in its governing category

(B) A pronominal is free in its governing category

(C) An R-expression is free

In Chomsky (1981), the domain of the bindee is thus defined:

(47) α is in the governing category of β if and only if α is in the minimal category containing β and a governor2 of β, and a subject (accessible to β).

This restriction on the domain determines that coreferential relations can only be established if both elements are in A-positions. This entails that whenever A'-

movement crosses the pronominal, and the pronominal therefore binds the trace of the moved element, coreference cannot be established:

(48) a. he likes <who>

b. Who$_{*i}$ does he$_{*i}$ like t_i

The same phenomenon applies to quantified antecedents as in (50), which can be syntactically compared to Wh-traces if we assume Quantifier Raising (QR), whereby a quantified NP adjoins to S leaving a trace in its original syntactic position (Reinhart, 1983).

(49) a. He likes every man

b. Every man$_{*i}$ [he$_i$ likes $_{t*i}$]

This phenomenon is referred to as *crossover effect*.

2.3.2 Reformulations of the Binding Theory

Since Chomsky's first formulation, the Binding Theory has been subject to many reformulations, as subsequent literature tried to capture the many occurrences of linguistically encoded (or banned) reference not captured by the original principles. For example, classical Binding Theory capitalises on a complementarity between pronouns and anaphors whereby whenever a construction is ruled out in condition B, it is accepted in condition A, and whenever a construction is ruled out in condition A, it is accepted in condition B.

(50) a. John$_i$ is ashamed of himself$_i$

*him$_i$ (by principle B)

b. John$_i$ said [that Mary is ashamed of *himself$_i$] (by principle A)

him$_i$

However, this does not hold if the pronominal is in the possessor position of a DP, as in (51), and the pronoun is also acceptable even if it is within a phrase that is c-commanded by the binder in its local domain.

(51) a. [The girls]$_i$ admired [$_\gamma$their$_i$ friends]

b. [The girls]$_i$ admired [$_\gamma$each other$_i$'s friends]

This phenomenon required an initial reformulation of the governing domain, whereby the pronoun must be free in γ. This reformulation was still insufficient to cover for cases in (52).

(52) a. He$_i$ pulled the table [towards him$_i$]

b. He$_i$ pulled the table [towards himself$_i$]

Here, the pronoun and the reflexive appear to be both licit in the context of a locative PP even though we are still in front of a c-commanding dependency, which should prevent the pronoun from forming a coreferential dependency with the antecedent by Principle B.

Reflexives violate the constraints imposed on them by classical Principle A in several contexts. For instance, in picture NPs with embedding, reflexives can freely take non-local antecedents as their binders, thus resulting free in their local domain, contrary to what principle A stipulates (Hamann, 2011):

(53) John$_i$ remembered that Aunt Sally kept a picture of him$_i$/himself$_i$ in the attic.

Thus, describing the behaviour of anaphors and pronominals in taking referents within their linguistic domain in terms of requirements to be bound or free seems to leave out several instances of licit coindexation. One of the most influential reformulations of the classical Binding Theory that was proposed is that of Reinhart and Reuland (Reinhart & Reuland, 1993), who propose a shift in perspective from domain to argument structure that also encompasses instances where the classical theory fails. We report (50) and (52) as (54) and (55) for practicality:

(54) *John$_i$ is ashamed of him$_i$

himself$_i$ (*encompassed in classical Binding Theory*)

(55) He$_i$ pulled the table [towards him$_i$]

[towards himself$_i$] (*not encompassed in classical Binding Theory)*

To account for the fact that in (54) the bound interpretation of the pronoun is disallowed, while of the anaphor it is not, and at the same time that in (55) both are allowed to be interpreted as bound, the authors suggest to look at the following difference: while in (54) the pronominal and the antecedent are coarguments, in (55) they are not. This insight leads the authors to deduce that the right generalisation concerning pronouns is not so much regarding their local domain, but rather it regards the argument structure they find themselves into. Thus, it becomes apparent that the bound interpretation of the pronoun is only disallowed when the pronoun and the antecedent are *coarguments*. Their proposed reformulation capitalises on the notion of *reflexivisation*, namely the

process of reflexivising a predicate which is not intrinsically reflexive. This is an arity reducing process involving the reduction of one Θ-role by identifying it with another Θ-role, thus turning a two-place predicate into a one-place predicate. Reflexivisation must only be possible if one of the arguments of the verb is reflexive-marked, and acts within the domain of the argument structure of the verb. Principles A and B of the classical Binding Theory are thus rewritten in terms of conditions on reflexive interpretation:

(56) Condition A: A reflexive-marked predicate must be interpreted reflexively.

Condition B: A reflexive predicate must be reflexive-marked.

(57) Definitions

a. A predicate is reflexive iff two of its arguments are coindexed.

b. A predicate (formed of P) is reflexive-marked iff either P is lexically reflexive or one of P's arguments is a SELF[8] anaphor.

Conditions A and B ensure that in (54) and (55) above, the only case in which a reflexive interpretation is banned is when the referring expression is within the argument structure of the verb and is not reflexive-marked, while in all other cases the reflexive interpretation is available.

Like we mentioned, because the Binding Theory and its reformulations refer to syntactic constraints alone, it leaves out the cases in which coindexation involving pronouns derives from different considerations.

[8] Reinhart & Reuland distinguish between two types of anaphors, which they call SE and SELF. SE anaphors are of the kind sé (Italian), zich (German), while SELF anaphors are of the type himself (English), zichself (German). They claim that only SELF anaphors have a reflexifising function (Reinhart&Reuland 1993).

2.4 Summary

In part I, we explored the theoretical background around the makeup, structural construction, and pragmatic and syntactic use of clitic pronouns. We started off in Chapter One by defining to the best of our abilities what clitics are and in what way they are specific types of pronouns. Pronouns are synonymous -sometimes even homophonous- linguistic elements, with no fixed referentiality, with the common role of referring to prominent elements. Nonetheless, a clear typology seems to occur within the macro-class of pronouns, and in the prospect of language economy it must be the case that specificity in their pattern of occurrence as well as in their morphological and structural makeup mirrors different and specific uses. On several components of language there seems to be a progressive decrease in features starting from the strong pronoun and arriving to the clitic. We saw so for their morphological complexity as well as for their structural makeup, as we report in (58).

(58) a. morphological features:

morph(strong) > morph(weak) > morph(clitic)

b. structural features

struct(strong) > struct(weak) > struct(clitic)

Conversely, we have seen that the universally attested order in choice of type of pronoun is the one in (59), which is strongly in line with the general principles of economy of language both in terms of syntax and in terms of pragmatics.

(59) choice:

clitic > weak > pronoun

At the level of syntax, clitics undergo movement from their generating argument position to a position higher up in the structure adjoined to the left of the verb in proclisis, and to the right of the verb in enclisis. We discussed several of the properties that specifically define them in opposition to the other referring expressions, as well as other phenomena that characterise them such as the possibility of occurring in combination. For each property, we tried to give a description of the underlying syntactic processes.

At the interpretive level, clitics require a lexical antecedent to be able to refer to an external referent, and within the sentence, they follow strict rules in how they are interpreted when c-commanded. The ability to disambiguate the referent of a clitic pronoun relies on syntactic abilities in binding contructions, and on syntactic and discourse abilities outside of binding.

In the following part, we will be looking at clitics in development, what phenomena characterise their acquisition in children learning a clitic language and the differences there are with children learning a language system that does not include them. Then, we will see how the typical pattern differs in other, non-typical types of acquisition or development.

Part II

Chapter III: clitic pronouns in development

3.1 Introduction

In the previous part, we defined clitic pronouns in the aspects that characterise them on a structural, morphological, and pragmatic level. What all referring expressions have in common is their role of bridging between an element in the external world, their referent, and the linguistic elements that represent it in discourse. With this referent they establish a relationship (it is said that they *corefer*), but there is no one-to-one mapping, in that no referent is always represented by one linguistic element. A referent may be described via different lexical expressions which may corefer with it without being mutually exclusive, for example *the woman in the blue dress* and *the professor of Linguistics*; or it can be referred to in the language via expressions with little descriptive value (but high economic value), namely pronouns. Clitics have special requirements for their use: syntactically they are free variables in their local domain; at the same time, in order to correctly refer they must have an antecedent; because of their lack of descriptive content they are only pragmatically felicitous when they refer to a highly relevant element in the discourse (in some cases they can introduce new arguments when used deictically -namely with a pointing gesture-, but this is not the case in all languages and all types of pronouns, as we will see).

Given these factors, a child learning to use pronouns must first of all understand which of the available types of pronouns their language employs.

Understanding which types to "activate" comes with knowledge of the syntax of the activated pronouns, both in the use of the correct constructions and in the choice of the correct instance of the pronoun in terms of its morphosyntactic shape (pronouns *I* and *me* for instance have near-identical meaning, but different morphology which indicates different roles). Lastly, knowledge of pronouns is intertwined with knowledge of the discourse properties of pronouns -if that child's language has different types of pronouns available, for example strong pronouns and weak pronouns, these will have specific functions and will not be used interchangeably- and requires the ability to explore the discourse space.

Despite this combination of properties, studies on child language have shown that, at least in the simple constructions and with one notable exception, pronouns appear quickly and are usually employed correctly, even in the weakest form available (namely the clitic), which is the one that may be presumed to need the highest level of computation. However, there are signs in typical acquisition that show that despite their early use, clitic pronouns, and the cliticisation process, are hard to compute, and adult-like use on all aspects mentioned above does not come as early as first spontaneous productions might make us believe.

Despite there being a great pool of work in the area, there are topics that are still less explored and that may contribute to the discussion on the acquisition of pronouns and what facilitates or hinders it in certain contexts. Exploring these will give us a better understanding of the computation that is required for each instance of the clitic, and where a difficulty may arise both in typical acquisition and in atypical and clinical development. Looking at how clitic pronouns behave in typical populations is an important step to take if we want to understand in what ways a trajectory can deviate from the one we would expect. Here, we will highlight the aspects that we think are worth exploring further, creating the basis for Study I. Then, we will discuss what is known of clitic pronouns in non-typical

and clinical populations, trying to understand what it is that makes them markers for deviant linguistic profiles, and to what extent this marker is specific to a pathology and how it differs, as it does, across atypical and clinical profiles. This will lay the ground for Studies II and III.

3.2. Knowledge of clitics: comprehension studies

3.2.1 The Pronoun Interpretation Problem and the Clitic Exemption Effect

The structural aspect that children must learn to master in order to correctly use pronouns is that of the constraints that must hold when the referring expression and its antecedent are both present in the linguistic environment of the same sentence. For the particular case of pronouns, this consists first and foremost in understanding the binding and coreference relationships occurring between antecedent and pronoun. To test the abilities of children of respecting the boundaries of binding, research turns to comprehension. The most noticeable discovery on the topic has been that there is a cross-linguistic pattern of acquisition: in fact, several studies yielded different results on children learning Romance languages on one side and children learning Germanic languages on the other.

Jakubowicz (Jakubowicz1984, 1989) and Wexler and Chien (Wexler & Chien, 1985, Chien & Wexler, 1990) report that English-speaking children show adult-like performance in picture verification tasks on reflexive pronouns in sentences such as *The girl is pointing at herself*, as well as on reference of the pronoun and the lexical nominal expression in sentences such as *she pointed at the girl*. On the other hand, they showed that children allow pronouns to corefer with local c-commanding antecedents in sentences such as *The girl is washing her* about 50% of the time. This phenomenon has since been documented in other languages including Russian, Dutch and Icelandic (Avrutin & Wexler, 1992; Koster,

1993; Philip & Coopmans, 1996; Sigurjónsdóttir & Coopmans, 1994, Sigurjónsdóttir, 1992). Because this illicit coreference between a pronoun and an antecedent in its domain is a violation of Principle B, this phenomenon was initially referred to as Delay of Principle B Effect (DPBE), but the preferred term today is Pronoun Interpretation Problem, PIP.

The first indicator was that within the DPBE/PIP (PIP henceforth), an asymmetry was found showing that if the antecedent of the pronoun is *quantified* (*Every girl is pointing at her*), children as young as 2-3 years old correctly interpret the pronoun as referring to someone outside the sentence 85% of the times (Chien & Wexler, 1990). QPs like *every girl* are assumed to be non-referential, in that they do not pick a specific individual from the discourse. Therefore, while they are subject to binding when in the governing category of an antecedent -just like non-quantified NPs (thus abiding by Principle B)-, they cannot enter a coreference relationship with it, unlike referential NPs. This result is indicative of the fact that it is not that Principle B is not acquired or cannot be correctly applied in child language, and that the locus of illicit coreference must be elsewhere-The same asymmetric accuracy in pronoun interpretation that is found in typically developing children is also found in agrammatic aphasics speaking English (Grodzinsky et al., 1993). Because aphasic patients are not in the phase of language acquisition, but rather they had an interruption in their fully formed language system which led to an impairment, the fact that they present the same pattern is taken to be an indicator of the fact that the interpretation of pronouns as free variables is not an issue which is specific to acquisition.

A second factor that disfavours the interpretation of the violation of pronoun reference as a violation of binding is the fact that, as anticipated, the PIP appears to be absent in the acquisition of simple transitive sentences in Romance languages (French: Jakubowicz, 1984, Hamann et al., 1997, Hamann, 2002,

Spanish: Padilla-Rivera, 1990, Italian: McKee, 1992). For both languages, judgement tasks on DO pronouns have shown that children consistently reject reflexive interpretations of object pronouns, thus being already adult-like much sooner than their Germanic-language speaking peers. This cross-linguistic asymmetry crosses out the problematic assumption that there is simply a delay in the acquisition of a (single) principle of the binding theory, which as part of a linguistic principle of UG should be well rooted in the child's knowledge of language. Furthermore, an acquisition delay account poses a problem of learnability, as children would need to unlearn to use pronouns in reflexive contexts in the absence of negative evidence (Baauw, 2016).

This phenomenon has initially been referred to as Clitic Exemption Effect (CEE), drawing on the fact that illicit reflexive interpretations are found with weak (object) pronouns, while not with clitics. Even in a clitic language, like Italian, if reference is produced through a full pronoun (such as *lei*), children are not spared from PIP (Berger, 1997). At the same time, other results point out that it cannot be the clitic per se to prompt this cross-linguistic asymmetry.

One such fact is that children learning German, a Germanic language that was expected to follow the Dutch/English pattern due to the presence of a weak/strong pronoun paradigm, were found to be at ceiling in interpretation of reflexives and pronouns in transitive sentences in Ruigendijk (Ruigendijk, 2009), thus following the Romance pattern instead, despite not having clitics available for reference. Their performance was considerably worse in so-called Exceptional Case Marking (ECM) constructions (or Verbal Small Clause (VSC)), namely the conditions where the pronoun covers the position of the small clause verbal complement of perception verbs, as in (60).

(60) ... und dann sah die Frau *sich/sie* tanzen

… and then saw the woman *herself/her* dance

… and then the woman saw herself/her dance

[taken from (Ruigendijk, 2009)]

In these constructions, the embedded pronoun is not a semantic coargument of the verb, and coargumentation of the object and the matrix subject is not ruled out in the scope of Principle B, but it is ruled out in Reinhart & Reuland's reformulation of the binding theory by the A-chain condition, according to which a maximal A-chain contains one and only one α_1 link that is both reflexively marked and case-marked.

This result was found both in languages where PIP is present, such as Dutch, where interpretation in ECM sentences is even more exacerbated (Sigurjónsdóttir & Coopmans, 1996), and in Romance languages (French by Hamann et al., 1997, Spanish by Baauw et al., 1997, Italian by Brunetto, 2012). In an act-out task where children heard the sentences and had to act them out using figures they had in front of them, Brunetto found that both 3-year-old children and 4 year-old children perform below chance on ECM constructions (around 45%), with a jump in the 5 year-old children, who are still at 59% correct interpretation (namely rejection of coargumentation between subject and clitic). On these constructions the performance of children speaking Romance languages is thus comparable to that of children speaking German languages. In both Germanic and Romance languages, this is only the case with the object pronoun: if the object clitic is substituted with a reflexive in cases resembling ECM, like (61) below, which feature restructuring, results on the interpretation are coherent with adult-like performance.

(61) a. La fille la voit danser (ECM)

the girl sees her dance

b. La fille se voit danser (restructuring)

The girl sees herself dance

The same asymmetry between object clitics and reflexives was confirmed in Italian by Brunetto (2012). This result specifies that the problem solely concerns pronominal clitics (and some pronouns), and the asymmetry is reminiscent of that found in simple “Principle A” vs. “Principle B” constructions in Germanic acquisition.

Brunetto also tested another construction, the so-called causative *faire par* (62), and showed that even in that case, CEE was not in action (47% correct in the youngest group, and 58% and 60% correct in the two oldest groups respectively).

(62) Papà lo fa abbracciare dalla scimmia

dad him-CL_{masc} makes hug by-the monkey

Dad makes the monkey hug him

This cross-linguistic result, which seems to be true regardless of the type of pronoun the language uses, prompted the idea that the key to interpret the PIP and the other relevant phenomena was the nature of the pronoun. Taken together, PIP and CEE suggest that this asymmetry lies somewhere in between the module responsible for interpreting bound variables and the module responsible for interpreting free variables, i.e., it will be accounted for by the nature of coreference as opposed to binding, and within binding by a difference in the nature of clitics with respects to weak pronouns. Some accounts have been given on the subject.

Baauw and Delfitto (Baauw & Delfitto, 1999, 2005) and Baauw and Cuertos (Baauw & Cuetos, 2003) explain the phenomena of PIP capitalising on the notion of *reflexivisation* rather than on that of binding. Crucially, the authors take Reinhart and Reuland's reformulation of Principle B of the binding theory (Reinhart & Reuland, 1993, given in 2.3.2) to be "an interface filter that prohibits arity reduction in syntax" (Baauw & Delfitto 1999:2). Therefore, arity reduction operations are only licit when they are marked in the lexicon and may not be part of an operation at the level of narrow syntax or to be applied in the course of the interpretation process. Under this view, (63) cannot get a reflexive-like interpretation in adult language because this would mean that the two-place predicate (or *relation*) *praise* would have to be reduced to a one-place predicate (or *property*):

(63) She praises her to the sky

As in Reinhart & Reuland (1993), coreference between co-arguments is generally excluded, but relations can get reflexive-like interpretations through reflexive anaphors. The authors propose that reflexive predicates can potentially be created through coreference in two ways: using two different guises, as illustrated in (64a) -in this case the predicate is *extensionally reflexive*; using one single guise, as illustrated in (64b), in which case the predicate is *intensionally reflexive*.

(64) a. She praises her to the sky (extensionally reflexive)

| |

F G

| |

z z

b. She praises her to the sky (intensionally reflexive)

| |

F F

| |

z z

[taken from Baauw & Delfitto 1999]

Take F to be a guise for “the woman with the blue eyes”, and G to be the guise “the woman with the blonde hair”. In (64b), the predicate is intensionally reflexive because, coreference being established by one single guise, it will hold in all possible worlds. This is not true in (64a), where coreference is established between two guises. In some worlds, these guises will refer to the same referent, in others they will not. The authors propose that the cases in which coreference is licit in adult language are those where pronoun and antecedent introduce two different guises and the predicate is interpreted non-reflexively. In these cases, coreference coincides with binding. If the predicate is interpreted reflexively and the two arguments are thus interpreted as coreferential, in the case of one single guise this will lead to *strong Principle B violations*; if it is between two separate guises, reflexive interpretation will lead to *mild Principle B violations*. The

intuition the authors have about child language is that, when they create a mildly reflexive predicate, they must decide whether Principle B is strong enough to rule out that interpretation or not. Because it is a mild violation of Principle B, they may decide at chance while they are still in the learning stage[9].

The asymmetry between full pronouns and clitics in comprehension has not been found on all forms which can be identified under a broader, non-syntactic definition of clitic. In fact, some Germanic pronouns are considered phonetic clitics on the basis of the absence of stress, such as in English *h'm* for *him* or Dutch *'m* for *hem*. However, these "clitic-like" pronouns do not cause a CEE in young children: Dutch 4- and 5-year olds show a PIP in constructions containing the weak object pronoun 'm ('him') as well as with the full pronoun. At the same time, we saw with German that not every non-clitic pronoun experiences PIP effects. What might be the central distinction between types of pronouns that signals these differences is in their position with respects to the verb: unlike "regular" arguments, clitics undergo movement[10]. According to Baauw and Cuetos (Baauw & Cuetos, 2003) a difference within types of pronouns emerges because Romance clitics do not allow accidental coreference: in their account of syntactic clitics, these, unlike strong pronouns, are always bound variables. Under their account

[9] A further corroboration of this hypothesis comes from results on Dutch by Sigurjónsdóttir & Coopmans (1996), who find that rejection rates of the reflexive interpretation are much worse in c (roughly 20% rejected) than in a and b (roughly 50% rejected):

a. Jan waste hem
John washed him
b. Jan aaide hem
John stroked him
c. Jan weers naar hem
John pointed at him

This in not interpretable in terms of the standard Binding Theory, which does not distinguish between the sentences above, but it is in terms of the Reflexivity model, which distinguishes the ability of a verb to be reflexive-marked. According to this model, verbs such as Dutch waste can be reflexive-marked, while verbs like aaide and weers cannot.

[10] Weak German pronouns, on the other hand, unlike other Germanic pronouns, can occur higher in the clause, in a position comparable to that of clitics, which is referred to as Wackernagel position. See Hamann (2002).

of (syntactic) clitics, it is a possibility that clitics moved outside of their VP situ are interpreted differently than regular vP-internal arguments. In fact, when they move it is understood that they leave a bound trace behind which is bound by a λ-operator. This bound trace could be what prevents clitics from being interpreted as free variables (Baauw & Cuertos 2003). Since reflexive interpretation of a pronoun requires that it be interpreted as a free variable, this option would not be open to clitics, as it would be a strong violation and not a mild one, which are the ones children are more likely to make. This analysis predicts that CEE is in fact structure-sensitive, contrary to accounts capitalising on the clitic's lexical deficiency. Brunetto (Brunetto, 2012) extends the structural account to ECM (and *faire par*) constructions: in fact, if the reduced verbal complement of these structures is assumed to be a vP, there is no c-commanding referential element within the vP that could bind either the clitic which moves out of the vP, or its trace. This has the consequence of opening up the clitic, which is now free, to accidental referential interpretation, and consequently as coreferring with the lexical antecedent. This explanation capitalises on the combination between the nature of the clitic in each specific case (whether it is in its "regular" bound state, or whether it is exceptionally free), and the nature of the verbal complement.

3.2.2 Comprehension of features

Whilst the bound variable status and the syntactic requirements that follow are the core syntax of clitics, these pronouns require an extra step to be associated the correct referent, and thus an extra thing that needs to be acquired, namely the correct interpretation of the gender and number features carried by this pronoun.

Testing comprehension of object clitics in French 4- to 6-year-old children, Zesiger and colleagues (Zesiger, et al., 2010) design a Truth-value judgement task

where the participant sees a picture depicting an action and hears a sentence that he has to evaluate. In the sentence, the clitic could match the number and gender of the relevant character (thus coming out as true), or the number but not the gender (thus coming out as false). The authors found a difficulty in the younger group in the condition of number match but gender mismatch. The gender mismatch violation was detected at chance in the youngest group (about 50% correct) and improved with age (75% of correct detection in the 6-year-olds). Pirvulescu & Strik (2014) design a picture-selection task precisely to test children's sensitivity to gender and number marking on clitics and strong pronouns. Here, children had to select on the basis of the interpretation of the clitic in sentences as in (65)

(65) Three pictures of a child, a banana, and a cake; verb: to eat.

Description: Tu vois? Ici il y a un enfant, la banane, le gâteau.

''Do you see? Here is a child, the banana and the cake.''

Prompt: Montre-moi l'image où l'enfant le mange.

''Show me the picture where the child eats it (masculine).''

The authors find that feature sensitivity is low in both clitics and pronouns in the youngest group (3-year-olds), and an asymmetry between the two types of pronouns is found in all groups, with performance on clitic features being lower. No significant difference was found between type of feature (namely gender vs. number), while both studies found a higher number of errors on masculine vs feminine gender mismatch (namely when a feminine was presented when a masculine was expected).

In Italian, the question was addressed for the gender feature by Orsolini and colleagues (1994). Three groups of children, 4-, 5-, and 6-year-olds were

tested via a picture-selection task on discrimination based on gender features on direct object clitics and indirect object clitics (namely lo/la for the DO and gli/le for the IO). The children were read a story and were asked to point at the relevant character, which in the last sentence of the story was referred to via a clitic (An example of the cue was: "*Si avvicina e la ferisce sulla gamba*", *pro* si-get-near and herCL_{fem} hurts on-the leg, She/he gets close and hits her on the leg). Another factor was the topicality (high or low) and pragmatic predictability of the referent (predictable – non predictable). The authors found that the youngest group's performance in understanding the referent of the clitic was better in the conditions where the strength of the reference was pragmatically enhanced; however, if reference discrimination was solely guided by feature identification on the clitic, namely if the referent did not have high topicality and/or was not highly predictable, performance was lower.

	+ TOP + PRED	+TOP – PRED	-TOP + PRED	- TOP – PRED
4-year-olds	77%	57%	65%	62%
5-year-olds	95%	78%	87%	72%
6-year-olds	88%	90%	83%	55%

Table 3 Adaptation of the results on DO clitics in Orsolini et al. (1994)

Taken together, these results on the ability to use ϕ-features of clitics as discriminating factors in Romance languages indicate that children appear to be able to exploit these features no sooner than the 4/5-year mark.

3.3 Use of clitics in typical acquisition: production studies

So far, we have discussed proofs of the fact that the syntax of clitic pronouns in children is in place from very early on (earlier than 3, McKee 1992), while the

analysis of their features takes a little longer. We now turn to analyse what happens in production of children learning a clitic language like Italian (see Belletti & Guasti, 2015 for comprehensive review).

3.3.1 Omission stage

First of all, studies on spontaneous production show that the element makes a very early appearance in the grammar of children: Leonini (2006a, 2006b) investigating the spontaneous productions of one child reports that at 2 the child already produces a good number of clitics (in 29% of cases when this would be expected), and, once production starts, it quickly increases, arriving at 86% of expected clitics produced at 2;8. Before clitics make their appearance, and while production is still moderate, the child produced high numbers of omissions (between 50-75% omission rates at 1;10-1;11, and 57% at 2). Omissions are taken to be cases where a clitic would be expected but is not produced, and no alternative structures are produced either (namely a lexical noun phrase or a full pronoun), thus resulting in an ungrammatical sentence in Italian.

The presence of an omission stage is confirmed in several elicitation studies as well: using an elicitation task where the pragmatic context for the use of a clitic was constructed, Schaeffer (Schaeffer, 2000) reports high omission rates at age 2 (64%), which virtually disappear by age 4. Importantly, the omission stage in typical development is clearly an optional phenomenon: it is not the case that every time a clitic is expected it is omitted, but rather that sometimes it is produced, while others it is not. Crucially, when they are produced, even during the omission phase, clitics are always *correctly located*, meaning that there are no misplacement errors. This result is in line with results on comprehension of the relevant structure, further confirming that the syntactic construction underlying clitics seems to be one of the first aspects to be in place.

3.3.2 Production of morphology

As we have seen in the previous chapter, with the two-step movement to their target position, clitics stop in AgrP, thus triggering a further morphosyntactic operation: past participle agreement. Here, the features of the clitic, both number and gender, are reflected on verb morphology (as in (66)).

(66) (La ragazza/il ragazzo) L'ho incontrata/o davanti al cinema

(The girl/the boy) (I) CL-have $met_{fem,sing/masc,sing}$ in front of the cinema

(Le ragazze/i ragazzi) Le/li ho incontrate/i davanti al cinema

(The girls/the boys) (I) CL-have $met_{fem,plur/masc,plur}$ in front of the cinema

[taken from (Belletti & Guasti, 2015)]

Exploring the abilities of children learning Italian on the clitic-verb agreement operation, both Hyams & Schaeffer (2008) and Moscati & Tedeschi (2009) find that the correct production of verb agreement seems to correlate with the actual production of the clitic. Hyams and Schaeffer perform an analysis on the responses to Schaeffer (2000)'s elicitation task, and find that the youngest group (2 year-olds), where children are still in the omission stage, past participle morphology is practically only realised when the clitic is realised as well; if the clitic is omitted, the verb has no morphological marking (-Cl -PstPrt Agreement 44% of the time and +Cl +PstPrt Agreement 44% of the time in the 2yos). Children have adult-like performance already at 3. Results are similar in Moscati and Tedeschi (2009), who find zero occurrences of the -Cl +PstPrt Agreement type even in the youngest group (2yo).These results are consistent with general results on verb morphology (Guasti M. , Verb syntax in Italian child grammar: Finite and non-finite verbs., 1993/4), and highlight that children clearly have in mind the important relationship between a clitic and its host verb.

3.3.3. Knowledge of the pragmatics of clitics

When discussing production, we have focused thus far on the (morpho)syntax of clitics, as we saw that they appear early in life, they are correctly placed, and verb agreement triggered by the clitic is correctly produced every time the clitic is produced. We also saw that for a short, but crucial, period of time, clitics undergo a phase of omission. Omission is usually taken to mean that the structure that would be expected is, at least at that moment in time, too hard for the participant to produce. Another strategy is that of producing an alternative structure to avoid producing the clitic to compensate a lack of confidence in the production of the clitic itself. The possible alternatives to clitics could be: strong pronoun[11] or lexical expression. Results on production consistently show us that children either omit the clitic or they produce a lexical noun phrase, without ever (or very rarely) resorting to the strong pronoun. This is an important result because it suggests that not only do children have syntactic knowledge of clitics from early on, they also are aware of the different informational values the different types of pronouns have and are reluctant to use them interchangeably. While using a noun phrase in a context where the referent has been already mentioned in the preceding context sounds pragmatically redundant, it is signalling a change of class; in a system which has both clitic pronouns and strong pronouns, these have very specific contexts, with the former being the neutral pronominal form and the latter being used for focalisation, disambiguation, or correction of a statement. Lexical noun phrases may be less favoured when the referents are prominent, but they can be acceptable as substitutes of both the clitic and the strong pronoun; clitics and strong pronouns on the other hand are very strong competitors with different roles, and do not interchange very easily. Children

[11] Strong pronouns are the other pronouns available in the pronoun paradigm in Italian, as the only weak pronouns available in Italian (nominative *egli, ella, essi, esse*) are obsolete. The only remaining trace of weak pronoun is dative *loro*, which is rarely used in colloquial Italian (Cardinaletti, 1991, Cardinaletti & Starke, 1994)

learning a Romance language seem to have this clear in mind from early on. This result is found both in elicitation tasks, where clitics were either omitted or substituted with NPs (Schaeffer 2000), and in spontaneous speech, where the pattern was similar (Leonini 2006a, b). An analysis of corpora of 20 French-speaking children in natural dialogical settings of ages spanning from 1;10 to 3 yielded similar results on clitic pronouns, with children using them from their onset to maintain reference rather than to introduce new discourse objects (Orvig, et al., 2010).

Interestingly, on this pragmatic aspect of "knowing pronouns" Romance-language speaking children and Germanic-language speaking children seem to be on the same page. In a corpus study testing the Givenness Hierarchy (Gundel et al., 1993), Gundel and Johnson (Gundel & Johnson, 2013) investigate the ability of children aged 3 or less to respect the levels of the framework. The framework elaborates on the concepts of given/new by subdividing into six categories the possible levels of givenness of the referent under discussion. To each level will correspond a cognitive status of the interlocutor, and each level is a necessary and sufficient condition to use the associated referring expression and entails all lower statuses.

(67) The Givenness Hierarchy:

topic > activated > familiar > uniquely identifiable > referential > type identifiable

{it} *{this... N}* *{that N}* *{the N}* *{indef this N}* *{a N}*

[adapted from (Gundel & Johnson, 2013)]

According to their analysis, very young children already use the relevant referring expression for the given element, namely the topic of the current

sentence, over 95% of the time. This means that children have the pragmatic requirements for the corresponding element, namely the weak object pronoun, in place already at 3: they use it coherently when the referent was mentioned earlier in the sentence, and rarely make the mistake of assuming it was in focus when it was not (thus overextending it). The overall picture considering all referring expressions allows the researchers to conclude that children use the full range of referring expressions appropriately in spontaneous production by age 3 or earlier.

3.4 Open questions

The discovery of the CEE in pronoun comprehension in children learning a Romance language seems to say that learning to understand clitics is easy, despite (but actually more plausibly because of) their density of properties, and the construction which does not follow canonical argument construction. We anticipated part of the discussion on what it is that brings about this advantage of clitic over regular weak pronoun in comprehension, but further data on the CEE and some unsolved questions on production open more interpretations on the "easiness" of this construction. This is important to connect results on comprehension and results on production, where we have seen that while appearing in the language early, clitics are problematic to compute until later on.

The majority of the studies on acquisition of clitics, we have seen, have been limited to a specific instance of the pronoun, namely 3rd person direct object clitic in proclitic positions. Data on other types of clitics come from Silva (2010). Wanting to investigate use of null objects (which is licit in some domains in Portuguese), she tested production of 1st,2nd,3rd person singular and plural direct and indirect object clitics in enclisis, proclisis, and island contexts in Portuguese children. Participants were shown an interaction between two puppets, and then

one of the puppets would ask them something regarding what happened (for example, the puppet would say something like “I was distracted! What did grandma do?”). The participants’ age covered four groups, from 3 to 6. The author finds no significant difference between the accuracy on production of direct object clitics and indirect object clitics, as well as similar omission rates. The only difference she finds is a higher production of strong pronouns in place of the indirect object clitic. As was expected, she found a significantly higher production of 1st and 2nd person clitics over 3rd person clitics. No significant difference in the production of null objects was found between proclisis and enclisis. The position of the clitic with respect to the verb was also tested in Mantione (2016). While her data are mainly on developmental dyslexia, her control groups, namely one age-matched to the experimental group (mean age 9;4), one reading-skills-matched (mean age 7;2), and one of younger children (mean age 4;4) give an initial idea of the differences in development. The children were shown a video representing a character asking another character to perform an action and were asked to answer a question. The probes elicited the production of a DO clitic either in proclitic position (“Cosa fa fare la maestra a Maria?” *What is the teacher making Maria do?*) or in enclisis (“Che cosa ha detto di fare il papà con la mucca?” *What did dad say to do to the cow?*). While the production of the oldest group does not vary on the two conditions, the 7-year-olds and the 4-year-olds both produce more proclitics than they do enclitics.

Cuervo & Pérez-Leroux (2015) carry out a corpus analysis of longitudinal spontaneous data of two children from Spain in order to check for the production of clitic clusters. The children are approximately 12 months old in the first recordings, and the researchers find the first instances of clusters appearing at around 2 years of age. These first instances, the authors note, are already productive in Maria, who uses different clusters with different verbs, while Emilio starts showing productivity a few months after his first instances, at around 2;6.

During the period of the study, which covers until the children reach 3, approximately, the overall rate of cluster production rises to 37.5% for Marìa and 46% for Emilio of total produced over possible contexts. Among the alternatives to clusters, full DPs are the most frequent for Marìa especially (91%), and for Emilio (55%); Emilio produces a great number of licit null arguments (44%), while Marìa rarely does (5%). Importantly, the children show low error rates, with some omissions, they produce the clusters in the correct position and they respect their internal order in all but a few cases, and with no illicit feature combination. The authors conclude that clusters do not seem to be more difficult than single clitic. Comparing omission rates of single clitics and clusters for both children, they find no significant difference.

3.5 Conclusions and research direction for present work

There is a substantial and robust body of work on acquisition of object clitic pronouns in typical acquisition. This research has allowed us to draw some important conclusions regarding this both derivationally and pragmatically complex element. In spontaneous production this appears very early, earlier than 2. At this stage, typically developing children are still struggling with it, and go through a robustly attested phase of omission. During this phase, the child is nonetheless aware of the pragmatic contexts in which a clitic would be used, and those are the contexts in which the child omits them (the omission stage does not characterise contexts in which an NP is expected, for example (Tedeschi, 2009)). Both results on spontaneous speech and from eliciting studies show that by age 3/4 omissions virtually disappear and the pronouns are in place. The child is also aware of the syntactic construction of clitics, never misplacing them. Furthermore, comprehension studies show that knowledge of binding constraints on the interpretation of clitics in simple sentences is also in place early on, thus disfavouring coindexed interpretations. However, constructions such as ECM and

faire par have been shown to admit some degree of ambiguity for children, who struggle in rejecting the subject of the matrix clause as the antecedent for the object clitic. These results which hold both in clitic languages and in some Germanic languages could suggest that issues with ECM (and possibly *faire par* constructions) are beyond pronoun-specific properties. Moreover, results on gender and number features show that children are not in tune with the morphological level of clitics from the start, and at 4/5 they are still unable to discriminate between competing referents solely on the basis of phi-features such as number or gender. These ϕ-features are also involved in the production of agreement with the verb. When they are in the omission phase, children often omit agreement marking on the verb if they also omit the clitic; as soon as omissions get lower, agreement marking increases.

Regarding the status of clitics in acquisition, and indirectly the extent of the CEE, we saw there are still the open questions on the acquisition of other instances of the clitic. Widening the scope of the tested clitics would allow to investigate whether clitics with a less direct relationship with the verb (namely indirect objects), or more complex clitics (namely double object clitics, also known as clusters) have a similar pattern to the more widely tested DO clitics. Furthermore, it is still to be confirmed if a different type of movement and target position of the clitic influences performance (namely enclisis). These are all relevant aspects both for typical acquisition and atypical populations, and data from Italian could contribute to these aspects.

Chapter IV: clitic pronouns in non-typical populations

4.1 Introduction

The profile we have explored thus far for typical acquisition is convergent on two things: comprehension of DO clitics in simple contexts is an easy process to acquire when it comes to banning referential interpretation on syntactic grounds, and clitics appear early in production and the discourse conditions for their use is in place from the start; but a consistent period of omission in production as well as a persistent difficulty in assignment of reference to the correct one between two competitors based on features alone show that, unlike other elements of the clause, clitics are still perceived as hard to produce when they first appear. This becomes even more apparent when we look outside the boundaries of typical acquisition. Doing so forwards knowledge of the phenomenon in typical acquisition, because it gives other hints as to what aspects of it or what contexts or underlying processes are perceived as easier or harder, whilst also highlighting aspects it may be worth paying attention to when investigating the language abilities of (presumed or actual) non typical populations.

4.2 DO clitics in multilingualism

4.2.1 Bilingual/early L2 children

Early L2/bilingual acquisition is an interesting mode of acquisition to check for potentially permeable constructions. Research on children learning Italian in the

condition of early (simultaneous or successive) bilingualism shows a similar pattern of typical monolingual acquisition, with some differences is the timing and in the alternative productions.

Spontaneous productions of object clitics in Italian children were investigated in the longitudinal corpora by Ferrari (Ferrari, 2006) and Serratrice and colleagues (Serratrice et al., 2004)[12]. Ferrari's work offers insights on the productions of clitics by two German/Italian children, Vincenzo (2;5 – 3;0) and Elisa (2;10-3;5), and Serratrice and colleagues' on the productions of null subjects and null objects of one English/Italian child (Carlo, 1;10 – 4;6) growing up in Scotland in an American-Italian household. All children's other language was a Germanic language, not implementing clitics in their pronominal system and not allowing for null objects. Crucially, all three children show a prominent stage of omission, just like their Italian monolingual counterparts. This is clearly not a case of competing settings of the two languages they are learning, as neither of the two alternative structures allows for a null object. Importantly, it is also not the case that when speaking Italian, the children are substituting the clitic with a strong pronoun, which would be available in Italian and possibly mimic their other language. In fact, production of a strong pronoun as an alternative to the clitic does not seem to be an option for these children. So, bilingual children, just like monolingual ones, have a clear idea of the identity of clitics, but they need some time before feeling confident in their use. The time they need is one of the aspects where they seem to differ from their monolingual peers: in fact, when the monolingual children are around 2;8 (data from Leonini reviewed previously, Leonini 2006a,b), their production rate is already very high (around 86%), whereas at the beginning of their recordings the two German/Italian children are still producing clitics in slightly more than half the contexts where they would be

[12] Similar results were found in early L2 speakers of French in speech samples (Adiv, 1984; Paradis, 2004; White, 1996).

expected (Vincenzo 57%, Elisa 59%)[13]. What is interesting to note is that despite the difference in productions, the omission rate in these children is perfectly comparable to that of the monolingual child in Leonini (2006a,b). This reveals that there *is* in fact a structure they resort to more frequently than the monolingual child does, namely the production of lexical noun phrases (Vincenzo 39%, Elisa 29%). This is a welcome result because it shows that even though bilingual children are less confident in the use of pronominal clitics, resorting to an ungrammatical sentence such as a null object sentence is never a favoured option[14]. Their high production of full NPs on the other hand shows that, while conscious that strong pronouns are not a good alternative, bilingual children find cliticisation harder for a considerably longer period of time. Because the language next to Italian for all three children was a non-clitic language, it could be worth exploring this as a factor for the delay, but elicitation studies offer a more detailed interpretation.

An elicitation task targeting production of DO clitics was implemented in Vender and colleagues (Vender, Garraffa, Sorace, & Guasti, 2016) to test the use of this structure in early L2 learners of Italian coming from a variety of L1s. The authors tested three groups of L2 children: L1 Albanian, L1 Romanian, and L1 Arabic, as well as a control group of monolinguals. As a requirement, they had to be exposed to their L1 from birth and have had at least 1 year of exposure to Italian. Length of exposure varied from child to child. The 120 children were age-matched (with a mean age of around 4;8 in all groups). It is important to note that all the languages they were native speakers of are clitic languages: Romanian and Arabic inflecting for person, gender, and number, and Albanian for person and

[13] Here, the corpus by Serratrice et al. (2004) is less directly comparable, as their stages of analysis are divided by MLU and not age, and their analysis focuses more on the presence/absence of null subjects and objects rather than on the alternative structures.

[14] It is interesting to note that their pattern is very similar to that found for adult L2 learners in Leonini & Belletti (2004) in a controlled production experiment.

number. Results are reported in Table 4. All experimental groups performed considerably below the monolingual control group in terms of total number of correctly produced clitics, with two groups around chance (ALB and RUME), and one below (ARA). However, analysis of produced answers shows that if the overall number of produced clitics (correct and incorrect) is considered, ALB and RUME reach MON performance (around 80% of both L2s, and around 89% for MON), while ARA remains at 53%. From these results, it is clear that in the older children the pattern has shifted from that of the children we saw in spontaneous production: while their number of correct productions is still lower than that of the monolinguals, they no longer omit and they no longer produce lexical NPs, following a natural monolingual-like development. All children's most common mistake is now the production of an incorrect clitic, namely showing errors of gender, number, gender and number, or case. Importantly, the errors were never of misplacement, just like in monolingual typical acquisition[15]. By age 4/5, EL2 children have mostly dropped all alternative answers to the clitic, but at this stage their use of clitic is still prone to error. The types of errors were mostly towards favouring the unmarked or neutral clitic, namely masculine for feminine and singular for plural.

[15] It is important to remember that all L1s were clitic languages. When the dominant language is a non-clitic language misplacement errors have been attested in French early L2 speakers, with the clitic wrongly appearing in a postverbal position typically dedicated to the lexical NP/strong pronoun or attached to the past participle in compound verbs (Adiv, 1984; Granfeldt & Schlyter, 2004). However, the frequency of this alternative answer remains very low, preceded by lexical productions and omissions (Paradis, 2004; Rogers V. , 2009; White, 1996; Belletti & Hamann, 2004). Interestingly, Belletti & Hamann find placement errors in an early L2 child speaker of French with L1 German, Elisa, but not in Lorenzo, a successive bilingual speaking Italian and French.

	Target	Incorrect_cl	NP	Omission
ALB	48%	33%	6%	4%
ARA	29%	24%	9%	9%
RUME	51%	29%	6%	8%
MON	73%	16%	6%	3%

Table 4 Mean percentages of accuracy in Vender et al. (mean age 4;8) (2016)

As we have anticipated, all first languages were clitic languages, and yet the children in these groups are still struggling in their use of correct clitics. Therefore, it is not the case that a non-clitic L1 is what determines hardship on the use of clitics. Moreover, even clitic languages might offer contrasting structures that may lead to transfer issues. In Arabic, for example, clitics are always enclitic, so the canonical proclitic position that Italian adopts for matrix verbs is not adopted. Despite this, the ARA group did not have placement errors[16].

4.2.2 Adult L2

When clitics are learnt as part of a second language later in life, the pattern they reveal shows some crucial differences and some crucial similarities to the one we saw for monolingual and bilingual children. While the fact their supply of clitics in elicited contexts is low is not in itself unexpected (39% of elicited clitics in Leonini & Belletti 2004, 28% in Leonini 2006a,b for Italian), particularly when these individuals with mature L1s do not have the clitic as part of the options available in their native system. However, the structures that are used when clitics are elicited make an interesting picture. First of all, DO clitics are frequently dropped,

[16] The results for the ARA group, which are considerably lower than those of the other groups, are explainable in terms of lower *cumulative length of exposure* to Italian, which was again considerably lower at group level than for the other groups. A side result of this study was in fact the high impact of this value over length of exposure or age of acquisition: lower scoring in the pre-tests (vocabulary and comprehension tasks) correlated highly on the length *and* amount of exposure the subjects had (Vender et al. 2016).

thus producing an illicit sentence in most clitic languages. As we have seen earlier, this is the plausible reason why omission is overcome quite quickly in children. The most common alternative answer in adult L2 speakers is the production of a lexical NP. Because there is no reason to believe that adult speakers have an unclear understanding of the pragmatic differences between the two elements, this can be viewed as an avoidance strategy. This is confirmed if performances are divided on language level as in Leonini and Belletti (2004), whose participants had various levels of L2 Italian, decrease in omissions correlated with increase in clitic production and decrease in production of lexical NPs. Importantly, the production of a strong pronoun is not a valid alternative in adult language just as it was not in child language. Interestingly, some studies report some instances of placement errors on the clitic (Granfeldt & Schlyter, 2004, for instance), while others do not (Leonini and Belletti 2004).

4.3 DO clitics in clinical populations

4.3.1 Developmental Language Disorder

Developmental Language Disorder (DLD, a more generic and more encompassing denomination for Specific Language Impairment) is understood to be a condition where individuals suffer language impairment in the absence of cognitive impairment (Paul, Norbury, & Gosse, 2018). DLD has been shown to have a sensitivity towards specific constructions, namely those that arguably imply a more complex degree of linguistic computation. For example, many of the children with a (syntactic) DLD exhibit limitations on grammatical morphemes such as verb inflections and free-standing functional elements (Leonard L. B., 1998). Apart from being one such functional item, the clitic pronoun and the cliticization process, as we have seen so far, may classify as requiring a high cognitive load due to all the relevant morphosyntactic computations that are

required to produce a correct syntactic clitic. Because of this, and because typical children by age 3 master most aspects of this construction, clitics have qualified as an early marker for DLD (French: Jakubowicz et al., 1998, Hamann, et al., 2003, Tuller et al., 2011, Italian: Bortolini et al. 2002, 2006, Arosio et al 2010, 2014 inter alios).

Bortolini and colleagues (2002, 2006, replicating Leonard et al., 1992) investigate the production of DO clitics as well as other plausible candidates to mark for clinical impairment in Italian. To elicit DO clitics, the experimenters show the child two drawings, describe the first one and prompt an answer on the second, as in (68).

(68) Qui la bambina compra il gelato (first drawing), e qui … (second drawing)

here the child buys the ice-cream (first drawing), and here…(second drawing).

The expected response contains a DO clitic (…lo mangia pro it-CL eats). Children older than three -the age assumed to be the threshold for adult-like answers from typically developing children and spanning from 3;7 to 6;0 approximately (3;7 to 5;6 in Bortolini et al., 2006 and 4;0 to 6;0 in Bortolini et al., 2002) and with a diagnosis of SLI were tested. The authors consistently find that the children with an SLI diagnosis are significantly less likely to produce the target object clitic than their TD counterparts (26% of target clitics produced in the SLI group, 96% in the age-matched controls). Importantly, the non-target answers consisted in the overwhelming majority of cases in omissions. This is an interesting piece of information, considering that, as we have seen, omission is the first (and only) type of error that typically developing children experience when they are younger. Only a few instances of incorrect clitics (with errors on

both gender marking and position) were found in this study. It must be noted however that Bortolini and colleagues choose to discard the responses in which answers provide a lexical NP, thus not providing information about this alternative answer.

Omissions were also the most frequent type of error in a study on Italian by Leonard & Dispaldro (2013), who tested production of clitics with and without priming: SLI children were much more likely to omit the clitic in the non-primed condition (where the prompt contained an NP – around 68% omitted) than in the primed conditions, allowing for a facilitation effect (around 30% omitted) In the primed conditions, which contained a clitic that was not the clitic that would then be elicited in the prompt, there was a significant number of incorrect clitics supplied as well. Leonard and Dispaldro also checked for the production of null subjects, which are the unmarked realisation of subjects in Italian, and found that the children with SLI performed like the controls on this measure. This is a crucial result regarding the specificity of the impairment as well as the difference between types of pronouns and their acquisition. Importantly, a similar result has been obtained for French, where in contrast the unmarked subject is realised through a weak pronoun, also known as phonetic clitic. In a study on spontaneous speech of children with an SLI diagnosis, Hamann and colleagues (2003) find that both the younger group (over 3;10 and under 5 years of age) and the older group (over 5 and under 8) frequently fill the subject position with subject clitics (63% of the relevant clauses in the younger group and 91% in the older group), rarely producing lexical subjects (in which the authors include NPs and strong pronouns) and omissions. On the other hand, productions of clitics in object position remain very low in both age groups in contexts where they would be expected, with the younger children omitting the object altogether at a mean frequency of 4.5 occurrences out of a mean frequency of 27.5 obligatory contexts and producing it at a mean frequency of 5. Another interesting asymmetry in this respect was

found between 1st and 3rd person accusative clitics: Tuller et al. (2011) and later Durrleman & Delage (2016) find that whilst performance on production of 3rd person object clitics is in fact impaired in SLI, the same is not true for 1st person object clitics, where they perform well.

The difference between subjects and objects shows that the problem does not lie in discourse pragmatics: in fact, DLD participants have no issues in selecting the discourse-appropriate form of the subject (null in Italian, realised as a weak pronoun in French, in the examples above). The production of these subjects is arguably not computationally complex, unlike the cliticisation process. On the same token, the fact that 1st person object clitics are spared, at least in French, confirms the fact that this impairment is tied to the syntax of clitics: first (and second) persons are always discourse-independent, in that they always refer to either the speaker or the addressee, so no structural reference is to be built within the syntactic space of the sentence; furthermore, third persons carry more morphological markings, carrying both gender and number, adding to the complexity of the computation.

Research on older participants shows that the difficulty with production of clitics is not just an early phenomenon of DLD, but rather it permeates later stages of childhood (for French the older group of Hamann 2003, mean age 6;9, for Italian Arosio et al. 2014, 6;0-9;11, mean age 7;3 and Guasti, et al., 2016, mean age 6;7) and all the way into early adulthood (French, 11;5–20;5, mean age 14;8 Tuller et al. 2011). The comparison between the younger and the older participants reveals a big improvement in the older children (in Guasti and colleagues, who examined the production of two age groups together, the 5-year-olds are at 44% target, and the 7-year-olds at 71%), but they still lag behind their age-matched TD peers. In a longitudinal single-case study of an SLI Italian child from 6;2 to 9;4 years of age, Bottari and colleagues (Bottari, Cipriani, & Chilosi,

2000) analyse spontaneous speech focusing on different productions of clitic pronouns. Apart from confirming the overall pattern of few clitic productions and the presence of clitic omissions, their data adds interesting information regarding occurrences besides the DO clitic in simple constructions. In particular, their child shows almost no instances of clitics in past participle constructions, and those that appear are only in the later stages and only in 1st/2nd person (with which the past participle does not need to agree), and the total absence of clitic clusters. Most produced clitics are in proclitic position, and not enclitic.

Another crucial result from these studies on later stages resides in the analysis of the alternative structures produced. Whereas we saw that studies on earlier stages converge in finding as the most frequent -sometimes the only- error the omission of the relevant element (and of any overt object, which we remind to be an ungrammatical alternative in Italian), older individuals with SLI supply a low number of omissions and a high number of lexical noun phrases in place of the relevant pronoun[17]. It seems plausible to think that this overuse of the lexical noun phrase in a later stage mirrors a better awareness of the ungrammaticality of a null object, and thus these older individuals, whilst still struggling with the computation of cliticization and also wanting to avoid an illicit construction opt for the less discourse-appropriate but grammatical construction with the NPs.

4.3.2 DO clitics in other atypical populations with no cognitive impairment

Clitics, as we have seen, have been proposed as early clinical markers for DLD. While it is true that the use of clitic pronouns is problematic from the start in DLD, and that in this population there is a clear pattern in their (mis)use both in the same age group and in acquisition, it is unclear to what extent these are markers

[17] However, if the production of clitics is simplified, as it was in Guasti et al. (2016), where the authors adapt Arosio et al (2014)'s design with modifications on the verbs and lead-ins so as to promote the use of clitics even further, accuracy is higher in the older group and they do not produce as many lexical NPs. See Guasti et al. (2016) for discussion.

that are specific for this condition, and to what extent they could be considered a general marker for language impairment. In fact, issues with cliticisation have been found in several other populations that show a degree of language impairment.

Another population which has normal intelligence, a normal language faculty but restricted access to a language input is that of individuals with prelingual mild-to-moderate hearing loss (MMHL), and deaf individuals with cochlear implants. Thirty-three children pertaining to the latter group have been tested on clitic production in Guasti and colleagues (Guasti, et al., 2014). Participants were implanted between 12 and 56 months of age and were 50 to 82 months of age at the time of testing and had not been exposed to sign language. This means that for the first few years of their lives, these children were exposed to no language. Background tasks on lexical, pragmatic, and phonological knowledge showed a general disadvantage with respects to their age-matched controls, but no severe delay. In an elicitation task taken from Arosio and colleagues (2010), participants were prompted to produce 3rd person DO clitics in a compound tense (with agreement on verb morphology) and in a simple tense (with gender/number features on the clitic). Results showed that children with cochlear implant (CI) produced fewer clitics than normal-hearing children (NH), as well as failing more frequently in producing obligatory past participle agreement. Importantly, the authors claim that despite being weaker than their age-matched controls in production of clitics, the CIs seem to follow the same pattern of development. In fact, error analysis shows that the most common mistake is omission, just like it is in younger NH typically developing children. Failure to produce past participle agreement is also a commonality with the younger TDs. Interestingly, more than with chronological age results from CIs seem to correlate with length of CI use (namely length of exposure to language, which varied within the group). Tuller and colleagues (2011) make a similar

discovery for adolescents with MMHL. The group consisted of 19 participants with a mean age of over 13 with a diagnosis of bilateral, sensorineural, prelingual hearing loss with a PTA (pure tone average) of 20 and 70 dB. Tested on production of accusative clitics and weak subject pronouns, while comparable to the control group of 11-year-olds on the production of subjects, their mean production rate for 3rd person object clitic was lower than that of the TDs, despite the few years age gap (MMHL 85% mean, TD 97.9% mean). Despite the fact that these individuals, contrary to CIs in Guasti et al., have been exposed to at least some language from birth, and despite their older chronological age, the production of the accusative clitic is still marking a degree of linguistic weakness.

Through the now familiar elicitation tasks, a number of recent studies have tested this structure in Developmental Dyslexia (DD). DD is a generic term encompassing disorders interfering on different levels with the acquisition of phonology and consequently reading and writing skills, once again in the absence of cognitive impairment. While their specific impairment resides in reading and writing, difficulties with more complex syntax could be experienced due to phonological short-term memory and working memory deficits found in (some individuals in) the population (Beneventi, et al., 2010, Vender, 2017). Nine-year old children with DD were tested in Guasti (2013) within an analysis of oral abilities of children with this diagnosis, and Zachou and colleagues (2013) in their production and ability to detect clitic omission in comprehension. Both studies find that DD children at that stage, where clitics are well established in TD, are producing fewer clitics than their age-matched controls (as well as being less aware in detecting illicit omissions). Guasti points out the importance of looking at individual results for this population; in fact, in her study some of the participants performed at the same level as the controls. Similarly, there was a subgroup of children whose performance was considerably lower than the mean (around 20% target answers). In her doctoral thesis, Mantione (2016) explores

the relationship between production of clitics and working memory requirements, by designing a task that combines two levels of syntactic requirements, namely presence and absence of Agreement, and two levels of WM requirements, namely high and low. Children are shown images and auditory stimuli and are asked to answer a question. In the low-WM condition, there was no distractor between the first stimulus and the question regarding it, while in the high-WM condition there were distractor stimuli between them. The agreement condition depended on whether the prompt elicited a present tense or a compound tense. Overall results showed that children with DD at 9 (mean age 9;4) performed worse than their age-matched controls on all conditions, and that decrease of WM load correlated significantly with accuracy in the DLD group but not in the TD controls. Mantione's data confirm great variability when it is checked at individual level, with 7 out of 20 subjects performing like the controls.

Looking at the error pattern of the participants that do show an impaired performance on object clitics is useful for our purpose to detect specificity in the patterns of different populations. In the studies discussed, the most common mistake in this population was clitic substitution, namely the production of a clitic with the wrong number or gender features, or even in the wrong case (indirect instead of direct, in Mantione (2016)).

4.3.2 The complex case of Autism Spectrum Disorder

Autism Spectrum Disorder (ASD) is a developmental disorder one of the main symptoms of which is a difficulty in communication in terms of discourse abilities. The extent of this impairment in the language domain has been at the centre of a great body of work and is still under discussion. The main reason why it is difficult to reach definite conclusions is the fact that, as the name suggests, this pathology is a spectrum, an umbrella term under which there is a wide variation in the type and severity of symptoms experienced. In particular regarding

language, the topics under discussion are the placement of the linguistic impairment -namely if it only pertains to discourse-pragmatics, which is directly derived from their cognitive profile, or to other areas which would derive from a linguistically specific profile-, whether there exists a specific subgroup of the spectrum which has more impaired language, and what it is that drives the more severe cases of language impairment.

In fact, while it seems to be the case that a general claim on the language skills of ASD is not descriptive enough due to the high variability in the linguistic abilities of this disorder, many studies carried out thus far on formal language, both general linguistic assessments and more specific syntactic investigations, found a disadvantage in some if not all participants of their ASD group with respects to the control groups of typically developing children (Roberts et al., 2004, Kjelgaard & Tager-Flusberg, 2001). Various studies have found the variability of results to be great enough to justify a distinction between ASD with language impairment (usually referred to as Autism-Language Impairment, ALI), and ASD with normal language (Autism-Language Normal, ALN), with the latter group showing a performance on the same level of that of the typical groups, and the former presenting a pattern of language impairment (Kjelgaard & Tager-Flusberg, 2001., Modyanova et al., 2017, Tuller, et al., 2017 inter alios). Results obtained thus far on clinical markers seem to be in line with the idea of a general linguistic disadvantage in children with ASD. Studies featuring nonword repetition find the phonological abilities of their participants to be compromised with respects to their TD controls (Durrleman & Delage 2016, Riches, et al. 2011 among others). The same is true for sentence repetition tasks, with issues on different grammatical structures across the board.

One area where several testimonies of linguistic gaps in children with ASD competence is that of use of pronouns. Both avoidance and reversal of first- and

second-person pronoun were found to be more frequent in production of English-speaking ASD children than in language-matched TD children in a study on spontaneous speech on children with ASD (31.64 months old at the time of the first recording) (Naigles, et al., 2016). Similarly, in a narrative task (Terzi et al. 2019), Greek-speaking children with ASD produced less overt pronouns than TDs (thus preferring to repeat names or use referential expressions such as DPs), and produced more errors of ambiguous pronouns when using them (i.e. producing a pronoun with no antecedent or more than one plausible antecedent). The preference for names or referential expressions was replicated in elicitation of first-, second-, and third-person (full) pronouns in Italian-speaking children (Mazzaggio & Shield, 2020), as well as with deaf ASD children signers of ASL when elicited to produce a first- or second-person pronoun (Shield, Meier, & Tager-Flusberg, 2015). As for comprehension, which we know to require the correct application of syntactic rules in order to correctly establish coreference, Perovic and colleagues (2013a,b) test two groups of autistic participants (6 to 18 years of age) one ALI and one ALN (grouped according to their scores on pre-tests on receptive and expressive vocabulary) on a two-picture selection task on disambiguation of the referential relations between pronouns and reflexives and potential antecedents (Principle A and Principle B). Their results show that the ALN group perform similarly to the controls by showing good performance on Reflexive and control conditions (thus showing a mastery of c-command), but significantly poorer performance for the Noun-Pronoun condition. Here, they tend to assign a reflexive reading to the pronoun. The authors attribute the poorer performance of both TDs and ALNs on pronouns to the chronological age of the participants, half of which (in each group) are below the age of 6;6, which is approximately the upper bound of the age at which DPBE/PIP is still observed. The ALI group on the other hand also shows low performance on the reflexive condition, which the authors attribute to the interpretation of the semantic

relations of binding. Tested on comprehension of strong pronouns, clitics and reflexives via a three-picture selection task, Greek-speaking high-functioning ASD children (mean age 79.8 months) were less accurate than TD participants in comprehension of clitics, but not of pronouns or reflexives (Terzi et al., 2014), thus comparing to Perovic and colleagues' results of the ALN group on these last two measures. This interesting result could indicate that while pronouns are not problematic for ASD children unless there is either linguistic impairment and/or cognitive disadvantage, clitics constitute a domain of grammar which may be affected in the population. Interestingly, the presence of a third picture allowed for two types of mistakes, namely a reflexive interpretation of the pronoun (like in Perovic and colleagues 2013a,b), but also a theta-role reversal between patient and agent. Terzi and colleagues found the majority of errors to be of this type and attribute the disadvantage to plausible insufficient familiarity with the pragmatic and prosodic conditions that license the presence of a clitic. That clitics may in fact be an area of possible impairment seems to be confirmed in production (Greek: Terzi et al., 2016 (mean age 6;11), French: Durrleman & Delage 2016 (mean age 9;07), Prévost, et al., 2018 (mean age 8;7)). Studies on French find performance in the language-impaired groups to be worse than that of the controls in particular on 3rd person object clitics[18]. On the other hand, Terzi and colleagues find that performance in production of clitics in Greek children is overall less accurate in ASD than in TD on the comparable task testing 3rd person DO clitic even if the participants are classified as high-functioning.

These results are certainly in line with the uncertainty revolving around the linguistic abilities of this population, as is the fact that, when errors in production are found, there does not seem to be a clear pattern like we have seen in other

[18] Production of 1st person object clitics was significantly higher even in the language-impaired groups, and TD-like in the ALN groups. This is reminiscent of the result on clitic production in SLI by Tuller et al. (2011) discussed in paragraph 4.3.1.

populations (and like there was in the comprehension study by Terzi and colleagues 2014). All studies mentioned here find both cases of omissions and of production of lexical noun phrases. Crucially, the one mistake that is not really attested is production of alternative instances of the clitic: when they produce it, they produce the correct one. Another error that is attested and that we find here for the first time is that of role reversals, attested both in comprehension and in production. This is a mistake that draws from the (in)ability to correctly interpret the roles played by the actors in the scene and is very much in line with the issues of Theory of Mind that are characteristic of this population. While these error patterns mostly reveal a strong pragmatic profile, it is still unclear whether the syntactic core of clitic pronouns is in place in this population, especially if levels of computational complexity are added.

4.5 Conclusions and research direction for present work

As we have discussed, clitic pronouns have been tested in a variety of non-typical populations, both clinical and non-clinical. The most important results from these studies have been that the cliticisation process is in fact confirmed to be hard, and that different linguistic profiles seem to determine the types of alternative productions that are given when a target clitic is not produced. When the acquisition of cliticisation is driven by a specific linguistic impairment, like in the case of DLD, the strategy is avoidance: younger children omit completely, thus producing an illicit sentence, and older children produce NPs. When the acquisition of cliticisation is only delayed, like in the case of early L2/bilingual acquisition, or hindered by a non-specifically syntactic linguistic issue, like in the case of DD, the characteristic errors seem to be the production of a non-target clitic: these children are already aware of the structure they must produce, and try to produce it, but sometimes fail to control for its morphological aspects. For ASD, it could be the case that the linguistic impairment is driven by their Theory

of Mind profile, and this might explain part of the errors found in their performance with clitics, but not all. Furthermore, not all children with ASD seem to be affected in this area of language. The issue of clitics in autism is still open to some interpretation and needs further data.

Part III

Chapter V: the experimental protocol

5.1 Some preliminary observations

In this chapter, we are introducing the tasks that were adapted or designed for the studies presented in this work. We also review the background measures that were used across two or all studies. Other pre-tests that may be specific to one test are described within the methods of that study.

All tasks were administered via a laptop computer. Tasks were presented on PowerPoint, and they featured the pre-recorded voice of a female native speaker of Italian reproduced on loudspeakers, and black and white (experiments four, five) and in colour (experiments one, two, three) drawn images. All images for the newly designed tasks were drawn by a professional illustrator, who was instructed to keep images child-friendly in the design of the characters, to only include the relevant figures and to have minimal background with as few distractors as possible.

All participants were audio-recorded whilst taking the test. All participants' responses were written down during the session and later digitalised. They were also analysed and reported in terms of constituent structure. Responses were macro-classified as target and non-target, and non-target responses were subclassified into different response types according to each task. A response was considered target if it indicated the correct image in comprehension (Task One), or if the expected clitic was produced in a licit sentence in production (Tasks Two to Five).

5.2 Background measures

5.2.1 Non-verbal intelligence

Reasoning abilities were measured through the Coloured Progressive Matrices (CPM, Raven et al., 1998). Designed specifically to test non-verbal intelligence, the CPM is a version of Raven's Progressive Matrices (RPM, Raven et al. 1988) standardised on children aged 3 to 11: it features two of the sets of RPM, namely sets A and B, and a further set between them, set Ab, for a total of 36 items (12 for each set). In each set, items are ordered for increasing difficulty. Unlike the RPM, which is entirely in black and white, the first two sets of the CPM are in colour, to ensure engagement. Each item presents a geometric design with a missing piece, and participants must choose which of the six presented tassels logically completes the reference drawing. Responses are evaluated as wrong or right, and wrong answers can be further analysed in function of the type of the selected tassel.

5.2.2 Nonword repetition

Tasks of nonword repetition are a useful tool to test phonological knowledge of the language they are designed on, as well as phonological memory. In this study, we used the non-word repetition task contained in the Italian evaluation battery "Prove di Prerequisito per la Diagnosi delle Difficoltà di Lettura e Scrittura" (Cornoldi et al. 2009). This task is composed of a total of 25 pseudowords following both syllable design and tone placement of Italian, of increasing number of syllables (from one to four-syllable words). The stimuli are divided into five sets of five pseudowords each, one one-syllable set, two two-syllable sets, one three-syllable set, and one four-syllable set. The participants are presented with the auditory stimulus read aloud by the tester and are instructed to repeat.

The score is given on number of correctly repeated syllables (tone included), for a total of 60 correct. Below are some examples for each set:

1. One-syllable: pun, stre
2. Two-syllable: nanta, mimbri
3. Three-syllable: francìtra, tàstola
4. Four-syllable: dulcabrìte, undocìste

5.2.3 Sentence Repetition

Sentence repetition is another useful measure to assess linguistic abilities, which is designed to test processing of grammatical structures. For this study, we used an adapted version of the sentence repetition contained in the CLAD-ITA GAPS standardised test for Italian (Vernice, et al., 2013). This battery of tests has the purpose of being a quick screening tool that is sensitive to language impairment. Each sentence of the repetition task features a "critical point", namely a specific syntactic element or construction around which the sentences are designed, and which determines the scoring for each sentence (one point can be assigned only if the critical point is correctly and entirely repeated). To the 11 sentences the original test is comprised of, we added four that replicated structures that would be found in the experimental tasks. Specifically, we added: one 1st person dative clitic in enclitic position and one in proclitic position, one 3rd person clitic cluster in enclitic position and one in proclitic position; this was done in order to have a comparative measure for the structures under investigation, which have different properties with respects to the clitic constructions already contained in the task of the CLAD-ITA GAPS. Some examples of the items follow.

1. Il cane è spinto dal gatto (critical point: passive)

2. I gatti hanno mangiato il pesce (critical point: number agreement)

3. Marco glielo compra (critical point: clitic cluster. Added)

5.2.4 Sentence comprehension

Sentence comprehension is a tool that is frequently used to assess the level of proficiency in a language. To this end, we use a short version of the task "Comprendo", designed by Cecchetto and colleagues (Cecchetto et al., 2012) for Italian and standardised on adults. A total of 30 items were selected out of the 100 of the original task. These were selected out five of the sentence-type categories: active, passive, subject relative in subject position, object relative in subject position, coordination. Participants are presented with three images and must choose the correct one upon hearing a sentence.

5.3 Experimental tasks

In this work, we developed a battery of tests for a comprehensive assessment of clitics both in comprehension and in production for a total of 5 tasks. Each study implements variations on the battery, which is presented here in its entirety. All stimuli for each task that was re-adapted or created for this work are presented in Appendix B.

5.3.1 Task 1: comprehension of clitic pronouns

Checking comprehension of reference management involving clitic pronouns is an important step towards disentangling abilities in the properties of language at use with pronouns. It allows us to monitor the knowledge of the syntactic property governing reference management, namely binding. As we have seen in 2.3.1, pronouns are bound variables, and their correct interpretation in

comprehension is dependent on Principle B of the Binding Theory in the case of object pronouns and on Principle A in the case of reflexive pronouns (as well as on the correct checking of the ϕ-features carried by the pronoun itself, but these will be controlled for in this task in order to isolate binding and will be tested in production). While in acquisition of non-clitic languages the syntactic module finds a competitor in the pragmatic module of interpretation of free variables (Reinhart 1983), thus leading to the Pronoun Interpretation Problem (PIP), acquisition of languages with clitic pronouns has been shown not to go through the same phenomenon (thus ensuing the Clitic Exemption Effect, CEE), and comprehension of reference in binding constructions is in place already in very young children (see 3.2.1).

The task we use for this purpose is the one designed by Terzi and her colleagues (Terzi et al. 2014) for interpretation of pronouns and nonactive morphology in Greek. For this study, the task was adapted into Italian and for our specific purposes as presented in the following paragraphs. In a picture-selection task, where each item consists of an acoustic stimulus, namely a sentence, and a visual one, namely three pictures, participants are asked to indicate the picture that depicts the sentence they hear. Of the three pictures, disposed in a triangular shape, one was the correct one and two were foils, with position of correct image being randomised.

In the original study, the picture-selection task featured six conditions, three testing pronouns (strong pronoun, clitic pronoun, reflexive pronoun) and three testing verb morphology marking for reflexivity and voice (verbs with passive morphology, verbs with reflexive morphology and reflexive interpretation, verbs with reflexive morphology and passive interpretation). In the adaptation of the task that was carried out for this study, we had a total of three conditions: object clitic pronouns, reflexive pronouns, and R-expressions. To create the linguistic

stimuli, six actional verbs used to test pronouns in the original task were translated and adapted to match the visual stimuli: *lavare* (to wash), *insaponare* (to wash with soap, to shampoo), *coprire* (to cover), *pulire* (to wipe), *accarezzare* (to caress), and *vestire* (to dress). The action was performed by two participants, who were always an adult and a child. All the characters used throughout the task were members of one family, six adults and six children. The adults involved in the action were referred to with a name representing their kinship to the child (e.g. *mamma* mum, *zio* uncle, etc), while the children were referred to as *bambino/a,* child M/F. This was done for the child not to have to rely on remembering first names to correctly establish reference, specifically in the NP-NP condition (see Condition 3 below). In order to avoid gender cues specifically on the clitic condition (see Condition 1), and thus to isolate binding, all items featured two characters of the same gender performing the action. For this reason, however, correct interpretation of the action with respects to the sentence was not entirely independent from the correct pragmatic assignment of the kinship name and the name "child". To do this, participants had two elements, namely the initial presentation of the characters, where the names they would be referred to were clearly stated, and the visual distinction between adults and children, with the former being clearly represented as taller than the latter.

5.3.1.2 Methodology

This task is composed of a total of 18 items, six per condition. The order of the items was pseudorandomised and was the same for all participants. There are three trial items to familiarise the participant with the characters and with the task itself. The characters were also presented to the participant before the beginning of the test to familiarise him/her with the characters and their relationship to one another. For each auditory stimulus, the participant saw three

pictures. The experimenter changed to the next item when the participant had given their response.

Like in Terzi and colleagues' task, the condition testing for comprehension of clitic pronouns featured an [NP_{Subj} $clitic_{Obj}$ VP] construction, as shown in (69).

(69) La bambina la accarezza.

The child.f her.acc.clitic caress.3s

'The child is caressing her'

The clitics were all singular, and balanced for gender (half feminine, half masculine). As already mentioned, the gender of the clitic and that of the NP were always matching, to avoid gender cues in pronoun resolution.

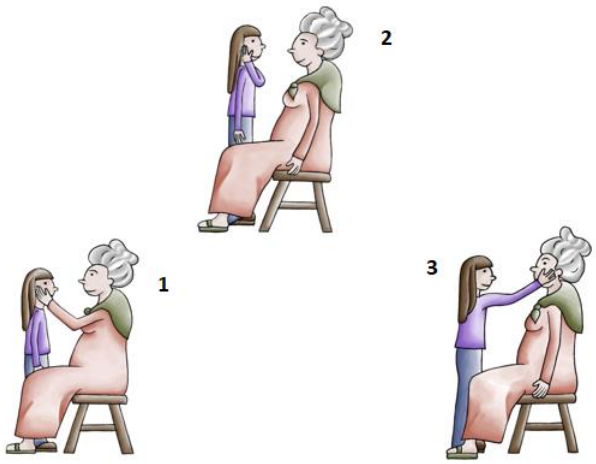


Figure 1. Example of visual stimuli for Task 1. 1 = foil 2 = foil 3 = right

Incorrect pictures depicted the action with inverted agent and patient (Θ-role reversal, 1), and the same action produced on the self (reflexive interpretation, 2).

Condition 2 featured reflexive pronouns. DO clitics and reflexives in Italian share most features. Like DO clitics, the prosodic realisation of reflexives is weak, and

they are used under the same pragmatic circumstances. While they follow the same syntactic construction in the clause as DO clitics, their specific morphosyntactic properties have some differences: contrary to them, reflexives do not mark for gender, but are only marked for person and number, with the exception of the 3rd person (*si*, him-/her-/itself/themselves), which only marks for person.

In order to fully test knowledge of the binding relations, and in line with the literature, it made sense to include in the task reflexives despite them not being the focus of this study. The construction of items with reflexives mirrors that of items with clitics: [NP_{Subj} $reflexive_{Obj}$ VP], as shown in (70).

(70) Il papà si pulisce

The dad himself wipe.3s

The dad wipes himself

Contrary to the other conditions, in the reflexive condition the action's agent and patient were in the same person. Nevertheless, in order not to cue to the correct picture solely based on the drawing, the picture depicting the reflexive action still featured both participants, one doing the action, and the other observing the scene. The two foils showed a non-reflexive action: in one, the agent is the correct one, but the action involves an external patient (object interpretation, figure 2 picture 3), and in the other the agent is the other participant (role reversal figure 2 picture 2).

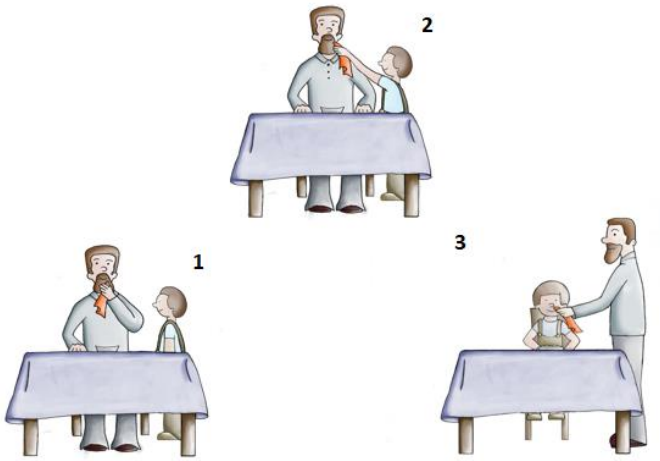


Figure 2. Example of visual stimuli for Task 1. 1 = correct, 2 = foil, 3 = foil

Our third and last condition was a control condition featuring no pronouns: the object, as well as the subject, was expressed as a lexical NP, in the following fashion: [NP_{Subj} VP NP_{Obj}] as in (74). In this case, no reference requires to be managed, as both arguments of the verb are expressed overtly as full phrases. Furthermore, the structure does not feature any movement, so its syntactic organisation is also canonical.

(71) Il papà pulisce il bambino

This condition was added as a control condition to make sure that comprehension of elements organised in a structure with no clitic pronouns was similar to that of a structure with the same elements but realised through a clitic, which we would expect in situations where comprehension of clitics is in place. At the same time, we would expect to see a difference between the two conditions if the pragmatic and syntactic make of clitics is not mastered.

5.3.1.3 Classification of responses

Each stimulus contained one right answer and two foils. Accuracy was calculated in terms of right answer over total items split per condition. The two foils were classified as summarised in table 5.

	wrong 1	wrong 2
clitic	reflexive interpretation	Θ-role reversal
reflexive	object interpretation	non-reflexive, Θ-role reversal

Table 5. classification of non-target answers for task 1

5.3.1.4 Task1 Online

Task 1 was also developed as an online task on Psychopy. The number of items, conditions, balancing, and randomisation were kept identical. The participant was instructed to press one of three keys, namely x, t, and n, which mirrored the position of the images on the screen, so select the correct image. No time limit was set, and the following item followed the selection of an answer in the previous item. Reaction times were collected but will not be analysed in this work. Instructions were available both in Italian and in English.

5.3.2 Task 2: production of clitics and pragmatic use

For Task 2, we adapted the elicitation task designed by Arosio and colleagues (2010, 2014). The original task tests clitics and reflexives in simple and compound constructions and is designed as follows. Each item is composed of two steps: in the first step, participants are shown an image which portrays an animate character about to perform an action involving another character (which could be either animate or inanimate). While this image is on the screen, the participants hear a pre-recorded sentence describing the scene. After that, a

second image is shown where the character has completed the action, and a pre-recorded voice utters a question. The participant is instructed to answer the question.

For the purposes of this study, this task was adapted to check for the understanding of the pragmatic differences between use of a clitic and use of a full referential expression. The adaptation, following Tedeschi's work investigating sensitivity to discourse cues in elicitation of referring expressions (Tedeschi, 2008), consisted in adding to the condition eliciting clitic pronouns a condition eliciting full NPs on use of referring expressions in pre-school children.

5.3.2.1 Methodology

The task consisted of a total of 14 items. Three familiarisation trials were given at the beginning of the session, and conditions as well as gender were balanced and pseudorandomised. All probes elicited a present simple, but answers were felicitous both with a present and with a past tense

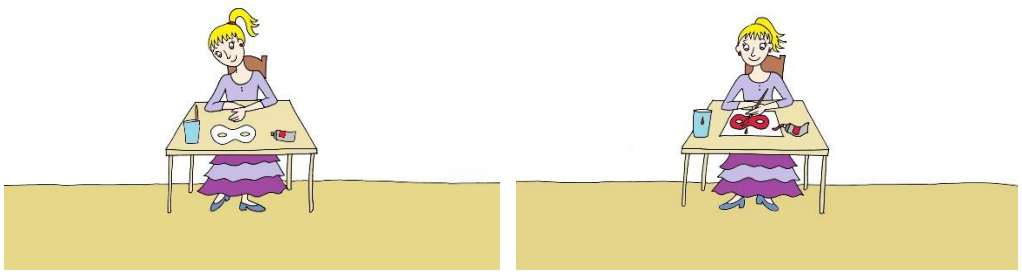


Figure 3. Example of visual stimuli for Task2

(72) Preamble: in questa scena, $[NP]_{Subj}$ vuole [VP $[NP]_{Obj}$].

In this scene, $[NP]_{Subj}$ wants to [VP $[NP]_{Obj}$].

Eliciting probe:

a. Clitic probe: Cosa fa $[NP]_{Subj}$ a $[NP]_{Obj}$?

What is $[NP]_{Subj}$ doing to $[NP]_{Obj}$?

b. Full DP probe: Cosa fa $[NP]_{Subj}$?

What is $[NP]_{Subj}$ doing?

The clitic condition features elicitation of 3rd person DO clitics with a finite verb (73 below). Because the probe contains (both the subject and) the object explicitly, a pragmatically appropriate answer in Italian regarding the object of discussion, namely the patient of the action, should treat this element as given information and thus cliticise it. Elicited clitics are balanced for gender. An example (Figure 3):

(73) In questa storia, una signora vuole dipingere una maschera (image 1).

In this story, a lady wants to paint a mask (image 1).

Probe: Guarda, cosa fa la signora alla maschera (image 2)?

Look, what is the lady doing with the mask (image 2)?

Target answer: ***la*** dipinge / ***l'***ha dipinta

$it_{Cl,fem}$ *paints/has painted*

The lexical NP condition is adapted on Tedeschi's *general question* condition. The probe contains an explicit subject, and an implicit object. Because the question

implicitly concerns the object, but this is not explicitly mentioned, discourse appropriateness would require the answer to produce the object explicitly again to bring it back into focus, rather than cliticising it.

(74) Probe: Cosa fa la signora?

what do.3s the girl

What is the girl doing?

Expected answer: dipinge la maschera

paint.3s the mask

she is painting the mask

5.3.2.2 Classification of responses

The utterances were transcribed, codified, and then classified as follows:

1. *Target:* all licit utterances containing the elicited referring expression, namely an object clitic in Condition 1 and a lexical NP in Condition 2.

2. *Wrong referring expression:* utterances containing the opposite referring expression, namely containing a lexical NP when a clitic was elicited and containing a clitic when a lexical NP was elicited.

3. *Non scorable:* irrelevant sentences that deviated from the task and could not be included in any of the other categories.

Non-target answers on the clitic condition contained further classification:

4. *Other clitic:* utterances containing a clitic that was non-target. This category includes both instances of incorrect clitic type, in this case an IO when the task elicits DO (e.g. ***gli*** *tira l'acqua* "s/he throws at him water"

instead of ***lo*** *bagna* "s/he wets him"), and instances of DO clitic with a gender or number error (***la*** *prende* "s/he catches it_{fem}" instead of ***lo*** *prende* "s/he catches it_{masc}").

5. *omission:* utterances produced with a dropped object clitic (illicit in Italian).

5.3.3 Task 3: elicitation of 3rd person DO clitic and IO clitic in enclisis and proclisis

The next experiment has the purpose of checking production of clitics on two different levels, namely the syntactic (and Θ-) role it covers with respects to the verb it is attached to (whether it is a direct argument, so VP-internal, or an indirect argument, so VP-external), and the position of this verb in the clause (whether it is finite, thus giving rise to proclisis, or non-finite, giving rise to enclisis). An elicitation task was designed to include the four possible outcomes of the two levels combined, namely:

a. direct object, proclisis

b. direct object, enclisis

c. indirect object, proclisis

d. indirect object, enclisis

5.3.3.1 Methodology

The task consisted in a picture-elicitation design presented on PowerPoint. It consisted of a total of 24 items, and was divided in two parts, the first part containing 12 items eliciting proclitics and the second part containing 12 items eliciting enclitics. Each part had three trial items. The elicited clitics were 3rd person singular and were balanced for gender. The order of presentation was pseudorandomised and was the same for each participant.

In order to create a felicitous outcome for an indirect object, all items were created around verbs that take three arguments. Because the prepositional phrase is outside the VP, while strong with a few verbs (such as *dare*, to give, and *regalare*, to gift), the obligatoriness of the realisation of the IO is mostly weaker than that of the DO, thus potentially leading to PP omissions. We tried to prevent this as much as possible by putting the same pragmatic focus on all elements involved in the action as is now described. Each item depicted an action with three participants: an agent, a patient, and an inanimate object. First, the three elements were brought to the child's attention by being shown as visually isolated from the rest of the picture (see fig. a below), whilst a pre-recorded voice was reproduced verbally naming the elements (*in questa scena, ci sono X, Y, e Z.* In this scene, there are X, Y, and Z). Then, the image was shown fully, and the participant heard a question on the action under discussion. Importantly, the verb describing the action taking place in each item was not explicitly stated anywhere in this task, in order to avoid overloading the participant's memory with information to recall and to take into account during the production of their answer. Consequently, the choice of which verb to use to describe the action whilst answering the question was left to them. This in turn allowed them to use the verb which they found most fitting to accommodate for the two elements.

We decided to keep the two structural conditions separate because the creation of the conditions containing non-finite verbs required the introduction of a third animate character who would interact with the other two characters, thus adding another element to the items requiring new instructions and a new trial.

For all conditions, items were balanced for gender. This ensures that, together with checking performance based on position in the clause, we can also check for the features on the clitic itself. However, an important proviso needs to

be made regarding indirect clitic objects. Despite the existence of a clitic for both the masculine and the feminine both in direct and in indirect position, the feminine dative clitic is notably an element that is disappearing in spoken Italian, with a generalised use of the unmarked masculine being more and more common in adult native speakers of Italian as well. This is a factor that must be taken into account in accepting or rejecting provided answers and will be dealt with in the error analysis session.

For the clitic pronouns in proclisis (condition 1), the picture depicted two characters performing an action involving an object and the question was either on the agent or the object.

(75) Preamble: In questa scena (Figure 4 image 1), ci sono un commesso, una signora, e un maglione.

In this scene (Figure 4 image 1), we have a clerk, a lady, and a pullover.

a. DO clitic probe: che cosa fa il commesso al maglione? (Figure 4 image 2)

   What is the clerk doing to the pullover? (Figure 4 image 2)

   i. Expected answer: lo dà/passa/mostra alla signora

      He gives/hands/shows it to the lady

b. IO clitic probe: cosa fa il commesso alla signora?

   What does the clerk do to the lady?

   i. Expected answer: le dà/passa/mostra il maglione.

      He gives/hands/shows her the pullover.

Figure 4. Example of visual stimuli for Task3

To elicit the construction of a non-finite verb (condition 2), we created a different environment. After the first part of the test finished, the participants were introduced to a new character, a donkey puppet called “Maui” (pictured in figure 5). Maui was described to them as a donkey who was a bit bossy and liked to tell people what to do, and he was going to tell the characters in the scenes to do things. A second trial phase followed, were children could get familiarised with the new prompts. The items were the same we had in phase 1, but the object/dative condition was reversed: if an item in phase 1 was used to prompt a DO clitic, in phase 2 it was used to prompt an IO clitic, and vice versa. The preambles and questions of phase 2 are given in (76).

(76) In questa scena, ci sono il papà, Martino, e un flauto.

In this scene, we have dad, Martino, and a recorder.

a. DO clitic probe: Arriva Maui. Cosa dice al papà di fare al flauto? Dice di...

   Here comes Maui. What does he tell the dad to do to the recorder? He tells him to…

   i. Expected answer: …darlo a Martino

      … give-it to Martino

b. IO clitic probe: Arriva Maui. Cosa dice al papà di fare a Martino? Dice di...

   Here comes Maui. What does he tell the dad to do to Martino? He tells him to…

   i. Expected answer: …dargli il flauto

      … give-him the recorder

Figure 5. Maui

In this condition, the probe contains both a question and the beginning of the answer, thus requiring a completion. The rationale behind this difference is that the question “cosa dice il papà di fare a Martino” is felicitously answered with a “di + non-finite” construction if the participant aligns with the question, but they do not they have another construction which would be felicitous and would not alter the meaning, namely a “che + finite” construction. Only the “di + non-finite” construction will elicit production of an enclitic pronoun, therefore we needed to encourage the use of that kind of construction as opposed to leaving the choice to the child.

5.3.3.2 Classification of responses

The following categories were distinguished in analysing response types:

1. *Target:* all utterances containing the elicited clitic in the elicited position. For reasons explained above, for the IO clitic productions containing a masculine instead of a feminine were also considered target.

2. *Lexical NP:* utterances containing a lexical noun phrase in place of the targeted clitic.

3. *Other clitic, features:* utterances containing a non-target clitic, namely a clitic with the incorrect gender and/or number features.

4. *Other clitic, pragmatics:* utterances containing a non-target clitic that was of the opposite type, namely an IO when a DO was elicited and vice versa.

5. *Omission:* all instances of utterances containing no elicited clitic and no alternative structure e.g. lexical NP, thus producing an illicit construction. A few limited cases where an alternative structure was produced, but the omission of the second argument (typically the PP) made the sentence illicit because of strong trivalent verb structure (e.g. *il ragazzo dà in mano*

la lettera [a NP]$_{omitted}$ "the boy hands the letter [to NP]$_{omitted}$) were also included in this category.

6. *Other structure:* this category contained all instances of utterances containing a non-finite verb when a finite verb was elicited, and vice versa (e.g. Cosa fa il papà a Martino? *Di dargli il flauto* "What is the dad doing to Martino?" "to give him the recorder"). These could contain both a target clitic (but in the non-targeted structure), or a lexical NP.

7. *Non scorable:* irrelevant sentences that deviated from the task and could not be included in any of the other categories.

5.3.3.3 Task 3 short

This task is also presented in a short version (Task 3 short) featuring only the proclitic conditions, with a total of 12 items and three trial items. The selected items were the same as for the first part of the full task.

5.3.4 Task 4– elicitation of 1st and 2nd person clitics in enclisis and proclisis

Together with their syntactic and pragmatic properties, pronouns are also deictic elements. For this reason, use of pronouns is dependent on correct use of the underlying construction and of their features (syntax), the correct calculation of the common ground between hearer and speaker (pragmatics), and also the ability to assign them the correct referent in free environments. This last ability draws on a different interface between linguistic and cognitive abilities, namely that of Theory of Mind. 1st and 2nd person personal pronouns are so-called indexicals, in that they change the external referent based on the perspective the actors are in at the moment of the utterance, instead of being fixed rigid designators. For this reason, management of pronouns both in comprehension in context and specifically in production of these pronouns requires perspective

shifting to correctly assign reference. For this purpose, we designed an elicitation task which required a perspective shift in use of 1st and 2nd person IO clitics both in proclitic and in enclitic position.

5.3.4.1 Methodology

The task is a picture-elicitation design of a total of 16 items divided by structural condition, 8 for proclisis and 8 for enclisis. Like in the previous task, the two conditions were separated and had separate 2-item trials.

Participants were presented with two characters, which would have interacted with each other for the whole duration of the test. One character was a child (female and male versions were available), and the other was a female adult (Figure 6).

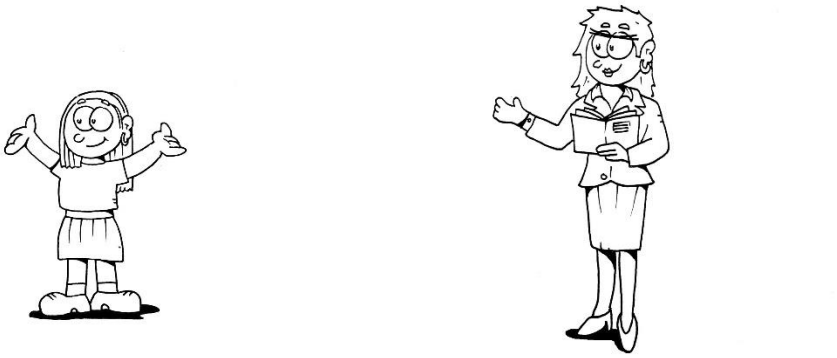


Figure 6. This is you (a), and this is me (b)

The instructions, which were read aloud by the experimenter, asked participants to identify themselves in the child ("questo/a sei tu", this is you), and to identify the experimenter in the adult character ("questa sono io", this is me). Each item consisted in the two characters interacting with each other by performing an action involving an inanimate object. The items were read aloud by the experimenter. This was to further encourage identification since the experimenter would be speaking about herself and the child as "me" and "you".

Figure 7 example of item in task 4

In the proclitic condition (condition 1), the items were as exemplified:

(77) Preamble: in questa scena, tu/io rubi/rubo la penna a me/a te.

In this scene, you/I are/am stealing the pen from me/you

i. Probe: cosa fai/faccio tu/io?

What are/am you/I doing?

ii. Expected answer: ti/mi rubo/rubi la penna.

I/you am/are stealing the pen from you/me

As in task 3, the probe for the non-finite clause (condition 2) was given using the verb “dire di”, to tell (someone) to, and the correct environment was obtained by introducing a third character, which was once again donkey puppet Maui. Children were reminded that Maui likes to tell people what to do, and so he was going to tell the characters what they should do to one another.

(78) in questa scena, Maui dice di rubare la penna a me/a te.

In this scene, Maui says to steal the pen from me/you

i. Probe: cosa dice Maui? Dice di...

What does Maui say? He says to…

ii. Expected answer: rubarmi/ti la penna.

steal the pen from me/you

In both conditions, the probe contains a full pronoun. We decided to include the full pronoun instead of omitting it, which would also have been a felicitous sentence, because we thought that having a fuller referring expression would have discouraged participants from repeating it on the basis of its pragmatic saliency, and favoured the cliticisation of the element instead.

5.3.4.2 Classification of responses

Responses were classified as follows.

1. *Target:* all utterances containing the target clitic in the target structure.
2. *Strong pronoun:* utterances containing a strong pronoun in place of a clitic (e.g. *passo la palla **a te*** "I throw the ball to you" instead of ***ti** passo la palla* "to-you$_{Cl}$ I throw the ball").
3. *Omission:* utterances presenting object or verb omission, resulting in non-target and illicit sentences.
4. *Identification error:* utterances where the identification was not applied correctly. These include utterances with clitics and utterances with weak pronouns. The error of person could be between the two persons included

in the task, namely 1st and 2nd, but there are instances of production of 3rd persons.

5. *Other structure:* all instances of utterances containing a non-finite verb when a finite verb was elicited, and vice versa. Utterances contained either clitics or strong pronouns.

6. *Non scorable:* irrelevant sentences that deviated from the task and could not be included in any of the other categories.

5.3.5 Task 4 clusters – 1st and 2nd person clitic clusters

This task is a variation on Task 4. It features elicitation of 1st and 2nd person clitic clusters in proclitic position using the same images and the same procedure of identification as the ones illustrated in 5.3.4. It is comprised of a total of 16 items, 8 eliciting 1st person clusters and 8 eliciting 2nd person cluster. The items are balanced for gender (half masculine, half feminine). The items had no preamble apart from the introduction of the characters before the beginning of the task as in 5.3.4.

(79) Prompt: Cosa faccio io con il disegno?

What do.1s I with the drawing

What am I doing with the drawing?

Expected answer: Me lo mostri

To-me it.masc show.2s

You show it to me

5.3.5.1 Classification of responses

Responses were classified as follows:

1. *Target:* all utterances containing the target cluster.
2. *Single clitic:* utterances containing one of the two elicited clitics, while the other element is either realised as a DP if it is the DO, or omitted or realised as a strong pronoun if it is a PP.
3. *No clitic:* when none of the elements are produced through a clitic. This type of answer typically features the DO realised as a DP and an omitted PP.
4. *Strong pronoun:* utterances where there are no clitics and the PP is realised as a strong pronoun of the type *a me / a te.*
5. *Verb morphology:* utterances with errors in verb morphology
6. *Omission:* production of bare VPs
7. *Identification:* sentences where the perspective shift has not been operated and thus the identification process did not follow through.
8. *Other cluster:* clusters with feature error on the DO clitic.

5.3.6 Task 5 – production of 3rd person clitic clusters in proclisis and enclisis

This task was designed by Mantione and colleagues (Mantione, Vender, Melloni, & Delfitto, in preparation). The aim of this task is to test the ability to produce clitic combinations.

5.3.6.1 Methodology

The task features elicitation of 3rd person clitic clusters with finite and non-finite verbs, half with feminine marking on the object and half with masculine marking.

Unlike tasks three and four, here prompts for enclisis and proclisis are mixed. Experimental items make up 16 items, which are preceded by three trial items. The task also features six filler items, which contain a single clitic in the DO form, three masculine and three feminine. Items are presented on a PowerPoint presentation.

The task features two children, Sara and Marco, interacting with each other by means of an object, and a lady referred to as *la mamma*, the mum, in the items eliciting enclitics. Similarly to task 3, items are built around trivalent verbs like *rubare*, to steal, *restituire*, to give back, *spedire*, to send, and so on. The characters are represented in two separate pictures performing two different actions (action 1 and action 2). In the first preamble of this task, each item presents a scene where one of the two acting characters has to/is told to either do one thing (action 1) or another (action 2). In the second preamble, the pre-recorded voice narrates what happens in the first picture (action 1). The prompt consists in a question on what happens in the second picture (action 2).

(80) Preamble proclisis:

In questa scena, NP_1 deve [$VP_{action1}$ oppure $VP_{action2}$ NP_{obj}] a NP_2.

In this scene, NP_1 has to either [$VP_{action1}$ or $VP_{action2}$ NP_{obj}] to NP_2.

Qui (image 1), NP_1 $VP_{action1}$ a NP_2.

Here, NP_1 $VP_{action1}$ to NP_2.

Preamble enclisis:

In questa scena, la mamma dice a NP_1 di [$VP_{action1}$ oppure $VP_{action2}$ NP_{obj}] a NP_2.

In this scene, mum tells NP_1 to either [$VP_{action1}$ or $VP_{action2}$ NP_{obj}] to NP_2.

Qui la mamma dice a NP_1 di $VP_{action1}$ a NP_2.

Here, mum tells NP_1 to $VP_{action1}$ to NP_2.

Image 1   Image 2

Figure 8. Example of visual stimuli for task 5, proclisis. Images property of the authors

For example, an enclitic cluster is thus elicited:

(81) *Preamble:*

In questa scena, la mamma dice a Marco di togliere oppure di restituire l'orsetto a Sara.

In this scene, mum tells Marco to take away or to give back Sara the teddy bear.

Qui la mamma dice a Marco di togliere l'orsetto a Sara.

Here mum tells Marco to take the teddy bear away from Sara

Prompt: E qui cosa dice?

And what does she say here?

Expected answer: di restituirglielo

To give-back-CL-to-her-it$_{masc}$

to give it back to her

Although pragmatically ideal, the use of the cluster is not obligatory, and we expect the prompt to also trigger single clitic responses, as in (82a) and b:

(82) *a.* lo restituisce a Sara

pro CL-it$_{masc}$ give-back to Sara

he gives it back to Sara

b. gli/le restiuisce il pupazzo

pro CL-to-him/her give-back the teddy

he gives her the teddy back

Even though the task was used in its original form, a distinction was applied on administration. Creating a pragmatic environment that strictly favours use of both elements cliticised is hard, with there being several different alternatives which are still grammatically felicitous (like for instance producing only one of the clitics). In Mantione and colleagues' original work, this issue is partly overcome by correcting the child in the trial phase, by explicitly giving the construction. However, because our interest lay not only in the ability to correctly produce a specific clitic, but also on the interpretation of the pragmatic context that would lead to use of specific pronouns, and also to be consistent with the other tests in our protocol, we decided not to adopt this strategy, leaving interpretation of the pragmatic context to the child, and only correcting them on technicalities regarding the task.

5.3.6.2 Classification of responses

Responses were classified as follows:

1. *Target:* all utterances containing the target cluster.
2. *Single clitic:* utterances containing one of the two elicited clitics, while the other element is either realised as a lexical NP if it is the DO, or omitted or realised as a lexical NP if it is a PP.
3. *No clitic:* when none of the elements are produced through a clitic. This type of answer typically features both elements realised as lexical NP. The PP may be omitted.
4. *Other clitic:* utterances where either a single clitic or a cluster is produced, but with incorrect ϕ-feature.

5. *Other structure:* this category contained all instances of utterances containing a non-finite verb when a finite verb was elicited, and vice versa.

6. *Omission:* production of bare VPs.

Because of the optionality of the production of the cluster, we will present data both with strict coding, which counts “single clitic” answers as non-target, and loose coding, where “single clitic” answers will be considered as part of the target answers.

Chapter VI: Study 1 – assessment of clitics in typically developing children from preschool to primary school age

6.1. Objective

In this study, we look at clitic pronouns in typically developing children on several levels. To do this, explore both comprehension and production. The comprehension task will give insight on the understanding of the syntax governing reference management; the production tasks will show us which clitics children produce more easily and which clitics they resort to alternative structures for, and crucially what these structures are. In particular, the tasks will elicit the following productions:

- DO clitic and IO clitic
- 1st/2nd and 3rd person clitics
- single clitics and clitic combinations

Furthermore, the tasks also aim at investigating other aspects involved in production of clitics, namely the pragmatic alternation between clitics and lexical NPs, and the deictic use involved in person-marked clitics of 1st and 2nd person.

The aim of this study is to gain further understanding on the patterns of acquisition of clitics in young typically developing children. This will be important both on the perspective of typical acquisition and on the perspective of non-typical development. As for typical acquisition, we are giving a comprehensive assessment which includes aspects of clitics and types of clitics that, to the best of our knowledge, have not been fully investigated in Italian acquisition. This will contribute to the discussion on acquisition of clitics in Romance languages. As for non-typical development, we hope that both accuracy and error analysis on the investigated conditions in young children acquiring Italian will in turn uncover other elements of production that may be good candidates to signal a difficulty with the construction. Moreover, it would provide us with insights on the types of strategies that could be considered "typical".

From what we know from the acquisition literature reviewed in detail in Chapter III, we would expect preschool children to already have good comprehension of clitics, as well as good use of 3rd person DO clitics. Furthermore, we would expect to find few traces of ungrammaticality such as omissions and feature errors in production. If any of the instances of the clitics that feature more operations signal an incomplete acquisition, namely the enclitic and the clitic cluster, we would expect to find more avoidance-type answers in the preschool children than in the other groups. The type of alternative answer that would still produce a felicitous answer that we expect to be selected in typically developing children of 4 or older is the use of lexical NPs.

6.2. Participants

Italian-speaking pre-school and primary school children were recruited to form groups with a two-year gap between them. Pre-school children were recruited in the kindergarten "Don Milani" in Castelfranco Emilia (MO), and primary school

children were recruited in primary schools “Giovanni XXIII” and “Menotti” in Modena and Villanova (MO), respectively. Recruitment was carried out by the teachers, who were instructed by the researcher on the inclusion criteria.

Inclusion criteria to be eligible for the study were that the child had to:

a. Speak Italian as a native language, with at least one parent being a native speaker of Italian and speaking Italian at home.

b. Not have any certified cognitive and linguistic impairments.

A total of sixty participants were tested for this study. Participants were divided into three groups according on their age, namely one preschool group (PS), and two primary school groups, one composed of six-year-olds (young primary school, yPR) who were in their first year of school, and one composed of eight-year-olds in their third year (old primary school, oPR). Two of the children from the PS group had to be eliminated from the count because they only completed around 20% of the experimental tasks as testing was interrupted because the children would find it hard to focus on the tasks, even if the sessions for their group were the shortest.

The following method was applied to see if other participants needed to be excluded from group counts based on performance. Bearing in mind that deviance from the group mean could be an interesting factor due to the objective of the study, we identified a way to exclude participants from group results that was neither too wide (with no eliminations) or too narrow (i.e., performance on one task determining the inclusion of the participant on counts for that and all other tasks). Furthermore, in light of the interests of the study, any participant eliminated from group results would be analysed individually. To be excluded, participants had to have individual values below the threshold in one criterion and at least another one out of two criteria that were identified for this purpose

(*One + one criterion*). The first parameter was total production of DO clitic pronouns in Experiment Two. This parameter was selected because the DO clitic has been identified as an early clinical marker for language impairments in Italian, and the effectiveness of the task itself to that end is proven by numerous replications. The other two criteria were the following: total production of clitic pronouns (Grouped results of Tasks Two, Three, Four, Five), and total correct comprehension (Task 1). The second criterion was selected to make sure that any issues with the production of the DO clitic were in fact part of a general disadvantage on production of clitics, and not an experimental effect due to that specific task; the third criterion was a measure on comprehension. During the design of the experiment, we were not expecting the comprehension task to be problematic. However, as we will see in the Results session, we realised that there was considerable individual variation in the PS group on this task, so we decided to include accuracy on this task as a possible criterion for exclusion. We calculated separate thresholds for each group for each of the three criteria as (mean-2SD). Individual scores had to be above the threshold for the group the participant belonged to. Of the remaining 58 participants, three were below the threshold of criterion One in yPR and two in oPR, but none of them was below threshold in *One + one criterion*, and so no other eliminations from the groups were made.

Group	**Number of participants**	**Mean age *(SD)***	**Age range**
Preschool (PS)	18	4;5 *(0.22)*	4;1-4;11
young Primary school (yPR)	20	6;7 *(0.16)*	6;4-6;9
old Primary school (oPR)	20	8;5 *(0.28)*	8;1-8;11

Table 6. Descriptives for the groups in Study 1

6.3. Materials and methods

Participants were individually tested by the same researcher, who was introduced to both pre-school and primary school participants and their classmates as a language expert wanting the help of some of them to better understand how children learn a language. The overall duration of the test was of 60 minutes approximately, which were divided into two 30-minute sessions for school-aged children, and three 20-minute sessions for pre-school children. The researcher was given access to an empty room the children were familiar with inside the schools, and participants were escorted by their teacher or the researcher herself to and from their classroom and the room where the testing took place. Before beginning, the researcher would explain to the child that they were going to go through some linguistic games together and asked for the child's consent.

All three groups performed the CPM (5.2.1) as a background measure for cognitive abilities. The PS group also performed background measures for linguistic abilities, namely non-word repetition (5.2.2) and sentence repetition (5.2.3). This group was the youngest, therefore the one which was at a higher risk of having non-diagnosed cases of linguistic impairment or simply language delays that would have an impact on the performance on the experimental measures. For this reason, it was important to have a more detailed assessment of language outside of the element tested for the study for this specific group. All three groups performed Task 1 (5.3.1), Task 2 (5.3.2), Task 3 (5.3.3), Task 4 (5.3.4), and Task 5 (5.3.6).

6.3.1 Background Measures

We report background measures for PS in Table 8, and for yPR and oPR in Table 7. We stress that these were not run to function as inclusion criteria, but to check

for other signs of linguistic impairment if a participant were to perform poorly on all experimental tasks.

		CPM percentile[19]
PS	*mean*	57.2
	SD	26.3
	range	6-98
yPR	*mean*	81
	SD	23.8
	range	16-100
oPR	*mean*	87.5
	SD	9.9
	range	68-100

Table 7. CPM percentile values for all groups

	CPM percentile	Non-Word repetition	Sentence Repetition
mean	57.2	.71	.75
SD	26.3	9.9	2.5
range	6-98	26-56	4-13.5

Table 8. Background measures for PS: percentile (CPM) and percentage correct (repetition tasks)

6.4 Ethics approval

This study was approved by the University of Trento's Ethic Committee, protocol number 012019.

[19] Calculated from raw scores according to the percentiles of individual administration on the CPM manual

6.5 Comprehension

Task 1 tests comprehension of reference management in binding contexts, namely when the clitic must be free from a c-commanding antecedent. It further tests this knowledge with a pronoun that must in contrary be bound, namely a reflexive. The third condition is a control condition featuring no pronouns and thus no reference management requirements.

6.5.1. Results

Results are given as accuracy results, where the statistical analysis is given, and error analysis.

6.5.1.1 Accuracy

Tables 9 and 10 report accuracy rates on the three conditions, namely clitic, reflexive, and lexical NP, divided by type.

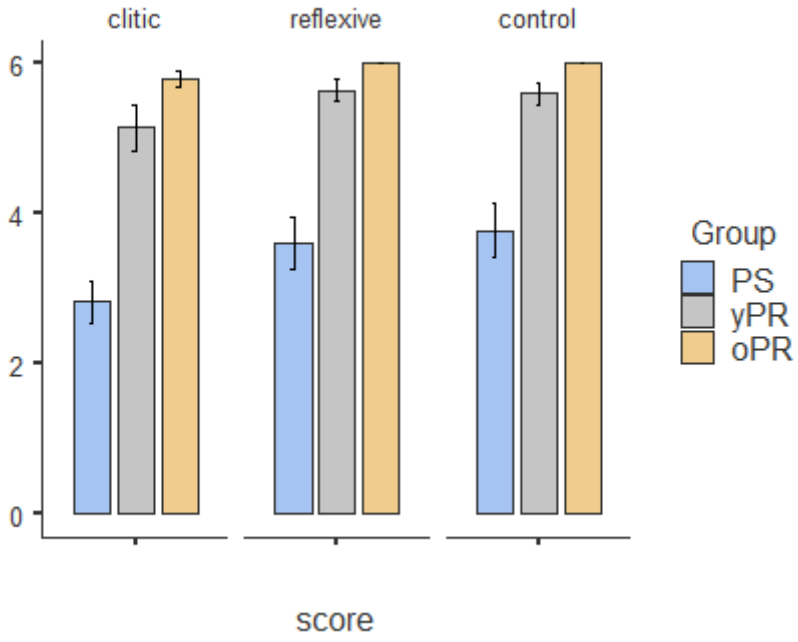


Figure 9. Study 1, task 1. Bar plot with error bars representing the mean target answers divided by type and group over the total possible score.

Target answers	clitic	reflexive	control (lexical NP)
PS	0.47 (1.2)	0.60 (1.5)	0.63 (1.5)
yPR	0.86 (1.3)	0.94 (0.7)	0.93 (0.7)
oPR	0.97 (0.5)	1 (0)	1 (0)

Table 9. Study 1, task 1. Percentages (and SD) of target answers in Task 1 divided by type and group.

A non-parametric one-way ANOVA (Kruskal-Wallis test) with type (clitic, reflexive, control) as dependent variable and group as grouping variable showed significant effects on all conditions (reported in Table 10). Pairwise comparisons show that the clitic condition is significantly different between PS and yPR (W 7.01, p <.001), PS and oPR (W 9.63, p <.001), and between yPR and oPR (W 5.00, p .001). For the reflexive condition, the difference between groups is significant between PS and yPR and PS and oPR (W 6.08, p <.001, W 7.39, p <.001, respectively), and marginally so between yPR and oPR (W 3.33, p 0.049). An unexpected result was the difference in the control condition, which is significant between PS and yPR (W 5.68, p <.001), PS and oPR (W 7.39, p. <001), and yPR and oPR (W 3.70, p 0.024).

Within-group paired samples T-test show that the difference between the clitic condition and the control condition, and the reflexive condition and the control condition is not significant for PS and oPR, while yPR has a significant difference between clitic condition and control (p. <.001), but not between the reflexive condition and the control condition.

Kruskal-Wallis

	χ^2	df	p	ε^2
clitic	9.58	2	0.008	0.168
reflexive	36.09	2	< .001	0.633
control	34.21	2	< .001	0.600

Table 10. Study 1, task 1. Kruskal-Wallis test

Figure 10 shows correct response rates for individual results of participants in the PS group for all three conditions. The performance shows great variability, with the control condition (grey column) ≤50% of correct responses in 8 children (subjects 1, 2, 3, 5, 6, 14, 16, 17) and ≥80% of correct responses in 7 children (subjects 4, 9, 10, 11, 12, 13, 20). The clitic condition is ≤50% in 13 children out of 18 (subjects 1, 2, 4, 5, 7, 8, 10, 12, 13, 15, 16, 17, 20) and ≥80% in only 2 children (subjects 6 and 9). The reflexive condition is ≥80% in 5 out of 18 children (4, 9, 11, 16, 20) and ≤50% in 8 children (1, 2, 5, 6, 8, 10, 14, 17). Only one subject is high on all three measures, namely subject 9 (5 out of 6 correct responses for all three conditions), while four subjects are ≤50% on all three (subjects 1, 2, 5, 17).

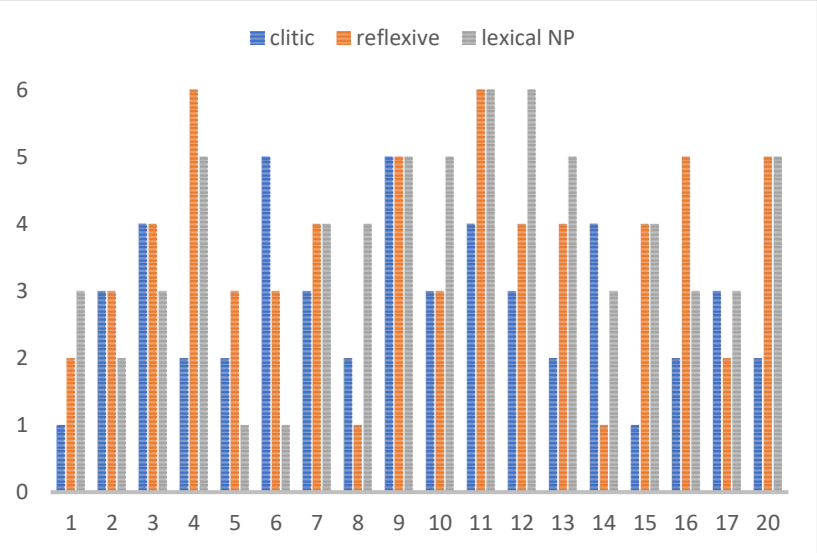


Figure 10. Study 1, task 1. Bar plot of individual results of PS group over total possible score

For this reason, we isolated the PS children whose performance on the control condition was ≥67% correct (namely who scored at least 4 out of 6). This

selection created a group of 10 participants, whose results were as shown in Table 11.

Target answers	clitic	reflexive	control (lexical NP)
PS-selection	0.43	0.70	0.82

Table 11. Study 1, Task 1. Percentage of accuracy on comprehension in a sub-group of PS children with performance on the control condition above chance

6.5.1.2 Error analysis

In the condition eliciting the clitic, selecting one of the two foils meant that the pronoun was being interpreted as a reflexive, in one case, or that the Θ-roles were reversed, in the other, as is shown in (83).

(83) item: la mamma **la** lava

the mother her$_{CL}$ washes

a. *correct clitic interpretation:* mother washing child

b. *incorrect reflexive interpretation:* mother washing herself

c. *incorrect Θ-role reversal interpretation:* child washing mother

The responses selected by the participants for this condition are visualised in the segmented bar plot in Figure 11. The most frequent non-accurate answer is Θ-role reversal, with 37% of responses of this type in the PS group and 12% in yPR. The clitic is interpreted as a reflexive in 16% of the cases in PS, and only in 3% of the cases in yPR.

The control condition, where non-target responses are the same as for the clitic condition in (83), reveals an interesting comparison. In fact, despite the similarity of the conditions -the clitic condition and the NP condition depict in fact

the same action-, the pattern of non-target responses is different. In the control condition, reflexive and reversal answers are similar in count (Table 12).

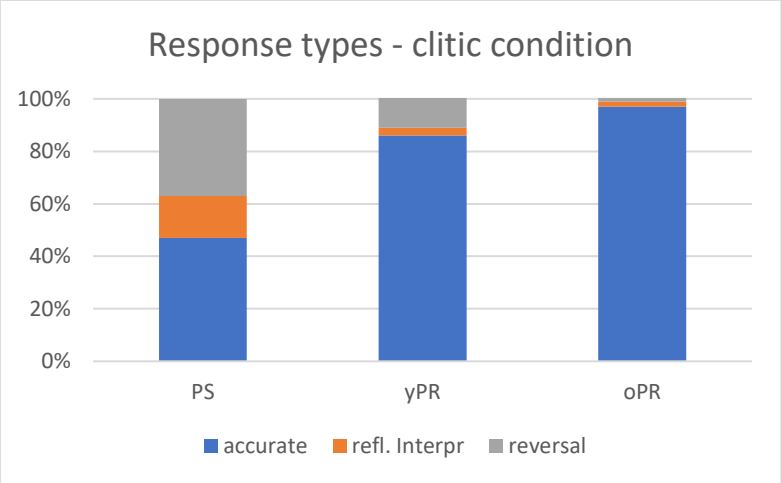


Figure 11. Study 1. Task 1. Relative frequency segmented bar plot for the clitic condition.

control (lexical NP)		**accurate**	**reflexive interpret.**	**Θ-role reversal**
	PS	.63	.19	.19
	yPR	.93	.03	.04
	oPR	1	0	0

Table 12. Study 1. Task 1. Percentages for each response type for the control condition.

Because there was only one image depicting a reflexive interpretation, alternative responses for the reflexive pronoun consisted in the following alternatives:

(84) item: la mamma **si** lava

a. *correct reflexive interpretation*: mother washing herself

b. *incorrect object interpretation*: mother washing child

c. *incorrect non-reflexive Θ-role reversal interpretation*: child washing mother

Results show that the most frequent non-target response type for the reflexive in PS is the non-reflexive, Θ-role reversal interpretation (Figure 12).

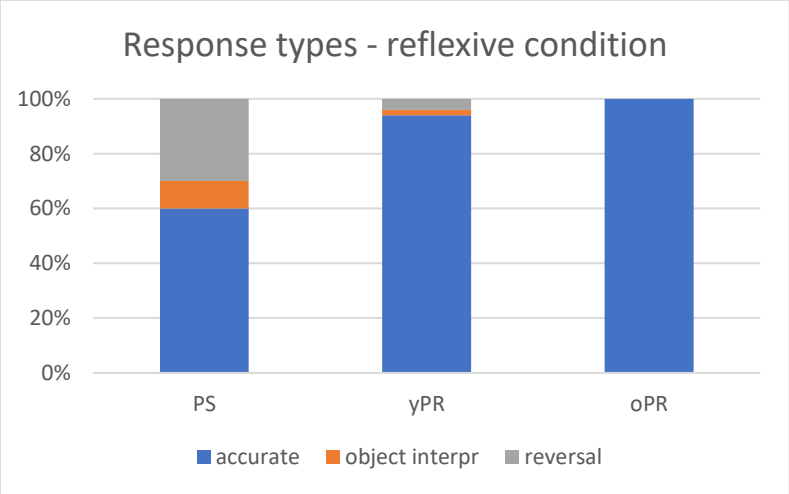


Figure 12. Study 1, task 1. Relative frequency segmented bar plot for the reflexive condition.

6.5.2 Discussion

The results on comprehension of clitic pronouns and reflexives in binding configurations reveal that performance on both conditions changes according to the age group. The clitic condition is the one where the difference between each group is the greatest, while in the reflexive condition the difference between the two primary school groups is marginal, while that between them and the youngest group is great. The most striking result is certainly the low accuracy in the PS group. In fact, previous research quite consistently showed that pre-school children learning Italian or another clitic language already show very high performance on the comprehension of both clitic objects and reflexives (McKee, 1992).

Another puzzling factor is that poor performance in this group in particular spills out on the lexical NP condition, which does not feature binding and c-command and was selected as a control condition for this reason.

Let us analyse in more detail what happens with the different selections, starting from the clitic condition. When the correct answer is selected, the clitic is interpreted as free (or non-reflexive) in its c-commanding domain:

[La mamma$_i$ [la$_k$ lava]]

c-command

This is the most selected configuration in all groups, even in PS where it is selected 47% of the time. This selection respects the boundaries posed by c-command on reference management of free elements.

The least selected alternative is the one where the subject and the pronoun are interpreted as coindexed elements. This is selected only 16% of the time in PS, and 3% of the time in yPR.

*[La mamma$_i$ [la$_i$ lava]]

c-command

Here, the free pronoun is incorrectly interpreted as a bound pronoun (or a reflexivising pronoun). This choice thus violates the boundaries posed by c-command on interpretation of c-commanded pronominal elements, and should be therefore a very disfavoured solution, as it turns out to be.

A similar pattern holds for reflexives. In this case, the most favoured interpretation in all groups is that the reflexive be bound, with 60% of PS children selecting it.

[La mamma$_i$ [si$_i$ lava]]

c-command

The majority of the time the c-commanding element and the bound element are interpreted as coindexed, and the bound element is interpreted as a reflexive-marked element. We remind that this selection contrary to the same selection for the clitic was further facilitated by the fact that only one of the three pictures showed a reflexive action, and this could explain why this condition is more selected than the one of the clitic already in the PS group.

The least selected alternative is once again the one that violates the binding principles. Interpretation of the reflexive as free in its domain is highly disfavoured, with only 10% of selection in PS and 2% in yPR.

[La mamma$_i$ [si$_k$ lava]]

c-command

The second most selected configurations after the target answer both in the clitic condition and in the reflexive condition are the ones which feature Θ-role reversal. For the clitic, this amounts to interpreting the pronoun as free, but misinterpreting the subject. This option is selected 37% of the time in PS and 12% of the time in yPR. For the reflexive, this interpretation requires both misinterpreting the subject *and* de-reflexivising the verb (and consequently the pronoun). This option is selected 30% of the time in PS and 4% of the time in yPR.

[la mamma$_i$ [la$_k$ lava]] (*i = la bambina)*

[la mamma$_i$ [si$_k$ lava]] (*i = la bambina, k= la mamma)*

It must be noted that, because there were three pictures, and not four, while the reciprocal action was repeated twice, with different Θ-roles, the reflexive action was only represented once, namely with the correct Θ-role. This has consequences on the possible alternative choices. While clitics have available both an inversion of Θ-roles and a reflexive interpretation, reflexives only have

two non-reflexive interpretations as possible alternative choices, thus not exploring the option of guessing reflexivity but misinterpreting the Θ-roles. Adding a fourth picture may have given a fuller picture. Nonetheless, the error patterns reveal that the most syntactically violating structure is the least selected.

This across-the-board low performance, which we have seen to not derive from a violation of the binding conditions per se, might be due to an issue the youngest children had with the procedure. Firstly, this was the only task that did not feature a direct question to the child, who had to retain the instructions from the beginning of the task in order to know what to do. Our children were very young, and this operation might have been effortful. Secondly, the conditions were presented together in a pseudorandomized order. This was not the case in McKee (McKee, 1992), where the clitic and the reflexive conditions (as well as other conditions) were presented separately. These factors may have influenced the youngest children's performance in a way that was not directly linked to the items itself: it may be the case that paying attention in the absence of a question and switching from one condition to the other within the same task tap into executive function abilities, which are known to be weak in pre-school age children (Diamond, 2013).

We can address this issue at least partially if we only consider the participants whose performance on the control condition was above chance (approximately 70% correct). While this operation takes the results closer to what we would have expected considering McKee (1992), the performance on the clitic condition remains below chance, and significantly worse than both the control condition and the reflexive condition in this group. This might still be an effect of the non-linguistic requirements that the task might impose on the children: while for the reflexive condition there was only one image that represented a reflexive

action, thus halving the possibility of making mistakes, a non-reflexive action was represented twice.

6.6 Production

The following tasks will feature production of clitic pronouns of different types and with different pragmatic requirements. For each task we will give detailed analysis of the accuracy and the answer pattern.

6.6.1 Production of DO clitics and pragmatic use

The first production task (Task 2) elicited either the production of clitic pronouns or the production of lexical noun phrases depending on the contexts. The task aims to check the ability to pick up the pragmatic alternation between the two elements and the ability to then produce the relevant structure.

6.6.1.1 Results

6.6.1.1.1 Accuracy

Children in preschool years are already comfortable using DO clitics, with an accuracy of 75% produced clitics of the total elicited. The same is true for the older children, who produce the same number of elicited clitics (85% yPR, 86% oPR) (Table 13 and Figure 13). Kruskal-Wallis test with scores by type as dependent variables and group as grouping variable reveals that a significance is not reached in either condition (Table 14). Pairwise comparisons (Table 15) show the only significant difference is reached between yPR and oPR in the lexical NP condition (W 3.317, p 0.05).

Furthermore, the youngest children show to already be able to distinguish between contexts that pragmatically require a deficient lexical expression, and those that require a full lexical expression, showing no significant difference on

the clitic condition and the lexical NP condition (p. 0.732). The same is true for the youngest (p. 0.052) and the oldest of the primary school groups (p. 0.848).

Target answers	**clitic**	**lexical NP**
PS	0.75 (1.8)	0.77 (2.57)
yPR	0.85 (1.75)	0.6 (2.76)
oPR	0.86 (1.78)	.88 (1.2)

Table 13. Study 1, task 2. percentage and standard deviation of target answers per group and per condition.

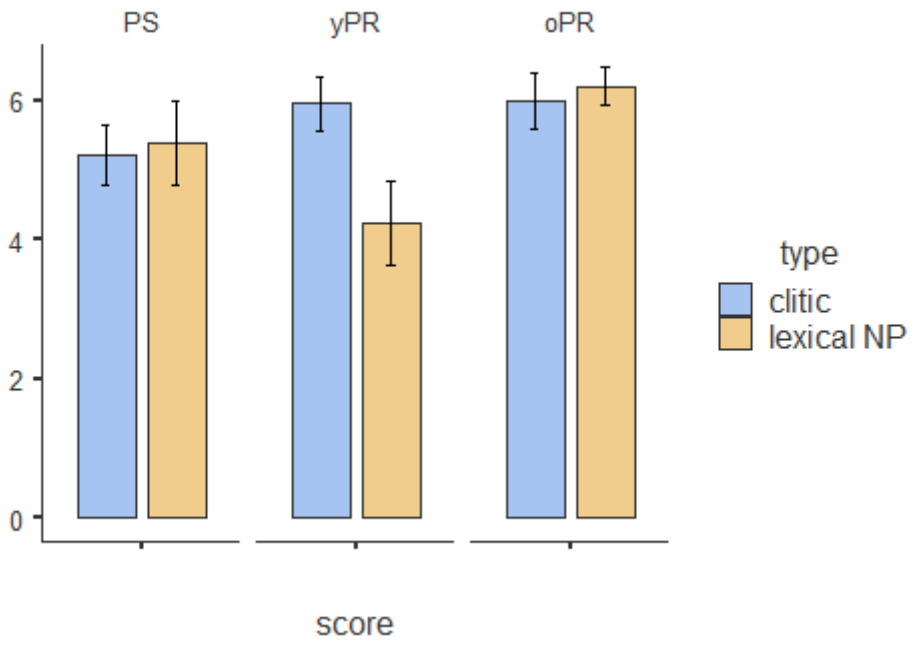


Figure 13. Study 1, task 2. Bar plot showing mean accuracy on production of DO clitic pronouns and lexical NPs over the total possible score for each condition.

Kruskal-Wallis

	χ^2	df	p	ε^2
clitic	3.49	2	0.174	0.0602
lexical NP	5.91	2	0.052	0.1019

Table 14. Study 1, task 2. Kruskal-Wallis test for accuracy in production of clitics and lexical NPs with Group as between variable.

Pairwise comparisons - clitic

		W	p
PS	yPR	2.157	0.279
PS	oPR	2.373	0.214
yPR	oPR	0.124	0.996

Pairwise comparisons - lexical NP

		W	p
PS	yPR	-2.337	0.224
PS	oPR	0.335	0.970
yPR	oPR	3.317	0.050

Table 15. Study 1, task 2. Dwass-Steel-Critchlow-Fligner pairwise comparisons on both conditions

6.6.1.1.2 Error analysis

Percentages of response types are given in Figures 14 and 15 below. As for the clitic condition, over 75% of all responses in all groups consisted in the production of the target structure, namely a clitic that was coherent with the pragmatic context as well as with the elicited features (masculine or feminine). Of the remaining answers, the majority consisted in the production of the lexical NP instead. This meant that the children would repeat the already highly accessible referent with a lexical NP instead of using a pronoun:

(85) Cosa fa la bambina alla farfalla?

What does the girl do to the butterfly?

Response: Cattura la farfalla

She catches the butterfly

The youngest children produce a few instances of clitic with a feature error (only 6 instances), and a few omissions (4 instances).

The "wrong referring expression" type response is really the only one available for the lexical NP condition, together with omissions which have not been produced[20]. An example of this type of response is given in (86):

(86) Cosa fa la bambina?

What does the child do?

Response: *la* cattura

(she) catches it_{fem}

We should also mention that the conditions were pseudorandomised and there were no filler items, so a portion of the mistakes on both the clitic condition and the lexical NP condition could be due to priming effects from the previous sentence, as was observed by the researcher while testing.

[20] It would anyway be more plausible to think of an omission as being an omission of a clitic rather than an NP, seeing as omissions of clitics are a phenomenon of child language, and there is clear evidence that the phenomenon concerns clitics and not lexical objects in general (Tedeschi 2009).

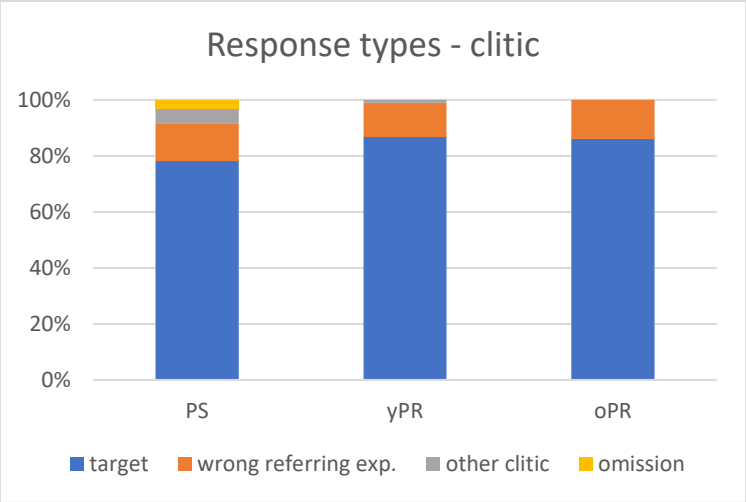


Figure 14. Study 1, task 2. Relative frequency segmented bar plot for response types for the clitic condition

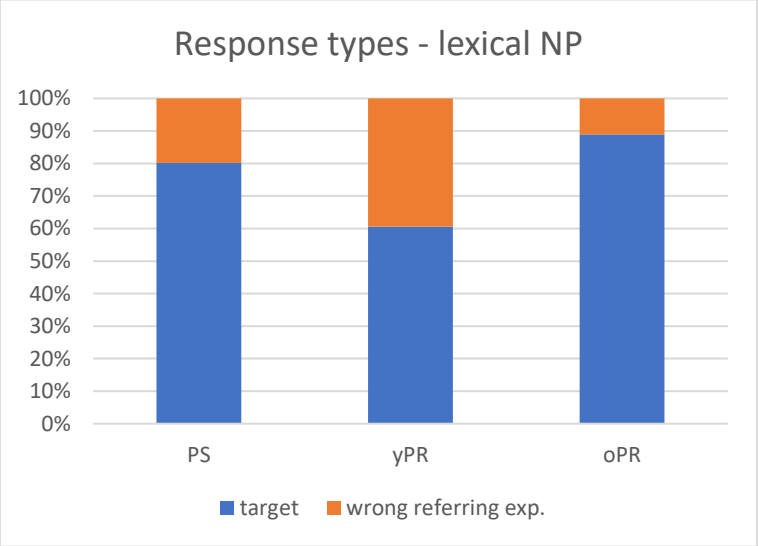


Figure 15. Study 1, task 2. Relative frequency segmented bar plot for response types for the lexical NP condition

6.6.1.2 Discussion

Children in our groups are able to produce DO clitics when these are required and with the required features. When they do not, they produce a full expression instead. While structurally sound, this type of answer is not in line with the discourse analysis of the prompt, and in fact is produced only about 12-14% of the time in all groups. Children at the age of our participants show knowledge of

discourse analysis, and they are able to take discourse considerations into account when choosing a referent, in line with previous results on production of pronouns (Tedeschi, 2008; Gundel & Johnson, 2013).

We notice that results on the lexical NP had a marginal but unexpected presence of errors in one of our groups, namely the yPR. The alternative production to the target element is production of a clitic. Like the choice of an NP in place of a clitic, this choice of referent is also not in line with the discourse properties established by the prompt. In this case, the prompt would prefer the recentring of attention on the object which is accessible in that it is visually present but has not been mentioned in the linguistic input, and the production of a deficient pronoun when the antecedent is not highly accessible can lead to ambiguity. It should be noted that any method using pictures maintains a certain degree of accessibility of the referents.

We identify two factors that avoid this unfavourable result even when using the least descriptive expression: firstly, there is only one plausible referent in the picture, which only features the character performing the action and the object (animate or inanimate) the action is performed on. This resolves any ambiguity the use of a deficient element might cause in that context. Moreover, while the antecedent is not directly present in the prompt, it has in fact been explicitly nominated just in the sentence before that, namely in the preamble:

(87) in questa scena, una bambina vuole catturare *una farfalla*.

In this scene, a girl wants to catch *a butterfly*

For this reason, the full realisation of the referent is not highly accessible, because it is not in the question, but it is not highly inaccessible either, as it is in the sentence just before the question. Therefore, while still not being the best fit for the discourse, producing a clitic in this context is still not a strong pragmatic

violation. Importantly, it is not as strong a violation as it is to repeat a lexical NP that was uttered in the question itself, which is what happens in the opposite case, namely when producing a lexical NP in place of a clitic. Here, it was closer in the discourse than the referent is in the prompt for the NP.

While this explanation might justify the presence of non-target answers in the conditions that do not require the production of a clitic, it still leaves open the question of why this type of answer is a valid competitor to the target answer in the yPR group (60% target, 39% opposite). Individual results (Figure 16) for this group show that 5 of the participants produce ≤30% of expected lexical NPs while performing well on the clitic. If these are excluded from the analysis, the difference between yPR and oPR in the lexical NP condition is no longer significant (W 3.317, p. 0.445).

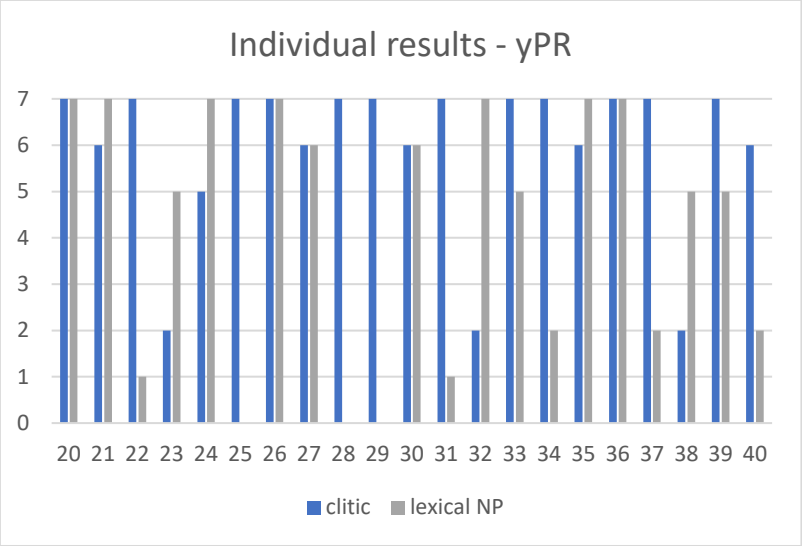


Figure 16. Study 1, task 2. Individual results for accuracy in the yPR group over total possible correct responses.

6.6.2 elicitation of DO clitic and IO clitic in enclisis and proclisis

The second production task is Task 3. This task elicits production of direct and indirect object clitics. As we discussed, these are morphologically different.

Moreover, the task elicits the production of these different clitics in enclitic and proclitic position. We remind that proclitics appear with finite verbs, and they appear on the left of the verb; enclitics appear with finite verb and they appear attached to the right of the verb.

6.6.2.1 Results

Results are presented as follows: we will first look at accuracy on the two structural conditions, namely proclisis and enclisis, in DO and IO clitics, and then we will look at accuracy based on type of clitic, namely DO and IO, in proclisis and enclisis. We will then analyse the types of alternative answers given in non-target production for proclisis and enclisis and for DO and IO.

6.6.2.1.1 Accuracy

Overall results on accuracy can be found in Table 16 and visualised in the bar plots in 17 and 18. Participants in all groups perform better in proclisis than in enclisis and they perform more target IO than they do DO.

	target					
	proclisis			**enclisis**		
	DO	**IO**	**total**	**DO**	**IO**	**total**
PS	.49 (1.76)	.70 (1.83)	.6 (3.29)	.29 (1.68)	.51 (2.19)	.4 (3.26)
yPR	.70 (1.66)	.77 (1.6)	.73 (3.12)	.53 (1.9)	.65 (2.2)	.59 (3.61)
oPR	.86 (1.5)	.89 (1.5)	.88 (2.24)	.69 (2.07)	.80 (1.8)	.73 (3.12)

Table 16. Study 1, task 3. Percentage of target answer and standard deviation for each condition

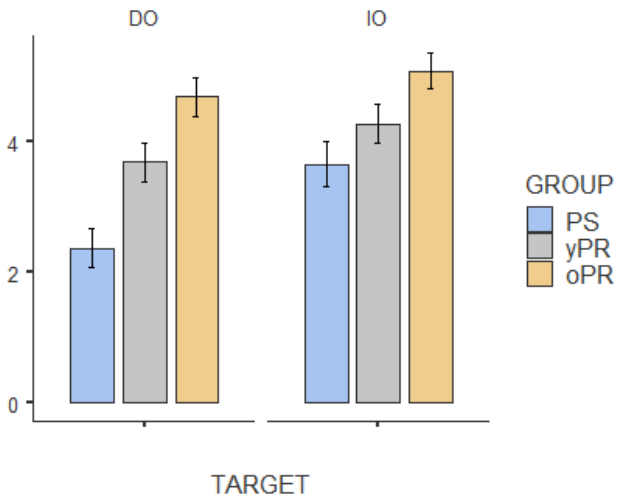


Figure 17. Study 1, task 3. Bar plot with standard error bars for the clitic type condition over total possible correct responses.

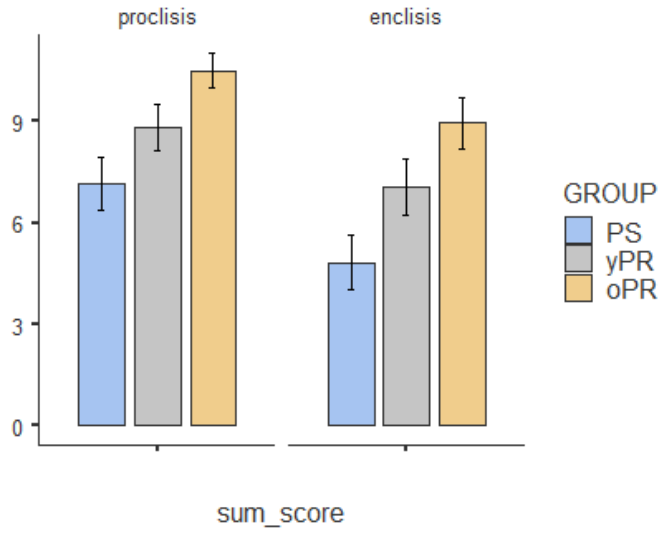


Figure 18. Study 1, task 3. Bar plot with standard error bars for the sentence type condition

Non-parametric one-way ANOVA reveals an effect of Group both in proclisis (p. 0.002) and in enclisis (p. .004).

Pairwise comparisons show that in proclisis the effect is significant between PS and yPR (W 3.75, p. 0.022), PS and oPR (W 4.68, p. 0.03), while it is not between yPR and oPR (W 1.76, p. 0.428). In enclisis, the effect does not reach

significance between PS and yPR (W 3.03, p. 0.081), and between yPR and oPR (W 2.15, p. 0.280), while it does between PS and oPR (W 4.50, p. 0.004).

Grouped results on condition reveal an effect both on DO (p. <.001) and on IO (p. 0.049). Pairwise comparisons show that the significance is only present when comparing PS to the other groups: in the DO condition, it is significant between PS and yPR (W 4.36, p. 0.006), and PS and oPR (W 5.78, p. <.001), and not between yPR and oPR (W 2.63, p. 0.151); in the IO condition, it is only significant between PS and oPR (W 3.449, p. 0.039), while it is not significant between PS and yPR (W 2.426, p. 0.202) or yPR and oPR (W 0.944, p. 0.783).

Within-group results show that the difference between the proclitic condition and the enclitic condition is significant in PS (p 0.025), in yPR (p. 0.002), but not in oPR (p. 0.105). The difference between the clitic type is significant in PS (p. 0.002), yPR (0.019), but not in oPR (0.573).

To check whether significance on the clitic type is at least partially dependent on the results on the enclitic condition, we also analyse the clitic type differences only in the proclitic condition. Kruskal-Wallis test (Table 17) reveals that the significance on clitic type is still reached both for DO (p. <.001) and IO (p. 0.022), but within-group analysis shows that a significant difference between the two clitic types in proclisis is only reached in PS (p 0.002), but not in yPR (p. 0.053) or oPR (p. 0.474).

Pairwise comparisons - proclisis all

		W	p
PS	yPR	3.34	0.048
PS	oPR	5.06	0.001
yPR	oPR	2.77	0.123

Pairwise comparisons - enclisis all

		W	p
PS	yPR	2.63	0.150
PS	oPR	4.80	0.002
yPR	oPR	2.59	0.161

Table 17. Study 1, task 3. Kruskal-Wallis test for the four conditions, with Group as between variable

6.6.2.1.2 Error analysis

Overall, the most frequent non-target answer in all cases is the production of a lexical NP instead of the clitic. Answers of this kind are, for example:

(88) Cosa fa il papà a Martino?

What does the father do to Martino?

Produced answer: dà il flauto *a Martino*

he gives the recorder *to Martino*

As we outlined in Chapters III and IV, this is a strategy that is generally employed when avoiding production of a clitic whilst still producing a grammatically licit sentence. This is the most employed non-target answer in yPR, and virtually the only one in oPR.

In proclisis, the youngest group has an equal number of lexical NPs and of the error type “other clitic – pragmatics”. We recall that this type of mistake means that the child would answer with an unelicited clitic:

(89) Cosa fa Sara al panino?

What is Sara doing to the sandwich?

Produced answer: gli dà *(al bambino)* il panino

(she) gives him$_{Cl,dat}$ the sandwich

This type of error is virtually only a real alternative as a non-target answer for elicited DOs, which in fact have the lowest accuracy. Here, it is produced 23% of the time in PS and 12% of the time in yPR. For the IOs on the other hand the overwhelming majority of alternative answers is once again the production of a lexical NP in all groups.

In the conditions eliciting enclitics, thus the production of a non-finite sentence, another type of error becomes visible particularly in the PS group, namely the production of another structure. While they may produce the target clitic, they are not producing the target structure, resorting to a finite construction:

(90) Cosa dice al commesso di fare al maglione? Dice di...

What does (he) tell the clerk to do with the pullover? (He) tells him to…

Produced answer: lo *dà* alla signora

(he) gives it to the lady

However, this type of error is not pervasive and does not characterize the language of young children. In fact, if we look at the percentage of correctly produced structures, regardless of the productions of clitic, we find that the embedded infinitival is already available in the youngest children in high rates, as shown in Table 18.

	target structure
PS	.84
yPR	.97
oPR	1

Table 18. Study 1, task 3. Percentage and standard deviation of correctly produced constructions featuring an embedded non-finite verb.

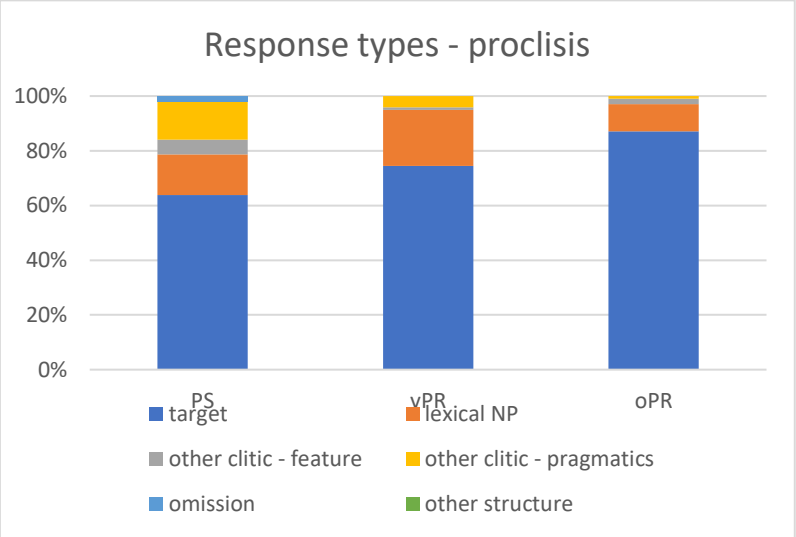


Figure 19. Study 1, task 3. Relative frequency segmented bar plot for response types in all proclitic conditions. Target= expected answer; lexical NP= lexical NP in place of a clitic; other clitic – feature= clitic with feature error; other clitic – pragmatics= cliticisation of the wrong argument; omission= omission of clitic or alternative referring expression; other structure= irrelevant answer.

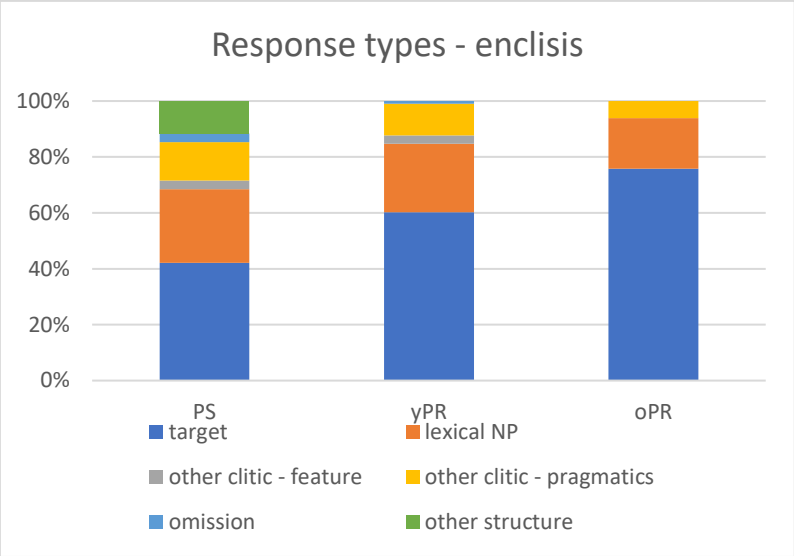


Figure 20. Study 1, task 3. Relative frequency segmented bar plot for response types in all enclitic conditions. Target= expected answer; lexical NP= lexical NP in place of a clitic; other clitic – feature= clitic with feature error; other clitic – pragmatics= cliticisation of the wrong argument; omission= omission of clitic or alternative referring expression; other structure= irrelevant answer.

6.6.2.2 Discussion

Results in this task showed that both type of structure and type of clitic determine group differences in the performance. For structure, we discovered that all groups perform worse on enclisis than they do on proclisis. For clitic type, we discovered that the youngest group perform more accurately on IO than on DO. This is true regardless of the type of structure. If we divide results by both type of sentence and type of clitic, the same is true for both yPR and oPR in the enclitic conditions. The production of DOs is not problematic per se, as can be seen from the previous task (see Table 19), which may provide an explanation to this outcome. We interpret these different results across tasks as a result of choice: while in task 2 the element to be cliticised did not have a competitor, seeing as there was no other participant that could have been assigned an indirect object, task 3 did. Moreover, the IO was elicited in half of the items of the task. For these two reasons, it was an available choice in this task. What seems to be the case is

that when there is only one available element to cliticise, in the case of task 2 a DO, cliticisation is not problematic; when there are two elements that may be cliticised, in the youngest group on all conditions and in the two other groups only in the enclitic conditions it is easier to pick the correct one when it is an IO than when it is the DO. This seems to indicate that this choice is in itself a "go easier" strategy, even within use of clitic. The question is then why resorting to an IO clitic would be easier than a DO clitic when you have the option, and you find the computation of what you are asked to produce more challenging. On a structural level, the IO is less inherently tied to the verb than the DO, being the external argument, to the point that some accounts on IO describe it as being relation with V-DO (Bos, 1972) rather than V alone. Moreover, Italian does not allow object drop, so the internal argument must be always realised. If anything, this makes the production of a DO clitic more probable than that of the IO. The tendency to overextend the IO instead of the DO may be in line with data found in Caprin and Guasti (Caprin & Guasti, 2009), where IOs were found to be omitted much less than DOs (74% vs 34% of omissions) in spontaneous productions of young children during the omission phase. The authors account for this facilitation of IO over DO clitics within the Unique Checking Constraint theory (UCC) (Wexler, Gavarrò, & Torrens, 2004). According to this account, children in the Optional Infinitive stage's grammar is governed by the following constraint:

(91) UCC

The D-feature of DP can only check against one functional feature

In clitic languages that require past participle agreement, as is the case for Italian, the object clitic must check for features both against the projection hosting the past participle (case features), and against the destination of the clitic (definiteness features). This double checking violates (91). The same is not true for indirect clitics, which do not agree to the past participle and thus require one

less checking operation. Therefore, children may perceive indirect clitics as simpler because they abide by UCC, while they drop (or disprefer) the direct clitic for the opposite reason.

The production of the non-elicited ciltic may also be partially task-dependent for the youngest group: in fact, much like in Task 1, the items targeting the two argumental positions were elicited in the same session. The shifting may require the same EF abilities, that are still under development at four years of age (Diamond, 2013).

	DO no competitor	DO with competitor	IO with competitor
PS	.75	.49	.70
yPR	.85	.70	.77
oPR	.86	.86	.89

Table 19. Study 1. comparison of 3rd person DOs in both tasks where they are elicited and IOs.

Our data further established that there are two types of non-target answer that are most common: the production of a non-target clitic, specifically an indirect clitic in place of a direct clitic, and the production of a lexical NP in place of the elicited clitic. Crucially, both do not produce an illicit sentence. In fact, illicit sentences (namely omissions and production of clitics with non-target features) constitute a very limited number of all produced answers in all groups, in line with previous accounts on children after the omission period (Schaeffer, 2000). Another alternative answer that is virtually absent is the production of the strong pronoun. As we have seen in 1.3, languages that have both clitics and strong pronouns accessible for reference have different uses of the two. In Italian, strong pronouns have contrastive value. For this reason, they were not pragmatically adequate in the contexts at hand. Our data confirms that children already at 4 do

not use strong pronouns for non-contrastive contexts (Leonini C. , 2006a; Leonini C. , 2006b; Gundel & Johnson, 2013).

Lexical NPs were also produced in higher levels as alternative answers in the enclitic conditions. Like we anticipated, producing a lexical NP is a known avoidance strategy for not producing a clitic, whilst still producing a licit sentence (Arosio, Branchini, Barbieri, & Guasti, 2014). Among the alternative answers, particularly in PS, we another type emerges, namely the production of a finite construction instead of the elicited non-final construction. While this may be partially due to the elicitation non-finite constructions being elicited in the same task as finite ones, which may have had some priming effects (but the two conditions were tested separately), if we sum up all licit sentences with correct structure, this is produced already 84% of the time in the youngest group, showing the verbal structure itself is not problematic. When what is being elicited is a finite verb with a clitic, the child must produce one finite verb checked for the appropriate morphology, and one clitic which follows the derivation of proclitics seen in 1.3.2; when what is being elicited is a non-finite verb with an enclitic, the child must produce one finite verb, one dependent non-finite verb and one clitic which attaches to the non-finite (and not the finite) verb as in 1.3.2:

[$_S$pro [$_{CL}$gli [$_{VP}$[$_{vP}$dà [$_{DO}$il panino]][$_{IO}$t]]]]

[$_S$pro [$_{VP}$[$_{vP}$dice [$_{CP}$di [$_{VP}$ dargli [$_{DO}$il panino]] [$_{IO}$t]]]]

When the structure that needs to be produced is more complex, children acquiring the language optionally opt out from the production of the attached clitic (more frequently) or of the complex structure (less frequently).

6.6.4 Production of 1st and 2nd person IO clitics in proclisis and enclisis

Next, we look at production of 1st and 2nd person IO clitics. This is interesting to check for two reasons: firstly, pronouns of 1st and 2nd person on one side and pronouns of 3rd person on the other have been claimed to be different in nature[21], with the latter possibly requiring further syntactic checking; secondly, 1st and 2nd person give us the option to explore another element that can come into play and interact with pronouns, namely the assignment of reference on the basis of discourse, capitalising on the deictic nature of 1st and 2nd persons.

6.6.4.1 Results

6.6.4.1.1 Accuracy

Results on accuracy are shown in Table 20 and visualised in the bar plot in Figure 21. The stark difference in performance between proclisis and enlclisis is confirmed in this task.

	proclisis	**enclisis**
PS	.58 (3.01)	.14 (2.10)
yPR	.7 (2.19)	.36 (2.60)
oPR	.86 (1.74)	.74 (2.86)

Table 20. Study 1, task 4. Percentage of accurate answers per condition and standard deviation.

[21] An assumption that we do not dive into but that capitalises on the notion that third person pronouns lack person specification, unlike first and second person.

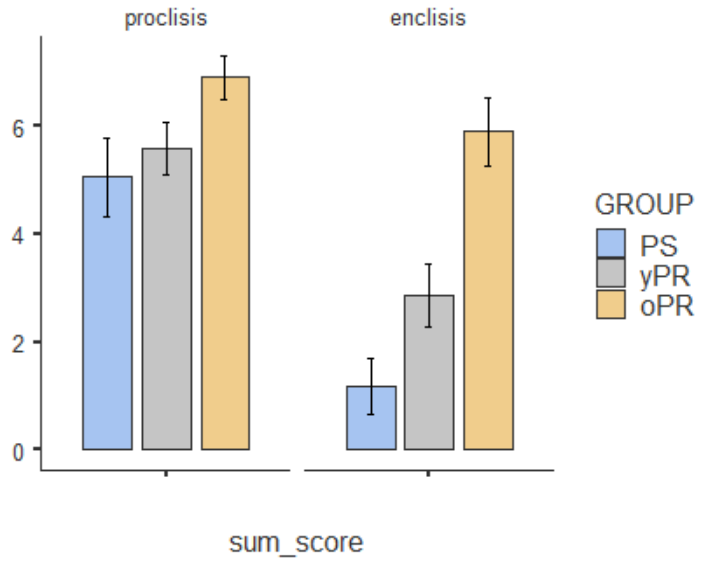


Figure 21. Study 1, task 4. Bar plot for mean accuracy per group on production of enclitic and proclitic 1st and 2nd person pronouns

Kruskal-Wallis non-parametric one-way ANOVA reveals an effect of Group both in proclisis (p. 0.020) and in enclisis (p. <.001).

However, pairwise comparisons show that in proclisis the effect is not significant either between PS and yPR (W 0.177, p. 0.991) or PS and oPR (W 2.933, p. 0.095), while it is between yPR and oPR (W 3.860, p. 0.017). This is due to the great range in PS in proclisis, and the presence of several scores below the mean in the yPR group, as can be seen in the box plot in Figure 22. In enclisis, the effect does not reach significance between PS and yPR (W 3.23, p. 0.058), while it does between PS and oPR (W 5.78, p. <.001) and yPR and oPR (W 4.56, p. 0.004).

Wilcoxon t-test for within-group statistics show that the difference between the proclitic and the enclitic condition is significant in PS (p. 0.001), in yPR (p. 0.001), but not in oPR (p. 0.218).

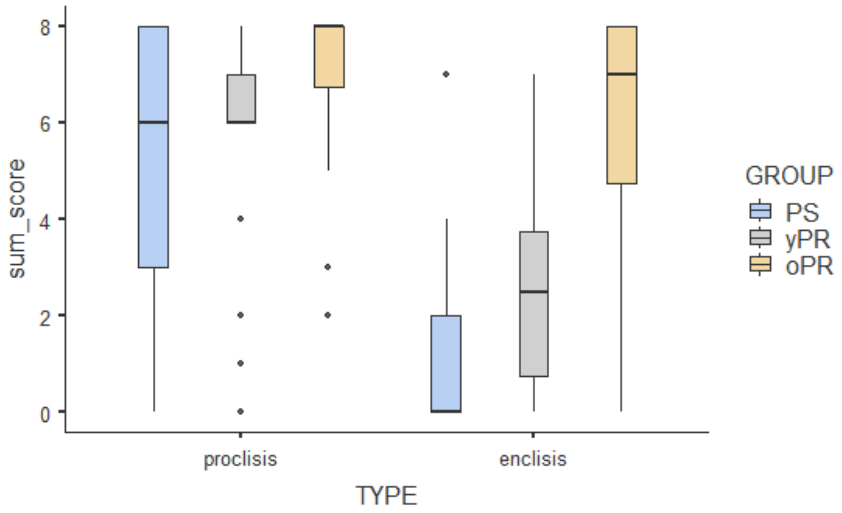


Figure 22. Study 1, task 4. Boxplot visualising the distribution of results in the groups, divided by sentence type.

6.6.4.1.2 Error analysis

Both in proclisis and in enclisis (Figures 23 and 24), the most common answer is the production of a strong pronoun in place of the clitic, as in (92). In enclisis, this answer is more common than the clitic both in PS and in yPR.

(92)a. target: mi dai il disegno

CL-to-me (you) give the drawing

produced: dai il disegno **a me**

(you) give the drawing to me

b. target: (dice di) darmi il disegno

(*pro* tells to) give-CL-to-me the drawing

produced: (dice di) dare il disegno **a me**

(*pro* tells to) give the drawing to me

The PS group also has a second error type both in proclisis and in enclisis, namely errors of identification. Other types of errors are marginally represented (≤7%). Errors of identification consisted of three possible outcomes: production of 1st person instead of 2nd person pronoun or vice versa (93a), production of 3rd person pronoun (93b), or production of absent or correct pronoun but wrong verb agreement (93c).

(93) target: mi dai il disegno

CL-to-me (you) give the drawing

produced: a. ti do il disegno

CL-to-you (I) give the drawing

b. gli dà il disegno

CL-to-him (she) gives the drawing

c. (mi) do il disegno

(CL-to-me) (I) give the drawing

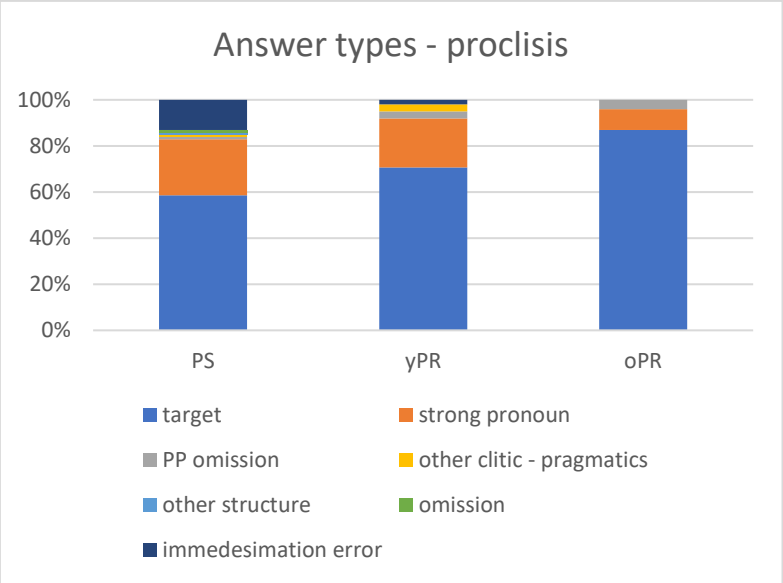


Figure 23. Study 1, task 4. Relative frequency segmented bar plot for response types for conditions eliciting IO clitics in proclisis

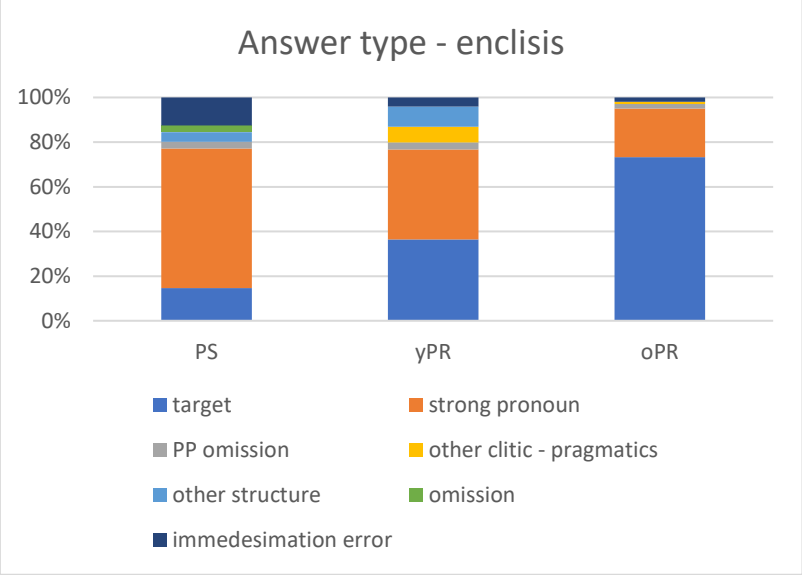


Figure 24. Relative frequency segmented bar plot for response types for conditions eliciting IO clitics in enclisis

6.6.4.2 Discussion

Results on this task show that children as young as 4 can produce 1st and 2nd person IO clitics in the elicited contexts. In this task, results on IOs are lower than in the previous task on 3rd person. However, we do not take this to indicate an

advantage in terms of person. In fact, clitics had a strong competitor in strong pronouns in this task: the prompt featured a strong pronoun and an explicit subject, both elements that might trigger the use of a contrastive expression:

(94) In questa scena, io lancio la palla ***a te***. Cosa faccio io?

In this scene, I throw the ball ***to you***. What am I doing?

Strong pronoun answer: lanci la palla **a me**

(you) throw the ball ***to me***

Notice that using a strong pronoun in the case of the 1st and 2nd person pronoun is also the only alternative answer that does not produce either a syntactically illicit sentence (e.g. omission) or a sentence that does not respect the identification of the characters, as in 95:

(95) expected answer: **ti** do la palla

pro CL-to-you give the ball

NP answer: do la palla **alla signora**

pro give the ball to-the lady

Interestingly, like the lexical NP in the previous task, the preference for a strong pronoun is particularly evident in enclitic constructions, where it is the most frequent answer in two out of three groups.

6.6.5 Production of 3rd person IO – DO clitic combinations in proclisis and enclisis

The last task (Task 5) that was carried out tested production of clitic clusters.

6.6.5.1 Results

6.6.5.1.1 Accuracy

Results on this task are varied. As can be seen from Table 21, accuracy on cluster production was very low for all children in all groups, with overall number or produced clitic clusters being very low regardless of the condition, and never reaching more than half the expected productions. The range and variation are big in all groups on all conditions, as can be visualised in the box plot in Figure 25.

Non-parametric one-way ANOVA reveals that a group difference was in fact not significant in either condition (proclisis, p 0.392, enclisis p. 0.454), and pairwise comparisons reveal that this is extended to all groups (Table 22).

Within-group statistics reveal that the difference between the two conditions is significant in PS (p. 0.033), in yPR (0.002), and not in oPR (p. 0.053).

	proclisis	enclisis
PS	.37 (2.73)	.21 (2.21)
yPR	.4 (2.43)	.16 (1.82)
oPR	.52 (3.1)	.34 (3.09)

Table 21. Study 1, task 5. Percentage of correct cluster production and standard deviation for the proclitic and enclitic conditions.

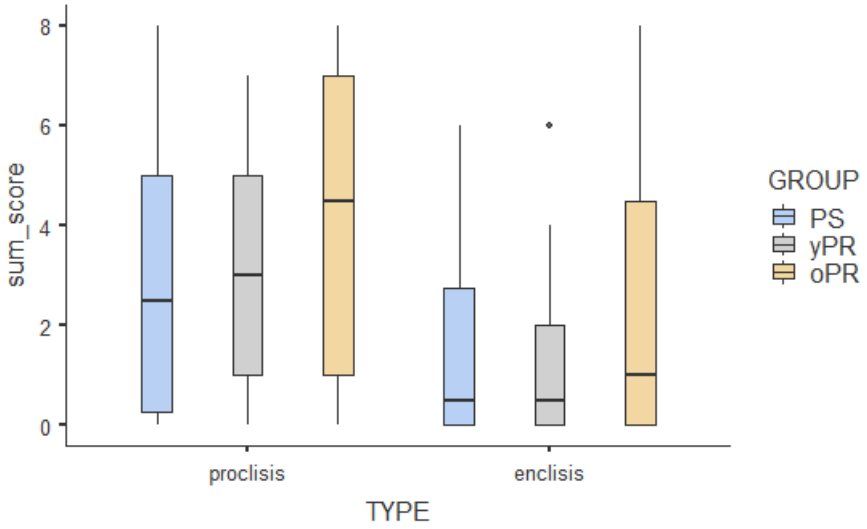


Figure 25. Study 1, task 5. Box plot representing mean accuracy in cluster production over total possible correct answers.

Pairwise comparisons - proclisis			
		W	**p**
PS	yPR	0.543	0.922
PS	oPR	1.754	0.430
yPR	oPR	1.503	0.537

Pairwise comparisons - enclisis			
		W	**p**
PS	yPR	-0.230	0.986
PS	oPR	1.323	0.618
yPR	oPR	1.665	0.467

Table 22. Study 1, task 5. Dwass-Steel-Critchlow-Fligner pairwise comparisons for proclisis and enclisis

6.6.5.1.2 Error analysis

Two types of responses were the most frequent in all groups in both proclisis (Figure 26) and enclisis (Figure 27). These were: production of a single clitic, and realisation of the objects as lexical NPs. As in previous tasks, errors on the clitic itself as well as omissions are marginal.

The answer featuring lexical NPs meant reiteration of one or both objects:

(96) Qui Marco ruba l'orsetto a Sara, e qui cosa fa?

Here Marco steals the teddy from Sara, what does he do here?

NP response: regala l'orsetto a Sara

he gives the teddy bear to Sara

The PP was occasionally omitted. In answering with a single clitic, the participant produced one of the two objects as a clitic and the other object as either omitted or produced as a lexical NP:

(97) Qui Marco ruba l'orsetto a Sara, e qui cosa fa?

Here Marco steals the teddy from Sara, what does he do here?

single clitic response: ***lo*** ridà (a Sara)

he gives **it** back (to Sara)

As discussed in 5.3.6.2, the "single clitic" response is one that may be considered correct if we do not adopt a strict evaluation for accurate responses. In fact, it is still pragmatically sound in the sentence. Table 23 presents the answers that contain one or two clitics combined, showing that production of a clitic was similar to that found in previous tasks.

	proclisis	enclisis
PS	66%	44%
yPR	71%	49%
oPR	72%	54%

Table 23. Study 1, task 5. Percentage of answers containing at least one correct clitic

Alternative answers in proclisis and enclisis differed in two ways: firstly, much like in the other tasks featuring the enclitic/proclitic distinction, the conditions targeting enclitic constructions also triggered errors of structure, with finite structures produced when a non-finite verb was elicited. Like in the other tasks, this error is mostly limited to the youngest group.

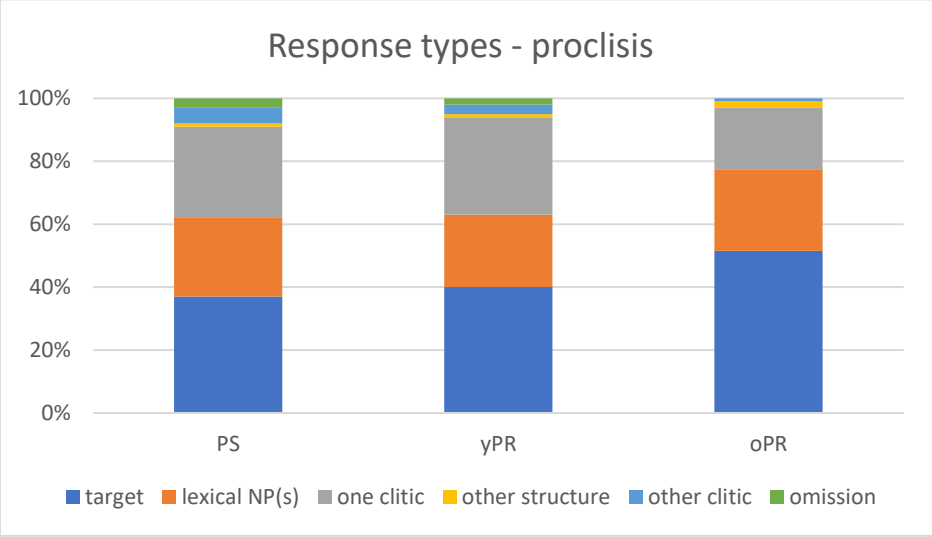


Figure 26. Study 1, task 5. Relative frequency segmented bar plot for response types for proclitic conditions

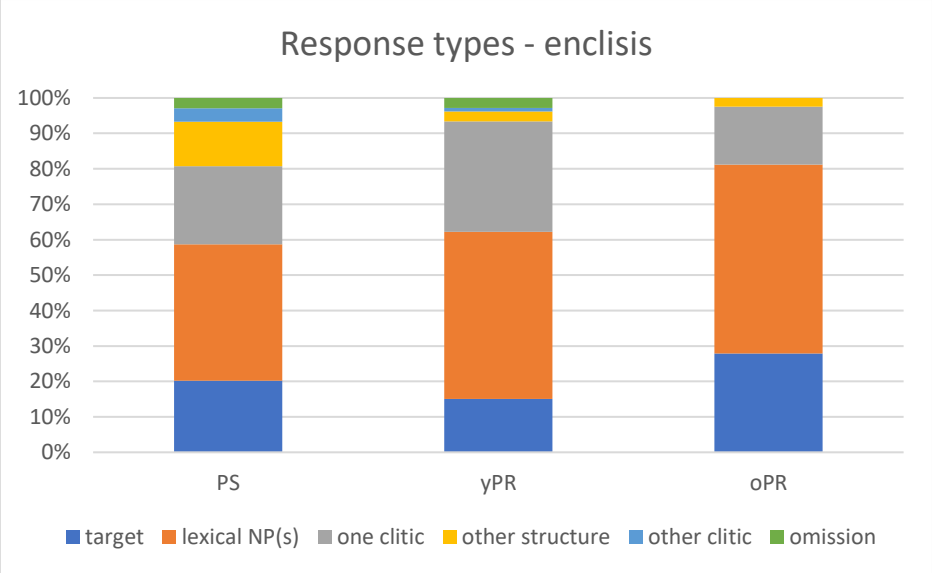


Figure 27. Study 1, task 5. Relative frequency segmented bar plot for response types for enclitic conditions

6.6.5.2 Discussion

Data from this task show a low production of clitic combinations in all age groups. We believe that the optionality that a context eliciting a cluster allows is in part responsible for this result. In fact, the cliticisation of only one of the two elements and the realization of the other argument as either an omitted element (in the case of a PP), or a lexical NP, was still pragmatically accurate. Counting together all utterances containing at least one target clitic, accuracy increases as seen in Table 23. In the original testing for this task, this was partially overcome by providing explicit examples of answers containing the clitic in the trial phase, but as already mentioned in 5.3.6, this step was skipped in the current study for purposes of consistency. Furthermore, a perception while testing was that the prompts featured in this task, which repeated the lexical NPs introduced in the preamble, were perceived as creating the pragmatic grounds for a contrastive focus on the verb. When the verb is in focus, cliticisation cannot take place and the arguments must be realized differently. In the example below, upper case indicates stress.

(98) Qui Marco RUBA l'orsetto a Sara, e qui cosa fa?

Here Marco steals the teddy from Sara, what does he do here?

verb in focus: a. RIDÀ l'orsetto (a Sara)

pro give-back the teddy (to Sara)

b. *lo RIDÀ

CL-it *pro* give back (to Sara)

Despite these task-related results, clusters are still produced more in the oldest group, and more in proclisis than in enclisis. This gives us reason to believe

that clusters are in fact acquired later than other occurrences of the clitics and are thus considered complex in the youngest children.

6.7 General Discussion

With this study, we aimed at giving a comprehensive assessment of clitics in children from preschool to primary school years. Our intention was twofold: that on the one hand that our results would contribute to the discussion on acquisition of pronouns with new data from Italian, featuring new conditions and testing both syntax and other conditions involved in reference management of clitics, on the other, that these results from typical acquisition would provide further insights on how clitics can work as tools to detect different degrees of language abilities in typical and non-typical language development.

Overall, our results confirm that the production of DO clitics in proclitic position is present already at a young age in monolingual typically developing children. At 4, children are aware of the pragmatic value of this element, as well as being able to produce grammatically coherent clitics (namely with the correct features and in the correct position). Importantly, we found that this is also true of IO clitics, which are produced correctly already in our youngest group. Therefore, if cliticisation is learnt with finite verbs, it is applied correctly regardless of the argument position the element occupies. This is to be expected given that the cliticisation process is similar between DO and IO arguments. One difference between the cliticisation of the two arguments that is visible in complex forms is that DO clitics must check for Agreement features under Past Participle, giving rise to 66, here repeated as 99a, while IO clitics do not, giving rise to 99b. This difference has been argued to result in a preference for IOs over DOs in children who are still in the UCC phase.

(99) a. (La ragazza/il ragazzo) L(***a/o***)'ho incontrat**a**/**o** davanti al cinema

(The girl/the boy) (I) CL-have met$_{fem,sing/masc,sing}$ in front of the cinema

b. (Alla ragazza/al ragazzo) gli/le ho dato un libro

(To-the girl/to-the boy) to-him/to-her$_{CL}$ have given$_{masc, sing}$ a book

While our tasks do not specifically target past participles, the use of tense was partially up to the speakers, thus resulting in use of both simple and complex tenses. Both the youngest children and the middle group do show a preference for the production of the IO clitic over that of the DO clitic when they have a situational context that is felicitous with both. Although accuracy was overall lower, we believe that the ability to produce IO clitics is also extended to 1st and 2nd person clitics. In fact, there is no reason to think that they would not, given that they follow the same steps of 3rd person IO clitics, only ending in a higher node (following Bianchi 2006). As we have anticipated, the IO clitic had a valid competitor in the strong pronoun in the task eliciting 1st/2nd person IOs, which was present in the prompt. Still, the IO in proclitic position is used more than half of the time already in the PS group. Thus, we conclude that both DO and IO clitics in preverbal position are acquired early in the typical child. For this reason, any deviance from this result may signal a linguistic impairment, as in fact is widely reported for the DO (Bortolini et al. 2002, 2006).

The second point that we can make looking at within-group performances regards the difference between proclisis and enclisis: while the differences on comprehension and on production of different types of clitics in proclisis are significant in PS but are already resolved at the second level, namely yPR, on all tasks featuring proclitic and enclitic conditions, the difference is still present in yPR, and only the oldest group show similar abilities in finite and non-finite environments for the construction of an enclitic structure. The issue is not with

the structure itself: in fact, we find that while participants *do* produce the sentence structure itself correctly the majority of the times it is elicited, the production of *clitics* decreases when they are to be placed within this structure. The mechanism is very clear in the PS group: rather than producing the "correct structure + correct clitic" combination, participants at this age more frequently produce one or the other, but more frequently they produce the correct structure, but no clitic. For this reason, in order to avoid omission of the argument, the production of a lexical NP, which is pragmatically disfavoured and is not an available candidate in proclisis, becomes available . This is a result on typical development that we deem important for the role of clitics as markers: in fact, while an impairment can be already visible in simple proclitics, the fact that another instance of the clitic which requires to manage both the clitic and a harder structure is mastered later may make this a good candidate to explore abilities on later acquired structures.

The same could be true of the production of clusters, which we have seen to be frequently avoided. This was partially due to the optionality of the double cliticisation, which made the production of a single clitic an appropriate answer for the context, the cluster is still a construction which is pragmatically desirable in a context where two elements are easily accessible, and that we would expect to see more frequently. However, it requires to keep track of two syntactically displaced elements at the same time, and to operate two movements, and children show a preference for avoiding this. Interestingly, the production decreases even more in enclisis, thus showing that the combination of the two possible instances of clitics which require the higher computations is the condition that has the lowest accuracy of all.

Overall, omission is not present among the answer strategies in the pre-schoolers, and neither are gender feature errors. This result is consistent across

the tasks. Elicited clitics are substituted more frequently with other clitics in all three groups: clitics in the non-elicited argument position (particularly when the contexts allow it, as in Task 3). Strong pronouns are not perceived as a valid competitor for the clitic, unless they are used in the prompt (as in Task 4). In PS, lexical NPs become a valid alternative to the clitic in the structures that appear later, namely for enclitics and clitic clusters.

Based on previous results on differences in the types of productions, most notably in DLD (Bortolini et al. 2002, 2006, Hamann et al. 2003, Arosio et al. 2014 inter alios), we expect there to be differences in the patterns of other populations. Specifically, if in the presence of syntactic impairment, we may find more errors on the cliticisation process itself, such as omissions, displacements, and feature errors. If in the presence of pragmatic impairment, we might expect to find higher numbers of alternative structures. If the impairment is in Theory of Mind, it might be particularly visible in exercises that require identification and discourse management. If the impairment is generalised or unclear, there may not be a clear pattern. In the following studies, we will look at conditions of non-typical development and see if any of these hypotheses are borne out.

Chapter VII Study 2 – assessment of clitics in bilingualism + attrition: Heritage Speakers of Italian born and raised in the UK

7.1 Heritage speakers

Heritage Speakers (HS) of a language are bilingual speakers who were raised in homes where a language other than the dominant language is spoken (Valdés, 2000). The HS is thus a native-speaker bilingual of this language, as well as a native speaker or a child L2 learner of the language that is spoken in their country (Kupisch & Rothman, 2018). While they are in fact native speakers of their heritage language (HL), they learn it in a reduced-input environment, from speakers of that language who are themselves exposed to attrition on their native language due to living in a community speaking a different language. Therefore, heritage speakers' input is thus not only lower than it would be if they were living in the country where that language is spoken, but it is also likely altered by the individual attrition of the parents or family members. Moreover, their bilingualism is typically heavily imbalanced in favour of the dominant, societal language, and thus their language will likely differ from that of their input (Polinsky & Scontras, 2020). How much it may differ has been shown to be heavily influenced by whether or not they had schooling in their HL (i.e., whether they attended for instance an Italian school in Germany as opposed to a German school in Germany). If they did, performance is similar to that of monolinguals of the HL (Kupisch & Rothman, 2018 and studies reviewed there).

Attrition on L1 speakers is a phenomenon that starts very early after their move (as soon as three months in lexical retrieval (Linck et al. 2009)), and shapes this linguistic population's language on several levels, from word level to syntax. In syntax, it seems to be the case that attrition is a selective process: it is a pervasive enough phenomenon to influence structures that already in L1 show some degree of optionality, but not strong enough to influence deep structures with no optionality that would lead to strong violations if modified (Sorace 2005, 2011 inter alios). For example, attriters have been shown to lose sensitivity to the Split Intransitivity Hierarchy (Montrul, 2005), and to allow more optionality for overt subject pronouns when their L2 is non pro-drop (Sorace, 2011, Chamorro & Sorace, 2019). These phenomena of interference have been shown to be the consequence of processing and activation patterns, rather than deriving from a re-shaping of the formal language of these individuals in their L1. In fact, even soon after L1-reexposure, they show to reactivate the structures that they did not show when tested in their L2 country (Köpke & Genevska-Hanke, 2018; Chamorro, Sorace, & Sturt, 2016).

Heritage Speakers are also characterised by phenomena that appear to be resilient, and others that are more vulnerable (as reviewed in depth in Polinsky & Scontras 2020). Among the resilient phenomena are phonetic and phonological competence -though they retain an "accent"- and production of some morphosyntax such as tense and determiners. Several and more investigated are the more vulnerable areas, and difficulties have been found in more complex structures like relatives (Polinsky 2011), anaphoric dependencies (Kim et al. 2009), and others. Importantly, some studies (for example passive constructions in German as investigated in Putnam & Salmons 2013) have reported that even when they lack production of some structures, they show comprehension of them, thus showing that they have the knowledge of the rule and a modality preference.

7.2 Objective

Clitic pronouns, we discussed, have the potential to highlight areas of language that may define the linguistic shape of speakers, and we are interested in finding out in what way they do so. The objective for this study is thus to see what the pattern of performance on a comprehensive assessment of clitics is in bilingual speakers of Italian with low exposure, namely Heritage Speakers. As we anticipated, this group of bilinguals learns their second language from native speakers whose exposure to a second language has influenced their native language. For this study, we are interested in seeing if and how having acquired the language from attriters, as well as in conditions of low level of exposure, influences performance of heritage speakers on comprehension and production of clitic pronouns.

It is not straightforward to predict how this population is going to perform on clitic pronouns. Because for the most part these adult speakers had received no formal schooling in their HL, we know their language will be different from that of a monolingual speaker of that language (following Kupisch & Rothman, 2018). Based on what we know from bilingual acquisition (Chapter 4.2) we might expect their comprehension of bound pronouns to be in place, and their productions to be correct, at least on simple clitics. Because some studies report a resistance to produce complex structures, it may be the case that the clitics requiring more operations are less frequently produced by these speakers. If they are particularly hard for them, attempts of production may result in some incorrect productions. As for alternative structures, if these participants are heavily influenced by English-type pronouns, we might expect to see an overuse of strong pronouns; if however their understanding of the pragmatic role of the strong pronoun in Italian is in place, their substitutions may be constituted primarily of lexical NPs.

7.3 Participants

A group of 30 Heritage Speakers (henceforth HS in tables) was recruited for this study (see Table 24 for group characteristics). Participants were recruited through ads circulating at the University of Edinburgh and the University of Heriot-Watt. All participants were born in an English-speaking country to an Italian family (27) or had moved there in early stages of childhood (3). All participants but one had no schooling in Italian. Participants were living in Edinburgh, Scotland at the time of testing.

	Heritage speakers (HS)
Number	30 (female: 19)
Age	M = 35.7, SD = 12.3
Education	secondary: 10, university: 20

Table 24. Study 2. Descriptives for the HS group

7.4 Materials and Methods

Due to the condition of bilingualism, a background assessment of language was carried out in both languages of the participants. Furthermore, all participants filled out the Leap-Q task (Marian et al. 2007) to get a better grasp of their language use in both languages.

All instructions were given in English, as it is considered best to give instructions in the most dominant language of the participant.

7.4.1 Background Measures

General abilities in the two languages were tested through the following tasks:

- Test of reception of grammar (TROG-2) (Bishop, 2003): The TROG-2 is a standardised sentence-comprehension task on English. The task presents the participant with four pictures and a sentence, which is read aloud by the experimenter, for a total of 80 items. It is often included in language assessment batteries and in clinical protocols.

- Comprendo (Cecchetto et al. 2012): A reduced (30 items in total), online version of the standardised COMPRENDO Italian sentence-picture matching task was adapted on Psychopy for this study. Participants hear a sentence and are presented with two images 1000 ms before the end of the audio, one representing the correct image and the other the same action with reversed roles. They are instructed to select the image that best fits the sentence by clicking on one of two keys, key *x* for the image on the left and key *n* for the image on the right. Items are randomised, and reaction times are measured.

Moreover, participants took two markers for Italian, namely non-word repetition (5.2.2), which serves as a measure for phonological awareness of the language, and sentence repetition, which controls for the abilities to process simple to complex grammatical structures in the target language. For this task, we used the FAST sentence repetition task by Di Domenico and colleagues (in preparation). The test is composed of 26 items of varying complexity, from simple actives, to coordination, passives, and so on. Each item can be assigned one point if the repetition is correct and complete, 0.5 if there is a partial omission (e.g. a morphological and/or phonological error) or a substitution error (e.g. when a word within the sentence is substituted or an inversion is operated), and 0 for complete omissions.

7.4.2 Experimental tasks

For this study, participants took the following tasks from the protocol:

- Task1online, testing comprehension of pronouns in binding configurations.
- Task2, testing the pragmatic context for DO clitics.
- Task3 short, testing production of DO clitics and IO clitics in proclisis.
- Task4 clusters, testing production of 1st and 2nd person clitic clusters, and
- Task5, testing production of 3rd person clitic clusters in proclisis and enclisis.

7.5 Ethics approval

This study was approved by the Ethics committee of the University of Edinburgh, and it is part of a joint project with the University of Heriot-Watt and the University of Edinburgh.

7.6 Results

This section is organised as follows: we will first present results on background measures, then on the experimental tasks divided by modality. Results will be expressed in terms of accuracy, and when the accuracy count makes it important, we will further analyse them in terms of response type. Discussion of results for the experimental tasks will be given together after result analysis.

7.6.1 Background measures

Participants were at ceiling on general linguistic tasks for both languages, as shown in Table 25, thus showing native-speaker-like proficiency in grammatical processing in both Italian and English.

	Heritage Speakers
Comprendo	M = 0.95, σ = 0.22
Trog-2	M = 0.99, σ = 0.99

Table 25. Study 2. Mean and standard deviation for the two general language tasks

On their second language, HS were tested on non-word repetition and sentence repetition (Table 26). Participants did not show any difficulties in the phonological and syntactic makeup of Italian.

	Non-word Repetition	**Sentence Repetition**
Heritage Speakers	M = 0.97, σ = 1.90	M = 0.96, σ = 1.69

Table 26. Study 2. Mean and standard deviation for the two markers for Italian

From the background tasks, we can conclude that the general abilities of these bilingual speakers in their non-dominant language, namely Italian, is very high. They have no issue with Italian phonology, as well as in processing of Italian sentences.

7.6.2 Comprehension

7.6.2.1 Accuracy

Results for this task are given in Table 27. Accuracy is high on all conditions in this group. Paired samples Wilcoxon test show that there is a significant difference

between the clitic condition and the control condition (p. 0.005), but not between the control condition and the reflexive condition (p. 0.773).

	Heritage speakers
Clitic	0.9 (0.59)
Reflexive	0.99 (0.209)
lexical NP	0.98 (0.288)

Table 27. Study 2, task 1online. Accuracy for each condition

7.6.3 Production

7.6.3.1 Production of 3rd person IO and DO clitics

Production of clitics in object and prepositional phrase position was tested with Task3short. In the task, participants were presented with two characters, an agent and a patient, and an object, and they were asked a question either on the patient, eliciting an IO, or on the object, eliciting a DO. All items were in finite environments. Elicited clitics had morphological features that had to be produced correctly for the answer to be considered accurate.

7.6.3.1.1 Accuracy

Table 28 shows results on accuracy on this task for HS.

	Accuracy
DO clitic	0.33 (2.12)
IO clitic	0.29 (2.24)

Table 28. Study 2, task 3 short. Accuracy of HS in DO and IO clitic production

As is apparent, the total produced clitics in this group is extremely low. Paired samples Wilcoxon test confirms there is no significant difference between DO

clitics and IO clitics (p = 0.466). The model shows that there is a significant role of the subject component in explaining the data (p = 0.038). Figure 28 confirms this result to the naked eye, showing how eight participants (9, 22, 23, 25, 28, 29, 30, 41) produced no clitics, whereas only two produced all elicited clitics (39 and 42). The rest of the subjects produced instances of either both types of clitics or of either one or the other.

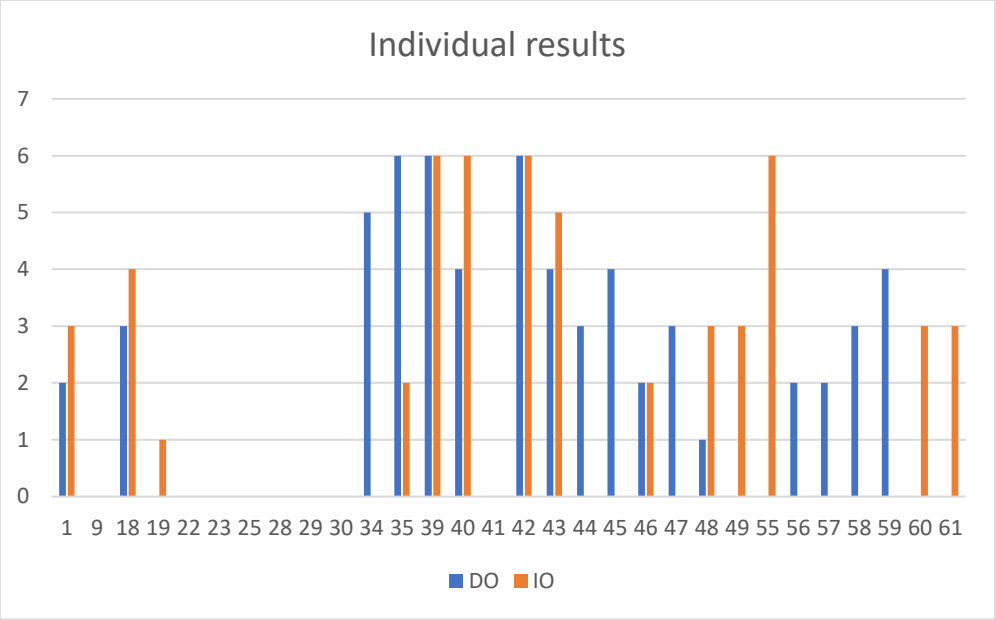


Figure 28. Study 2, task 3 short. Individual results for production of DO and IO clitics in HS

7.6.3.1.2 Error analysis

Because productions of clitics are so low, investigation of given answers is necessary to understand what the most favoured construction is instead of the one that would be expected in an adult speaker of Italian. Table 29 shows the total instances for each type of alternative response given in our participants.

	target total	lexical NP	other clitic-structure	other clitic pragmatics	strong pronoun	omission
HS	0.31	0.61	0.03	0.01	0.02	0.02

Table 29. Study 2, task 3short. Percentages for each type of response

The overwhelming majority of answers for this group was the production of a lexical NP in place of the clitic. Typically, their answers would be of the type:

pro (/[DP]) [VP] [DP] ([PP])

with the PP sometimes omitted, and the subject sometimes realised as overt (about 1/5 of the time).

The next most frequent type of answer was the clitic. Importantly, the number of clitics with a feature error is low, just as the number of omissions. As for the pragmatical aspects involved in the choice of element, clitics were always used in the elicited case. Furthermore, there are a few cases of production of strong pronoun in place of the clitic, but these are still low.

7.6.3.2 Production of 1st and 2nd person clitic clusters

In this task, participants were asked to identify themselves in the drawn characters and answer questions accordingly. The elicited productions were clitic clusters *me lo/la* and *te lo/la*. As we did not expect to see a variation between 1st and 2nd person, accuracy on the clusters was analysed as grouped. 1st and 2nd person clusters were only produced by the HS group in 16% of the cases (σ = 0.36).

7.6.3.2.1 Error analysis

Table 30 shows results of analysis of non-target responses. While the combination of two clitics was rarely produced by the participants, this did not mirror an overall resistance to clitics. In fact, the most produced element is a single clitic, with a preference for the indirect object (25% DO vs 75% IO of total produced single clitics). The other element is realised as a lexical NP, and it may be omitted if it is a PP.

(100) in questa scena, cosa fai tu con l'immagine?

Expeced answer: *te la* mostro

Single clitic answer: ti_{IO} mostro l'immagine

Two other structures are frequent among the responses, "no clitic" and "strong pronoun". The production of the strong pronoun in place of the clitic cluster still pronominalises only one of the two elements, like in the case of the single clitic, and the other element is realised as an NP:

(101) in questa scena, cosa faccio io con la palla?

in this story, what am I doing with the ball?

target: me la lanci

CL-to-me it_{fem} *pro* throw

you throw it to me

Strong pronoun answer: (tu) lanci la palla *a me*

(you) throw the ball to me

The "no clitic" response type refers to the total absence of pronouns in the produced sentence. It usually features an omitted IO and a nominalised DO:

(102) in questa scena, cosa fai tu con la penna?

in this scene, what are you doing with the pen?

target: te la prendo

CL-to-you it$_{fem}$ *pro* take

I take it from you

No clitic answer: (io) prendo la penna

(I) take the pen

The other, non-grammatical answer types were not frequent, as well as the identification errors. An infrequent answer type that was nonetheless present in these participants was errors in verb morphology. These were cases of "no clitic answers" where the verb did not have the elicited morphology.

(103) Elicited answer: te la scriv***o***$_{1pers}$

Wrong verb morphology answer: scriv***i***$_{2pers}$ la lettera

We will discuss whether these are actual errors on verb morphology in the discussion.

	target total	single clitic	no clitic	strong pronoun	verb morphology	omission	identification
HS	0.16	0.41	0.18	0.17	0.02	0.02	0.02

Table 30. Study 2, task 4 cluster. Percentages for all alternative answers

7.6.3.3 Production of 3rd person clitic clusters in proclisis and enclisis

While Task 5 elicits production of clitics in combination, we already discussed that it is not the only structure it may accept. It should not be surprising then, while

interesting, if the number of produced clitic combinations for this task in the HS population is 0, and thus accuracy on this cluster in this group is 0%.

7.6.3.3.1 Error analysis

Produced answers are reported in Table 31. Once again, the most produced structure in both proclisis and enclisis is one containing one or both arguments realised as lexical NPs. In proclisis, the only real competitor is the production of a single clitic, falling at around 30% of all responses. This is also an alternative answer for enclisis, where another frequent type of error arises, namely the production of a finite construction in place of an embedded non-finite construction.

	cluster	single clitic	lexical NP	other structure	other clitic	omission
proclisis	0	0.33	0.6	0	0.01	0.05
enclisis	0	0.24	0.57	0.13	0.01	0.04

Table 31. Study 2, task 5. Percentage for each type of response

7.6.4 Predictive power of the pre-tests

We checked for any potential correlations between pre-tests and clitics. First, we wanted to see whether there was a correlation between the results on comprehension of Italian and results on comprehension of clitics. We therefore ran a correlation matrix between accuracy on Comprendo, the comprehension pre-test for Italian, and Task 1. Results in Table 32 show that there is no significant correlation between the two. We also wanted to check for any correlations between the pre-test that features Italian production, namely the sentence-repetition task, and production of clitics. To do so, we ran a correlation between results on FAST, the pre-test, and the total correct single clitics produced, and the total clusters produced. Within the count of produced structures, we included

cases where a single but coherent clitic was produced when a cluster was elicited. There were no instances of the opposite phenomenon, namely productions of clusters when a single clitic was elicited. The matrix in Table 33 shows there is a positive correlation between FAST and the production of single clitics, while there is not between Fast and cluster production.

The correlation matrices show that comprehension of clitics in the configurations tested does not correlate with general comprehension of the language under discussion. While there is variation in both Comprendo (σ= .22) and Task 1 (σ=.59), the range in both is similarly tight (25-30 for Comprendo, 16-18 for Task 1), and the two measures seem to behave differently.

On the other hand, production of clitics shows to be positively correlated with performance on sentence repetition tasks. According to this, accuracy in production of (single) clitics and accuracy in sentence repetition increase together, with participants that perform well in repetition being more likely to also perform well in production of clitics. Importantly, this shows that simple clitics in proclitic position are coherent with the participant's production of sentences of various structures, not only containing clitics. On the other hand, production of clitic clusters does not correlate with accuracy on sentence repetition. This is an interesting result that shows that while a background measure such as sentence repetition may predict the production of single clitics, it does not pattern together with the production of a more complex structure such as the clitic cluster. This is an interesting piece of data both for describing the population, and to highlight the power of a battery of clitics to uncover patterns that would otherwise go unnoticed.

Correlation Matrix

		clitic comprehension	comprendo
clitic comprehension	Pearson's r	—	
	p-value	—	
comprendo	Pearson's r	0.058	—
	p-value	0.793	—

Note. * p < .05, ** p < .01, *** p < .001

Table 32. Study 2. Correlation matrix for comprehension

Correlation Matrix

		FAST sentence rep	single clitic production	cluster production
FAST sentence rep	Pearson's r	—		
	p-value	—		
single clitic production	Pearson's r	0.576 ***	—	
	p-value	< .001	—	
cluster production	Pearson's r	0.256	0.032	—
	p-value	0.172	0.865	—

Note. * p < .05, ** p < .01, *** p < .001

Table 33. Study 2. Correlation matrix for production.

7.7 General discussion

Reference offers great optionality, but typical, monolingual native speakers show clear and consistent preferences for the referring expression to use in each situation. Results of this study on reference in heritage speakers give us a good example on how this optionality distinguishes the performance of this population from that of the prototypical Italians speaker.

The most striking result we found in this population is the huge discrepancy between comprehension of clitics and production of clitics. This result is consistent with data found on modality in HS proficiency as reviewed in 7.1. Comprehension of clitics and reflexives is an easy task for these bilingual speakers, who show to have access to the structures governing reference with Italian clitic pronouns, as well as to the featural properties of both clitics and reflexives. On the other hand, elicited production of (single) clitics in this population does not surpass 40% of accuracy in any of the tasks. Clitics and their structure, we have seen from comprehension, *are* present in the speakers' system. This is mirrored in production, because when they are produced, clitics are produced correctly. In fact, clitics that are not coherent with the context in their ϕ-features are rarely produced, omissions are low (≤5%) and displacements are not present. Moreover, HS seem to also appreciate the pragmatic role of clitics, particularly within the class of pronouns. In fact, use of strong pronouns instead of clitics would mirror the English construction as in (104), which could arguably be interfering with the Italian construction:

(104) EN: The father gives_{VP} the ball_{DO} to him_{IO}

IT: Il papà dà_{VP} la palla_{DO} a lui_{IO}

but the strong pronoun is *not* a frequently selected option, except when a $1^{st}/2^{nd}$ person dative is elicited. Even then, this non-target selection is less frequent than selection of the clitic.

In looking for an explanation for this low use of clitics in HS, what becomes apparent from alternative answers is that in this population the production of clitics has one valid competitor, namely the lexical NP, as in (105). This result is coherent with results found in bilingual children reviewed in 4.2.1 (Ferrari, 2006; Serratrice, Sorace, & Paoli, 2004).

(105) Il papa dà la palla al bambino

the dad gives the ball to-the child

Particularly, these HS grown up in Scotland and schooled in English *always* prefer the production of a lexical NP over that of a clitic, regardless of the elicited condition. This constitutes a striking difference from the monolingual Italian speakers grown up in Italy that we reviewed in the previous study: there, the lexical NP only became a real competitor to the clitic in the embedded non-finite conditions, particularly in the youngest groups. Here, the clitic/lexical NP ratio remains similar across tasks and across conditions (approximately 30% clitics 60% lexical NPs, apart from the task eliciting 1st and 2nd person pronouns where there were more viable alternative answers).

The question is then what drives this difference between these two subtypes of native speakers, and what this tells us about clitic pronouns and lexical NPs. For HS, we notice that the construction in 103 implementing lexical NPs mirrors the canonical word order of both English and Italian. In fact, the IO is not preverbal as it would be in the Italian after movement, and the VO order is preserved. For this reason, it might be the case that the optionality involved in reference choice allows HS to resort to a construction they are most comfortable with, and in Italian this can only be done only if cliticisation is avoided. Whether this is because they find cliticisation hard to produce and thus resort to canonical order, or because the attriting language's structure influences their choice of structure is not immediately visible. However, the fact that the clitic/lexical NP ratio does not change across conditions seems to suggest that the production of lexical NPs is *not* a repairment strategy for them, as it might have been for the monolingual children.

Another factor to come out from our data is that while HS have clitics available for production, they may not have clitic clusters. In fact, participants produce little to no clitic combinations, all of the type *me lo/la, te lo/la*[22]). Correlation matrices showed that unlike frequency of single (pro-)clitics, which correlates with performance on the pre-test task of sentence repetition task, whether participants produce clusters does not correlate with either their performance on this or on single clitics produced: abilities on single clitic are not predictive of abilities on cluster production.

This result brings about two considerations: the first is that while clitics are only disfavoured in Italian HS, clitic clusters may be a construction that is partially inaccessible. The fact that higher syntactic complexity may pose some issues in HS is confirmed by the fact that, when elicited to produce a complex structure featuring an embedding (namely in the cases where enclisis is elicited), this group has a number of errors of structure, where they reiterate a simple finite structure instead of producing the embedding. The percentage of errors (13%) is the same that we found in the youngest TD group, PS, in the previous study. The second is that this may indicate that clusters add a level of computation to clitics that can highlight difficulties with complex structures.

7.7.1 Passing remarks

In passing, since it is not in line with our interests for this study, we notice a few other things about the language of HS. The first one is that HS show optionality in the production of overt subjects, producing them around 22% of the time. This

[22] This may be merely a task effect, in that the task eliciting 3rd person clusters did show to elicit fewer clitics and to also accommodate other answer types, as seen in Study 1 as well. Still, it is an interesting fact that may be explored further. *Glielo*-type clusters may also be perceived as phonologically more complex due to the presence of the λ phoneme and the merging of the two clitics, which does not take place in proclisis with 1st and 2nd person clitic combinations.

confirms previous studies on English-Italian bilingual speakers (Sorace, 2011, Chamorro & Sorace, 2019).

The second regards the production of verb morphology in the 1st-2nd person conditions, where the data contain instances of non-target verb morphology. In particular, these are all cases in which 2nd-person morphology is used instead of 1st-person morphology. There are other cases where this happens, but because of the presence of an indirect object which was also non-target, these were classified as errors in the identification process:

(106) expected answer: te lo do

given answer: mi dai il quaderno

The cases where the clitic or an alternative form of indirect object are also not produced make it harder to disentangle the identification error from the morphological error. Our intuition is that those may be true morphological errors, because the participants who produced them reiterated the second person in most of the task.

Chapter VIII Study 3 – assessment of clitics in ASD: cross-case study of four young adults

8.1 Objective

Autism Spectrum Disorder (ASD) is a neurodevelopmental condition characterized by difficulties in some areas of language and communication (American Psychiatric Association, 2013). Roughly 25% of individuals with ASD remain non-verbal, while the speech of verbal individuals is often characterized by formulaic language, idiosyncratic speech, echolalia (namely the unsolicited repetition of sounds and phrases made by another person), and difficulty in following discourse schemas (Happé F. , 1995; Tager-Flusberg, 1996). The source of this impairment has been indicated either as an impaired Theory of Mind (henceforth ToM) or as impaired Executive Function abilities (EF) (Eigsti et al., 2011 for review). Both areas of cognition have been shown to be very problematic for most children and adults with ASD: both first- and second-order false belief tasks in ToM (Happé F. G., 2005), and the planning, mental flexibility, and inhibition functions in EF (Hill, 2004). In one case, impairments in pragmatics are described as derived from the difficulty in building representations of other people's minds (see e.g. Baron-Cohen, 1988), in the other from the inability to simultaneously consider multiple sources of information (see e.g. Rogers &

Bennetto, 2000). The ToM theory is backed up by consistent evidence that ToM has a specific role in pragmatics.

Studies targeting general language and formal language abilities and more specific syntactic investigations found linguistic impairments besides pragmatics. One of the most striking outcomes from this line of work is that results were varied, sometimes even contradictory (see 4.4 for results on pronouns). The variety of syntactic *and* pragmatic phenomena involved in the realisation of clitics opens up a great opportunity of analysis of the potentialities of clitics to be subject to changes depending on the population. As we have anticipated, Germanic pronouns have been shown to pose some issues in the ASD individuals (mostly children) whose results in general linguistic tasks put them in the category of language impairment. Both comprehension and production of clitic pronouns on the other hand have been found to be problematic even in the high-functioning end of the spectrum, which is normally characterized by the highest levels of language proficiency in the population[23] (Greek: Terzi et al. 2016 (mean age 6;11), French: Durrleman & Delage 2016 (mean age 9;07), Prévost et al. 2018 (mean age 8;7)). The studies have in common a lower accuracy in the ASD children than the TD children, more so in production than in comprehension. As for alternative answers, no consistent alternative to the production of the clitic was found across all studies, with instances of omission, ϕ-feature substitution, and production of NP. A common error that was found and that is not typical of the populations seen until now is reversal of theta-roles and person substitutions. The fact that no unique pattern of mistakes was found in these studies may be in line with recent suggestions that lower language levels in this population are

[23]Nonetheless, there does not seem to be a strict correlation between non-verbal intelligence and language abilities in this population. See for instance (Perovic, Modyanova, & Wexler, 2013b; Durrleman & Delage, 2016).

generalised and non-specific like they are, for instance, in DLD (e.g. Sukenik & Friedmann, 2018).

With this study, we aim to contribute to this discussion with some data on Italian, with a specific interest in exploring whether an assessment of clitics may show one or more patterns in the comprehension and production of these linguistic elements by autistic individuals. Because our participants are linguistically mature, and comprehension features simple conditions of bound pronouns, we can expect it not to be particularly problematic for them. Given the role DO clitic pronouns have in marking linguistic impairments, we expect the early stages of our assessment to highlight impairment. If participants within the ASD spectrum and with normal communication abilities perform well on the DO clitic, we may infer that they do not have a language impairment. On the other hand, we expect the production of the clitic in embedded non-finite position, and the production of clitic clusters, to highlight possible vulnerability to complex structures.

As for answer strategies, if their pragmatic/ToM impairment permeates language strongly, we believe they may produce the syntax of clitics correctly, but make mistakes on the pragmatic aspects involved in reference management, i.e., in the alternation with referring expressions, or in the pragmatic shift required for $1^{st}/2^{nd}$ persons. If they have issues with complex syntax, syntactic errors such as omissions, or avoidance strategies may occur.

8.2 Participants

Because of the high variability of linguistic (and cognitive) abilities that has been found in previous studies on this population, we think that looking at individual performances may be the best way to go to find possible patterns that may not be generalised to the condition as a whole, as is expected e.g., in DLD, but part of

a kaleidoscope of possible profiles. Moreover, while tests on this population are usually ran on younger children, we think that an element such as this one, which we have seen to still be vulnerable in younger TD children, could be subject to delay in acquisition or confident use in any linguistically atypical population. For this reason, we choose to test older children. As a control group to give means to check individual performances against, we take the oPR group from Study 1, where children were around 8 years of age and arguably at the end of their language development.

ASD participants were recruited in the A.R.N.A.S. Civico hospital in Palermo, Italy, in the child neuropsychiatry ward. The person in charge of the ward conducted recruitment among their patients. Potential participants had to:

- Speak Italian as a native language, with at least one parent being a native speaker of Italian and speaking Italian at home.
- Have a diagnosis within the ASD spectrum.
- Be verbal and have nonverbal intelligence within the norm.
- Be between the ages of 10;0 and 16;0.

The four selected participants are presented in Table 34.

participant code	**sex**	**age (y;m)**	**Clinical Diagnosis**
F	M	15;11	Autism
R	M	14;11	Autism
A	M	14;9	Autism
C	M	10;2	Autism

Table 34. Study 3. Descriptives of the participants

8.3 Materials and methods

8.3.1 Background measures

The participants took part in a series of pre-tests the intent of which was to assess general linguistic abilities as well as NVIQ. These were:

- CPM. While it is true that the coloured version of Raven's matrices is indicated for NVIQ assessment in children up to the age of 11,6, they may be used as a diagnosis for delay both in development and in adulthood.
- Non-word repetition
- Sentence repetition
- Comprendo short

Results for the background measures are given in Table 35.

	CPM raw score	**Non-word repetition**	**Sentence repetition**	**Comprendo short**
F (15;11)	36/36 (1)	57/60 (.95)	12/15 (.8)	30/30 (1)
R (14;11)	36/36 (1)	58/60 (.97)	14/15 (.93)	28/30 (.95)
A (14;9)	23/36 (.64)	43/60 (.71)	6/15 (.4)	26/30 (.86)
C (10;2)	34/36 (.94)	59/60 (.98)	14/15 (.93)	26/30 (.86)

Table 35. Study 3. Results on background measures with raw score and percentage

8.3.2 Experimental task

Participants took the following tasks from the experimental protocol:

- task 1, which aimed at checking comprehension of pronouns in these participants.
- task 2, featuring the pragmatic alternation between clitic and lexical NP.

- tasks 3, 4, and 5, testing production of clitics in different positions.

As is considered best practice in individual case studies, each participant will be confronted with the mean of a larger group considered as "typical". For this purpose, we take as our control mean the oPR group from study 1.

8.4 Ethics approval

This study was approved by the University of Trento's Ethic Committee, protocol number 012019.

8.5 Results

Accuracy and error analysis will be presented together for each participant.

8.5.1 Comprehension

Accuracy on the experimental conditions of the comprehension task was at ceiling for all participants (Table 36). We use the Singlims_ES.exe programme (Crawford et al., 2010, Crawford & Garthwaite, 2002, Crawford & Howell, 1998) to test whether an individual's score is significantly different from a control group and calculate a point estimate of the abnormality of the individual's score. For the DO clitic condition and the reflexive condition, one-tailed probability was not statistically different for any participant (for DO clitic condition: t = 0.375, p = 0.35578; for reflexive condition: t = 0.000, p = 0.5). For the control condition, difference to the control group was not significant for F, R, and A (t = 0.000, p = 0.5), while it was for participant C (t = -4.880, p = >.0001).

	F (15;11)	R (14;11)	A (14;9)	C (10;2)	oPR
DO clitic	6/6 (1)	6/6 (1)	6/6 (1)	6/6 (1)	5.8
reflexive	6/6 (1)	6/6 (1)	6/6 (1)	6/6 (1)	6
control (NP)	6/6 (1)	6/6 (1)	6/6 (1)	5/6 (.83)	6

Table 36. Study 3, task 1. Accuracy raw score and percentage on comprehension for each type

8.5.2 Production of DO clitics and pragmatic use

In Task 2, participants were tested in their ability to understand the pragmatic alternation between contexts requiring a deficient element and contexts that preferred the repetition of a full expression. For the clitic condition, none of the participants was significantly different from the control group (F and R: t = 0.551, p = 0.294; A and C t = 0.000, p = 0.500). To judge whether the pragmatic properties of clitics and lexical NPs were respected, we look at total accuracy in this task. Three participants' results are not significantly different from those of the control group (F: t = 0.373, p = 0.35661. R: t = -1.492, p = 0.0760. A: t = -0.560, p = 0.29113), while participant C's results are significantly worse than those of the control group (t = -1.959, p = 0.03250).

	F (15;11)	R (14;11)	A (14;9)	C (10;2)	oPR
clitic	7/7 (1)	7/7 (1)	6/7 (.86)	6/7 (.86)	6
lexical NP	6/7 (.86)	2/7 (.29)	5/7 (.71)	2/7 (.29)	6.2
total	13/14 (.93)	9/14 (.64)	11/14 (.79)	8/14 (.57)	12.2

Table 37. Study 3, task 2. Accuracy raw score and percentage divided by condition

All mistakes on the lexical NP condition were pragmatic mistakes whereby the opposite element to the elicited one was produced, namely a clitic. This means that the two participants who did not do well in the alternation used clitics

throughout the test, regardless of the condition. The remaining two mistakes, one by A and one by C, were a feature error (produced by A), and an omission (C). All clitics except these two were produced correctly.

8.5.3 Production of clitics in different argument structures in proclisis and enclisis

This task tested the ability to produce clitics as 3rd person DOs and as IOs, and in preverbal and postverbal position. In this task, three participants have high accuracy on all measures, namely participants F, R, and C. Participant A on the other hand is significantly worse on all conditions. We first look at the performance by type of clitic, where results (Table 38) show that DO and IO conditions behave similarly in all participants except participant A, whose performance on DO is not significantly different from that of the control group (t = -1.403, p = 0.08844), while it is on IO (t =-3.490, p = 0.00123).

Looking at type of sentence (Table 39), in the proclitic conditions, participants F, R, and C have no significant difference with the results of the control group (F and R: t value = 0.655, p = 0.52053, C: t = -0.655, p = 0.26026), while A does (t = -3.273, p = 0.002). The same is true for the enclitic conditions, where A is significantly worse (t value = -1.882, p = 0.03765), and the others are not (R and C: t = 0.941, p = 0.17931, F: t = 0.627, p = 0.26899).

	F (15;11)	R (14;11)	A (14;9)	C (10;2)	oPR mean
DO proclisis	6/6	6/6	3/6	4/6	5.15
IO proclisis	6/6	6/6	0/6	5/6	5.35

Table 38. Study 3, task 3. Results on accuracy split by type of clitic (proclisis and enclisis merged

	F (15;11)	R (14;11)	A (14;9)	C (10;2)	oPR
proclisis production	12/12 (1)	12/12 (1)	3/12 (.25)	9/12 (.75)	10.5
enclisis production	11/12 (.92)	12/12 (1)	3/12 (.25)	12/12 (1)	9

Table 39. Study 3, task 3. Results on accuracy split by type of structure (DO and IO merged).

Overall, F gives only one non-target answer, in the enclitic IO condition. This consists in the omission of the clitic altogether. Because it is an IO, and thus an external argument, the sentence is not illicit:

(107) target: di consegnarle la lettera

to give-to-her the letter

produced: di consegnare la lettera

to give the letter

R produces all elicited clitics correctly. C produces three non-target answers in proclisis: two are errors on the clitic: one of feature (gender) and one of case, namely the production of the non-elicited argument. We report example (89) here as (108):

(108) Cosa fa Sara al panino?

What is Sara doing to the sandwich?

Produced answer: gli dà *(al bambino)* il panino

(she) gives $him_{Cl,dat}$ the sandwich

The remaining item is the production of an irrelevant answer. Interestingly, of the target answers by this participant, 9 are realised as clitic combinations, 5 in proclisis and 4 in enclisis. As for participant A, he produced a total of 6 clitics, 3 were in proclisis and 3 in enclisis. All produced clitics were DOs. Of his 18 non-target answers, 8 consisted in the production of non-clitic structures which featured lexical NPs, 3 consisted in production of clitics in the non-elicited case (namely DO instead of IO), 4 consisted in errors of gender on the clitic, and two were irrelevant productions. Of the non-elicited argument productions, three also had gender errors.

8.5.4 Production of 1st and 2nd person IO clitics in enclisis and proclisis

The main aim of this task was to check production of clitics when there is a requirement to shift perspective in order to produce the correct one. Results are shown in Table 40 below. Participants F and C have no significant difference from the control group in either of the conditions (proclisis F&C: t = 0.056, p = 0.47798, enclisis F: t = 0.716, p = 0.24140, enclisis C: t = 0.375, p = 0.35592). Participant R has high accuracy in the proclitic condition, with no statistically significant difference from the control group (t = -0.504, p = 0.31017), but low accuracy with respects to the control group in the enclitic condition, although this difference does not reach significance (t value = -1.670, p = 0.05563). Participant A has low accuracy on both conditions (proclisis: t = -2.182, p = = 0.02093. Enclisis: t = -2.011, p = 0.02936).

	F (15;11)	R (14;11)	A (14;9)	C (10;2)	oPR
proclisis	7/8 (.88)	6/8 (.75)	3/8 (.38)	7/8 (.88)	6.9
enclisis	8/8 (1)	1/8 (.13)	0/8 (0)	7/8 (.88)	5.9

Table 40. Study 3, task 4. Accuracy raw score and percentages

Out of the 13 non-target answers of subject A, 10 are strong pronouns of the form *a te/ a me*, 2 are errors in the process of identification, and one is a production of the unelicited clitic (namely the DO). R makes 1 error in the process of identification, 7 productions of strong pronouns in place of the clitic, and one omission of the indirect argument. F and C's non-target answers consist in strong pronouns. Identification errors were of the kind as in 92a, here reported as (109). 4 of C's correct productions were clusters.

(109) target: mi dai il disegno

to-me (you) give the drawing

produced: ti do il disegno

to-you (I) give the drawing

8.5.5 Production of 3rd person clitic clusters in proclisis and enclisis

Production of clusters was tested in this task. We remind the reader that the requirement to use two clitics is not strong enough for the use of the clitic combination to be perceived as obligatory, hence the lower production of this element in oPR. Three out of the four participants produce clitic clusters in most or all (≥75%) items where it was elicited in preverbal position, and their results are not significantly different from those of the control group in this condition (F&R: t value = 1.201, p = 0.12218). Participant A produced no clusters in this condition, but the difference from the control group is still not significant (t = -1.315, p = 0.10214) due to the high standard deviation found in this group (σ = 3.103). In postverbal, embedded position, participant F produced clusters in all items, nearing significance in the comparison with the low-performing control group (t = 1.659, p = 0.05673). R and C produced 40% of all elicited clusters, reaching no significant difference in the comparison with the control group (t

value = 0.079, p = 0.46892). Participant A produced none, again reaching no significant difference in the comparison with the control group (t value = -0.869, p = 0.19779).

As for the alternative structures, in the only item in proclisis where he does not produce a cluster, participant C produces a structure containing the DO realised as a lexical NP, and no IO. All other alternative structures in this participant and in participant R are the production of a single clitic, which could be either the DO or the IO. Participant A, who has no instances of clusters, produces different types of alternative answers. One gives rise to illicit sentences, namely the omission of the DO (4 instances). This type of error is only produced with non-finite verbs, which are uttered as bare elements:

(110) target: di rubargliela

to steal-to him/her-it$_{fem}$

produced: di rubare

to steal

The other types of answer are the realisation of the elements as lexical NPs (4 instances). Importantly, the most common type of alternative answer is the production of a single clitic (8 instances).

	F (15;11)	**R (14;11)**	**A (14;9)**	**C (10;2)**	**oPR**
proclisis	8/8 (1)	8/8 (1)	0/8 (0)	6/8 (.75)	4.18
enclisis	8/8 (1)	3/8 (.38)	0/8 (0)	3/8 (.38)	2.75

Table 41. Study 3, task 5. Accuracy in production of clusters

8.5.6 Relationship between pre-tests and clitic conditions

We ran further statistical analyses to check if the relationships between tasks was revealing. We first ran a correlation matrix between performances on the pre-test of sentence repetition, the total single clitics produced, and the total clusters produced (Table 42). We added to the count all correct single clitics uttered by the child, even when a cluster was elicited, and all correct clusters produced, even when a single clitic was elicited.

Results show that in our participants, the performance on sentence repetition correlates with the number of single clitics that the participant (correctly) produces (p. 0.016). On the other hand, the number of clusters that are (correctly) produced is not predicted by performance on sentence repetition (p. 0.073), but it does correlate with the production of single clitics (p. 0.045).

We did the same thing checking for the distinction between enclisis and proclisis (Table 43), but we found that neither correlates with score in sentence repetition, or with each other.

Correlation Matrix

		sentence repetition	**single clitic all**	**clusters all**
sentence repetition	Pearson's r	—		
	p-value	—		
single clitic all	Pearson's r	0.984 *	—	
	p-value	0.016	—	
clusters all	Pearson's r	0.927	0.955 *	—
	p-value	0.073	0.045	—

Note. * p < .05, ** p < .01, *** p < .001

Table 42. Study 3. Correlation matrix for production of single vs cluster.

Correlation Matrix

		sentence repetition	single clitics proclisis	single clitics enclisis
sentence repetition	Pearson's r	—		
	p-value	—		
single clitics proclisis	Pearson's r	0.835	—	
	p-value	0.165	—	
single clitics enclisis	Pearson's r	0.753	0.832	—
	p-value	0.247	0.168	—

Note. * p < .05, ** p < .01, *** p < .001

Table 43. Study 3. Correlation matrix for production of enclisis vs proclisis

8.6 General discussion

In this study, we aimed to see if one or more patterns in the use of clitic pronouns emerged in individuals with a diagnosis of autism and normal language, which could be telling on the nature of the language abilities of these individuals. Our four participants were individually compared against the mean of the oldest group of Study 1 for the experimental measures. All results per participant are summarised in Table 44 below.

All participants mastered the comprehension of the structures featuring clitic pronouns and reflexives, and in fact found the task very simple. We conclude from this that the abstract representation of a structure containing a pronoun in a binding configuration is equally available to all our participants. This result also ties in well with results on the background measure for comprehension of an array of constructions in Italian: here, all participants scored above 86% of correct answers. This proficiency on comprehension of reference in binding construction featuring clitics contrasts with previous results on the same constructions found

in Greek. This is the case for Terzi and colleagues, from whose work this task is adapted (Terzi, Marinis, Kotsopoulou, & Francis, 2014; Terzi, Marinis, & Francis, 2016). The authors, testing binding of clitics and reflexives as well as strong pronouns and nonactive morphology in Greek ASD children find high-functioning ASD children to perform worse that TDs on clitics, but not reflexives. An explanation for this discrepancy may be mere chronological age: not much is known about the progression of linguistic abilities in ASD, and our participants are considerably older than those in Terzi and colleagues (mean age 79.8 months). Moreover, we mentioned in 4.4 that some performances in high-functioning individuals have been found to be TD-like. It may be the case that the chronological age of these participants, as well as their linguistic profile, increased their performance on comprehension of clitics. If this were true, it could be the case that issues that ASD have shown in previous studies in comprehension of clitics is the by-product of a delay, and those individuals with no language impairment increase in performance when they are older.

	F (15;11)	**R (14;11)**	**A (14;9)**	**C (10;2)**	**oPR**
clitic comprehension	6/6 (1)	6/6 (1)	6/6 (1)	6/6 (1)	.97
clitic vs NP production	13/14 (.93)	9/14 (.64)	11/14 (.79)	8/14 (.57)	.87
3rd p DO clitic production	12/12 (1)	12/12 (1)	6/12 (.5)	10/12 (.83)	.78
3rd p IO clitic production	11/12 (.92)	12/12 (1)	0/12 (0)	11/12 (.92)	.85
3rd p proclisis production	12/12 (1)	12/12 (1)	3/12 (.25)	9/12 (.75)	.88
3rd p enclisis production	11/12 (.92)	12/12 (1)	3/12 (.25)	12/12 (1)	.75
1st-2nd p proclisis production	7/8 (.88)	6/8 (.75)	3/8 (.38)	7/8 (.88)	.86
1st-2nd p enclisis production	8/8 (1)	1/8 (.13)	0/8 (0)	7/8 (.88)	.74
3rd p cluster proclisis production	8/8 (1)	8/8 (1)	0/8 (0)	6/8 (.75)	.72
3rd p cluster enclisis production	8/8 (1)	3/8 (.38)	0/8 (0)	3/8 (.38)	.54

Table 44. Study 3. Results of accuracy on all tasks for each participant: raw score and percentage correct

The task on production of the relevant referring expression according to the context (Task 2) paints an interesting picture: firstly, all participants were able to correctly produce 3rd person DO clitic. Therefore, all four ASD participants do not show an impairment in the production of the correct DO clitic, which we remind to be a clinical marker for Italian. The task also tested the ability to correctly operate the pragmatic shift in type of expression required by the context. Here, results are mixed for the participants: two participants operate it, while the other two do not, overextending the clitic to the conditions eliciting a fuller expression. As we have mentioned, because the referents where both mentioned in the preamble, and they were both represented graphically in the picture, the choice of using a light expression which presupposes accessibility is not pragmatically wrong. Moreover, as the first trial item was eliciting a clitic, clitic overextension may be also ensue from a tendency for perseveration which is a typical symptom of ASD (American Psychiatric Association, 2013), which in turn is highly related to EF abilities, another notable area of impairment in this population (Lopez, Lincoln, Ozonoff, & Lai, 2005). At the same time, results by the participants who do not operate the shift are in line with studies on use of pronouns in ASD that found a tendency to use ambiguous pronouns, thus not paying the required attention to the point of view of the hearer when navigating the discourse space (Terzi et al. 2019, Mazzaggio & Shield 2020).

As for type of clitic, results show that three out of four of our participants have high production of elicited clitics regardless of argument position (IO vs DO) and person (3rd vs 1st/2nd). This is coherent with typical behaviour as shown in the oldest TD children. On the other hand, one participant produces an overall low number of clitics regardless of the type of clitic. Interestingly, while (the youngest) typical children were prone to produce IO instead of DO clitics, this one participant only produces DO clitics. The same three participants also show high accuracy on clusters, at least in preverbal position, and the same participant with

low accuracy produces no instances of clitic combinations. The cluster in enclitic position is arguably the most complex out of all our conditions in production, and here three out of four of the participants are below chance on accuracy on production of a clitic cluster. It is important to underline what we already noticed, namely that elicitation of 3rd person clusters is only partially successful, in that it is difficult to create contexts where both are equally as accessible. In fact, lower accuracy in this task does not mirror complete absence of clitics, with most alternative answers in all participants were single clitics. Furthermore, one participant that produces few instances of clitic clusters in this task produced 3rd person clusters independently in task 3 (participant C). Only participant A, namely the one with the poorest performance, produces other alternative structures including omissions and lexical NPs mostly produced in the non-finite contexts.

As for type of structure, only one out of four participants shows similar performance in proclisis and enclisis across all tasks. Of the 15 correct clitics the lowest performing participant produces, only three are in enclisis. The other two participants show a mixed performance, showing high accuracy in proclisis on all conditions, but not in enclisis: one participant shows high productions in enclisis on simple 3rd person DO/IO clitics, but not on 1st/2nd person clitics and on clusters; the other shows the lowest accuracy in enclitic clusters. So, whenever a participant does well in one condition, it is always in the condition where the verb is finite (and the clitic preverbal).

Contrary to what we might have expected, operating a shift in perspective did not pose an issue for production of clitics in any of our participants. In fact, identification errors, namely the production of the same person as the one from the prompt, were only produced three times across all participants in task 4. The most frequent error on this task was the production of a strong pronoun of the type *a te/ a me* (to me/you), and these were all in the correct perspective. As we

already mentioned, this may be justified by the presence of the same structure in the prompt, thus making the production of a full pronoun in place of a clitic not pragmatically disfavoured. However, this alternative structure is more frequently resorted to in the conditions eliciting enclisis by the high-performing participants and in both conditions by the participant with low overall accuracy, thus being used as a repairment structure to avoid use of clitics in the constructions that each participant may perceive as hard.

Analysing the lowest performing participant to check for a pattern, we notice he makes 3 types of errors with similar frequency: about half of his alternative answers consist in producing a lexical NP. The other two types of mistakes are production of a DO instead of an IO, and production of gender errors. Gender errors are always of the kind "masculine instead of feminine", and they are always on DOs. Taking these factors together, we can see that these errors boil down to an overextension of the same element, namely the 3rd person masculine DO clitic. It is important to mention that the researcher who tested this participant found his productions for the 3rd person DO clitics (*lo/la*) to be difficult to phonetically distinguish for the two genders, as the vowel was realised most of the time as a schwa-type phoneme. His performance in the phonetic pre-test may accommodate this perception, as it was the lowest among the participants. For this reason, it may be the case that this ambiguous vowel led to a level of inaccuracy in scoring both in positive and in negative scores. The perception that the majority of these may be realised as masculine would be accommodated by the fact that the masculine form is the neutral form in Italian morphology.

As for the reason why the shifting does not pose any issues, which is partly inconsistent with other results on perspective shift in autism, it could be the case that, because these (pre-) adolescents can clearly manage the task, this is sufficiently easy for them to be able to also manage perspective shift correctly.

Summing up findings from this study, it seems to be the case that patterns of clitics can be found in ASD participants. On the one hand, we have one participant who performs well across all pre-tests, on comprehension, and on all productions. On the other, we have one participant that shows a discrepancy between comprehension tasks, both pre-tests and clitics, and production tasks. While in production tasks he performs lower than the other participants in pre-tests, he does not fail in the production of the clinical marker for Italian, namely the production of (3rd person) DO clitic in preverbal position. However, any other instance of the clitic was avoided by this speaker. We can conclude that these participants clearly have different profiles, that are visible both from pre-tests and from clitics. Interestingly, the difference is not visible on the clitic that would be a clinical marker for language impairment, but on all other instances. Importantly, this participant was not the youngest one in our group.

Another, perhaps more interesting distinction was that between the highest performing participant and the other two high-performing participants. While performance of all three is high on pre-tests, and it is high on production of clitics in preverbal position regardless of the argument position or the person, their performance differs on enclisis on most conditions in one, and on all conditions in the other. This result highlights the role of clitics as a good candidate to discover potential difficulties with complex syntax, as well as confirming that there may be different profiles in ASD language, one being a non-impaired language on the early-acquired structures, but difficulties on the later-acquired, complex ones. In fact, performance on these tasks gives us a more in-depth view on the language of these participants. In fact, neither a standardised test or the production of single clitics predict performance on clusters, or the production in enclisis. These results suggest that clitics, particularly in the more complex cases, show different patterns from those of a language measure, and of production of simple 3rd person clitics. Moreover, we noticed that contexts that rely on the

pragmatic appropriateness of clitics highlight when this property is not properly picked up on, even when there is no specific linguistic issue with clitics.

Part IV

General discussion

In this work, we reviewed three studies that were carried out with a common goal, namely, to investigate the role of clitic pronouns in detecting different patterns of performance. Clitics are already known to be markers for early detection of a linguistic impairment in some of the languages they appear in (like Italian and French).

These well-documented conclusions on the power of clitics to detect different patterns were mainly carried out on the instances of clitics that are shown to be acquired early and are thus considered “easy” for the typical child native speaker, namely DO single clitics. Usually, issues on early structures are signs of impaired language in the case of native speakers. Our idea behind this series of studies was that other instances of clitics that have been less explored both in typical and in atypical language could add other layers to this role of clitics as markers for different linguistic patterns.

Specifically, we were checking:

1. the effectiveness in detection of linguistic abilities
    a) of early occurrences of clitics
    b) of late occurrences of clitics
2. the detection of patterns specific to different populations.

To this end, we developed an experimental protocol which was meant to be a comprehensive assessment of clitics in Italian, featuring the following conditions:

- comprehension of DO clitics in binding
- DO clitic and IO clitic
- $1^{st}/2^{nd}$ and 3^{rd} person clitics

- single clitics and clitic combinations
- pragmatic/discourse uses of clitics in alternation with lexical NP and in perspective shift

We tested versions of our protocol on three populations, namely:

- Study 1: a group of native-speaker TD children, who were divided in three further groups according to their age, namely pre-school, young primary school, and old primary school.
- Study 2: a group of heritage speakers (HS) of Italian, namely bilingual speakers of Italian immersed in an English-speaking community and with (late) bilingual parents.
- Study 3: four (pre-) adolescents with ASD and normal language, native speakers of Italian.

The detection of linguistic profiles

In the results obtained throughout our studies, clitic pronouns have shown to be good measures to detect different patterns in linguistic performance.

Firstly, comprehension of clitics in binding constructions is not problematic across all groups. This was true for the bilingual speakers, for all the ASD participants, and for the primary school children. An exception to this generalisation was the youngest group of typically developing children. While as a group they were the lowest performing in Study 1, as was to be expected due to chronological age, results on this task were unexpected given previous results showing comprehension in Italian to be in place at your children's age (McKee, 1992). Because the performance of our group on comprehension extended to both experimental conditions, namely clitics and reflexives, and the control

condition, we hypothesised that the issue was with the task itself, that was not appropriate for pre-school children. Apart from results from the PS group, upon which we do not draw conclusions due to a plausible role of the task, all our groups show core syntax levels which allow them to solve simple tasks containing clitics: they have abstract representations of the structures containing them, which feature c-command and binding. These syntactic operations are correctly managed across all populations.

A second result that was found and was the confirmation that (3rd person) DO proclitics are indicative of a specific linguistic profile. This was expected due to several results including DLD (Arosio, Branchini, Barbieri, & Guasti, 2014; Arosio, et al., 2010; Bortolini, et al., 2006; Bortolini, Caselli, Deevy, & Leonard, 2002; Guasti, et al., 2016), and bilingual speakers (Ferrari, 2006; Vender, Garraffa, Sorace, & Guasti, 2016). In our data, in the absence of linguistic impairment this occurrence of the clitic is not problematic -from the early stages of acquisition to autism in pre-adolescents with seemingly normal language-, while it signals a deviant performance in our group of bilingual heritage speakers. This result, together with the proficiency in comprehension, is in line with accounts of heritage speakers showing a vulnerability to the areas of language that show optionality, particularly in production (Polinsky and Scontras 2020).

Thirdly, in our study we found that the production of IO clitics on finite verbs is similar to that of DO clitics. Typically developing children as young as 4 and most ASD speakers show good cliticisation of the external argument of the verb, both in 3rd person and in 1st/2nd person. The production of heritage speakers is low on IOs as well, but they produce DOs and IOs alike. The only exception is one participant with ASD who showed the lowest performance on production of clitics: in fact, all clitics produced by this participant were 3rd person DO clitics, frequently pronounced with an ambiguous vowel that made it unclear whether

he was actually selecting a gender feature or not. This was not part of a larger phenomenon of reiteration in this participant.

A difference between DO and IO clitic production does come out in terms of preference for the production of one over the other in the youngest children. This is reminiscent of results found in Caprin & Guasti (2009) and is in line with UCC accounts of IO over DO in children (Wexler, Gavarrò, & Torrens, 2004). While one atypical participant with no productions of IOs is not sufficient to draw any conclusions on this type of clitic in atypical language, we believe that this first insight shows that it might be useful to further test this element on atypical populations.

A crucial result in this work is another aspect of clitics that was found to bring out different patterns, namely different sentence structures, specifically the constructions featuring non-finite verbs. The production of a clitic on the non-finite verb in a finite verb + non-finite embedding construction is problematic both in the pre-schoolers and in the 6-year-olds in typical development, and the difference between proclisis and enclisis is only smoothed out in the oldest group. This was true on all tasks featuring both conditions, thus indicating that the clitic reveals an aspect of language that is still vulnerable even in a later stage of acquisition. We hypothesise this to be due to the requirement to manage cliticisation on a verb moving to a high position in the structure. The non-finite verb moves to a position in the left periphery, which is presumed to be as high as AgrS for Italian. Assuming the movement account for the derivation of clitics, enclisis requires the movement of both the clitic, which needs to check its features, and the verb, which moves to its final position. The two merge when the verb left-adjoins to the clitic and then proceeds to the final position. Our data reveals that keeping the clitic merged to the verb in this operation is hard to manage, as they frequently resort to not cliticising the verb argument.

Importantly, instances of this difference are also found in participants with ASD who show otherwise good performance both on general language and on clitics. For this reason, we believe this construction to show a vulnerability to later acquired elements of language.

W predicted that the production of clitic clusters would also be indicative of linguistic abilities. Overall productions of this type were considerably lower than overall production of single clitics in all our groups. We discussed that our results were in part due to the experimental design: firstly, contexts eliciting clusters allow for a higher level of optionality than any other instance tested thus far, due to the presence of two arguments of the verb; secondly, particularly in the task eliciting 3rd person clusters the conditions were also felicitous with repetition of the NPs. Nonetheless, a subgroup of oPR and three of the ASD participants perform at ceiling in the proclitic condition of the clusters, while the 4-year-olds, the 6-year-olds, the lowest performing ASD participant and the heritage speakers show very low productions. Our data on typical acquisition was partly in contrast with results on spontaneous production found in Cuervo & Pérez-Leroux (2015), who find high production rates in children younger than the youngest group, but clusters have been found to be worse in TD pre-schoolers than in older children as well as in dyslexia (Mantione, Vender, Melloni, & Delfitto, in preparation), and in DLD (Bottari, Cipriani, & Chilosi, 2000). Despite overall low results, we take our results to be in line with these studies and to suggest that the production of clusters can be characterised by low accuracy in individuals or populations that show lower abilities on high complexity structures, such as very young children and atypical populations. This could be again due to their derivation. In languages with fixed DAT-ACC order like Italian, the derivation of clusters is proposed to happen with one clitic adjoining to the other (Terzi, 1999). The clitics are further adjoined to the verb. As the most common

alternative answer is the production of a single clitic, it could be the case that adjunction of one clitic to the other is what proves to be effortful.

As for the pragmatic aspects involved in use of clitics, we tested the alternation between use of the clitic and that of the full referring expression in DOs, and the pragmatic shift from 1st to 2nd person perspective in IOs. Both aspects were shown to be generally not problematic across all groups. Based on previous results on the acquisition of the pragmatic properties of clitics, we did not expect the first aspect to be problematic in any group, except in the ASD group, if they were unable to correctly calculate the common ground in order to choose the correct expression. This was the case only in one participant, but their results may have been the result of reiteration. As for the second aspect, namely the pragmatic shift, we expected it could be problematic in ASD and, possibly, in the typical pre-schoolers. This is because these operations rely on abilities of Theory of Mind that should be acquired in the older children, and unproblematic in typical adults, but may be still under learning in 4-year-olds, and impaired in ASD. This was only partially borne out, as the only errors in the pragmatic shift the PS group of the typically developing children. We hypothesise that computing both the cliticisation and the pragmatic operation shift brings about errors in their productions. Future research should further investigate abilities in this operation in ASD participants highly proficient in language, as it may be the case that if the task is easy enough, their linguistic proficiency can help them overcome what would otherwise be a hard computation for pragmatic reasons.

The detection of patterns specific to different populations

Answer analysis from our work confirms that clitics are not only susceptible to variation in accuracy, but also in the strategies that are employed when providing non-target answers. As for the most common alternative choice, this can change

both according to population and condition. We will first talk about TD and heritage speakers, and then analyse ASD participants separately.

In comprehension, the most common error in the pre-schoolers involved Θ-role reversal. All other groups had ceiling accuracy. In production, while TD participants resort to either non-elicited clitics or lexical NPs, and strong pronouns only in the case of 1st/2nd person IO clitics, in these same conditions heritage speakers only resort to lexical NPs as their most common alternative answer (in fact, more common than the clitic itself). The non-elicited clitic is the cliticisation of the other argument if one argument is elicited, and the production of a single clitic if a cluster is elicited. Importantly, these clitics, even if non-target, are syntactically correct. There were little to no errors of features on the clitic in typical development, namely gender or number.

A further distinction in alternative answers is apparent in the proclisis/enclisis distinction. In pre-schoolers, the non-elicited clitic is the most common alternative answer in the proclitic conditions, but the lexical NP becomes the most common in enclitic conditions. Importantly, the lexical NP-type answers in enclisis have the elicited structure, namely the embedded non-finite verb. Therefore, the majority of answers even in the youngest participants contain the target verbal structure. In heritage speakers, the lexical NP remains the most common alternative answer regardless of the condition. However, like the youngest TD participants but unlike the oldest, these participants produce some instances of irrelevant structures when an enclitic is elicited.

Children produce few instances of illicit omissions (namely omissions of the internal argument), and no instances of displacement. The production of illicit sentences is not an answer strategy that is adopted in this population. Apart from the low count of produced clitics, heritage speakers rarely produce clitics with errors on the ϕ-features. However, while produced structures are for the most

part licit, we find that an avoidance strategy that is present in this group is to avoid productions of the relevant arguments: in some cases (particularly in the task eliciting $1^{st}/2^{nd}$ person IOs) this yields the omission of the PP and the production of a VP+NP structure, which is syntactically licit but not pragmatically appropriate in the context, but in others it yields illicit bare VP structures.

This could be a common answer strategy in populations struggling with computation of more complex constructions, seeing as it requires the juggling of complex clitic and complex structure together. Future research should focus on better understanding what it is that prevents production of clitics in this population, when it is available as an abstract structure. This could be addressed through structural priming studies, to check if they have a facilitating effect in the production of such structures. If it does, then the use of alternative structures in elicited contexts could be a preference more than a lack of access. Moreover, a comprehensive cognitive assessment featuring Working Memory and Theory of Mind may show a role of the cognitive aspects of bilingualism on the production of this structure.

In our ASD participants tested in Study 3, the pattern of performance is different among participants, but this was a welcome result as ASD is a spectrum and it has been shown to be so on linguistic abilities too. In fact, we have seen that while one participant has overall low performance, and one has overall ceiling performance, the other two participants have a mixed (but coherent) pattern. The lowest scoring participant's alternative structures are in the majority of cases the production of lexical NPs, much like in all situations reviewed so far. However, his productions also include several instances of illicit structures, specifically structures containing an omitted internal object, and clitics with errors on the ϕ-features, particularly errors of gender. Importantly, these errors are for the majority not present in the other participants' non target structures.

This could indicate that these types of mistakes are indicators of a syntactic impairment in production. As we have seen, the other participants who do make non-target answers generally make them in the cluster and the enclitic constructions. Here, the most produced answers by the other participants are the production of a single clitic, and the production of non-finite structures in place of finite structures. These could be accounted for as signalling not a language impairment, but a vulnerability to complexity.

At the level of pragmatics/discourse, the relevant result in terms of types of alternative answers is that the selection of strong pronouns in place of deficient ones is not perceived as a valid alternative, regardless of the group. Thus, clitics and lexical NPs are seen by all of our groups as two elements that are plausible in the same context, while strong pronouns are perceived as being very different elements, as in fact they are.

Conclusion

Clitic pronouns have been extensively covered in first language acquisition, second language acquisition, and clinical linguistics. Clitics involve A-movement and remain within the TP layer, phenomena that are usually associated to early acquisition. However, movement triggers agreement checking and results in change of constituent order on the surface structure. So, while they appear early in child language (as early as 2), consistent correct use is not completed until later. A robust body of work has shown that several populations show sensitivity to this structure. With this work, we aimed to contribute to the discussion on the ability of clitics to describe the language profiles of an individual or a population, particularly focusing on occurrences of the clitic that have been studied less extensively, but that add further complexity to the production of a target structure. A comprehensive assessment of clitics was designed to check accuracy and answer strategies of different occurrences of clitics in Italian, in particular: 3rd person DO clitic, 3rd,1st,2nd person IO clitic, clitic IO-DO combinations in finite and non-finite constructions (pre-verbal and post-verbal clitic), as well as pragmatic/discourse uses of clitics in alternation with lexical NP and in perspective shift. The assessment of Italian clitics was tested on typically developing children, bilingual heritage speakers, and ASD pre-adolescents.

Results confirm that 3rd person DO clitics in proclisis are in place in 4-year-old native speakers of Italian. They further show that this is also the case for the IO clitic, both in 3rd person and 1st/2nd. As such, any deviant performance in native speakers of ≥ 4 years of age must indicate the presence of a different linguistic profile. And in fact, this was the case for the adult bilingual heritage speakers grown up in Scotland attending English schools, whose production of these early

instances of clitics is low, and for one ASD participant with overall lower language levels than his peers, who only produced DO clitics.

Furthermore, our data reveals that the same clitics but in enclitic position, namely attached to the non-finite verb in a dependent structure of the "X tells Y to Z" kind, are acquired later, as they were only on the same level as those in proclitic position in the 8-year-olds. That this is not an issue with the structure itself, but with the production of the clitic on the structure, was demonstrated by the fact that the structure -regardless of how the argument was realised- was correctly produced at ceiling even at 4, as well as the fact that the production of a lexical NP in place of the clitic, was more common as an alternative answer in enclisis than in proclisis in the youngest group. This alternative answer, while pragmatically dispreferred, allows to not operate the movement of the argument and its attachment to the verb. As such, they can be considered late phenomena in language acquisition, and they might show a deviant performance in those individuals or populations that have good performance on early structures, but that show a vulnerability to the late or complex phenomena. This was the case for some ASD participants who otherwise showed good performance on general language tests and on simple clitics.

Accuracy was the lowest in production of clusters, namely combinations of IO and DO clitics, both in proclisis and in enclisis. This construction allows for more optionality due to the presence of two cliticizable elements. In fact, performance was low across groups, except for a group of 8-year-olds and some ASD participants. Nonetheless, we find some indicating factors that this structure as well is a late phenomenon: firstly, the highest accuracy is found in the oldest TD children and the highest performing ASD participants; moreover, it is higher in proclisis than in enclisis. Here, once again the lexical NP is the most utilised alternative structure in enclisis, followed by the production of one single clitic.

Both alternative answers allow the speakers to not produce either or one of the movements of the arguments of the verb, thus simplifying the operation. Thus, we believe that this too is a late phenomenon, and that it can indicate vulnerability to complex structures in participants older than 8.

Moreover, our data confirms the describing value of answer strategies. For instance, productions of clitics with errors on their features, or of illicit sentence constructions, are limited to poor language abilities, and are thus rarely present in our data (the few examples being limited to pre-schoolers, heritage speakers, and one ASD). The most common alternative productions in our participants differed: they were correct but non-targeted clitics in most children and in most ASD participants, and lexical NPs in heritage speakers. Lexical NPs have also been shown to be employed in the "hardest" structures by younger children.

We believe these to be promising findings, that suggest that different occurrences of the clitic are useful to check whether an individual has a syntactic impairment proper or is vulnerable to the complex instances of language, which are generally indicated as the later appearing structures in child language (such as passives, relative clauses, and any structure that is realized in the left periphery). For this reason, we would like to conclude this work by proposing the idea that a comprehensive assessment of clitics such as the one presented in this study may be used to unearth specific linguistic profiles that are on a spectrum of severity. This would be useful particularly in clinical populations.

Future research should expand the work on the patterns that were found in this work. Particularly, results on typical acquisition showed a clear pattern of acquisition for enclisis, with a delay with respects to proclisis which is smoothed out only in the eight-year-olds, and it hints at one for clusters, as well as an interplay between the two conditions: the latter two should be explored further, by shrinking as much as possible the window for alternative answers to the

cluster, and by testing children between 8 and 12 on these constructions. These conditions were shown to be promising in conditions where a language impairment is not apparent, but harder computations may highlight areas of vulnerability. This is an important result particularly for atypical language. In fact, it is important to be able to detect language profiles as accurately as possible in atypical populations, and we believe that an assessment like the one here proposed might be used for future research with this very aim.

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Appendices

Appendix A: adapted pre-tests

1. Sentence repetition (adapted from Vernice et al. 2013)

Il gatto con il fiocco è grigio.
I gatti hanno mangiato il pesce
Il latte è tirato dal cane.
Cosa ha bevuto il cane?
Il cane che i gatti spingono è blu
Il gatto lo lava.
I gatti bevono il latte
Il gatto si lava.
Il cane è spinto dal gatto.
Il cane rosso gli da' il latte.
Chi hanno lavato i gatti?

Sentences added

Il papà veste il bambino
La signora pela la patata
Mi mostri un disegno
Maui dice di darti il quaderno
Sara gliela consegna
Marco glielo compra
La mamma dice di rubarglielo
La mamma dice di spedirgliela

2. Comprendo short (adapted from Cecchetto et al. 2012)

Six items out of 5 categories were selected. See the manual for the relevant pictures.

active	la mamma sta inseguendo il bambino
	la mamma sta accarezzando la bambina
	il cane sta inseguendo il gatto
	la mamma sta baciando il bambino
	il bambino sta inseguendo il cane
	il nonno sta inseguendo il cane
passive	il bambino viene inseguito dal cane
	il gatto viene morsicato dal cane
	la bambina viene accarezzata dalla mamma
	il bambino viene spinto dalla bambina
	la nonna viene salutata dalla bambina
	la nonna viene spinta dalla bambina
Subject relative	il cane che insegue il gatto guarda il nonno
	la bambina che tira il cane guarda il bambino
	il bambino che saluta il nonno guarda la televisione
	il bambino che guarda il cane beve il latte
	il gatto che graffia il bambino beve il latte
	il bambino che spinge la bambina guarda la nonna
coordination	la bambina mangia la torta e il bambino beve il latte
	la bambina bacia la nonna e il nonno accarezza il cane
	l'uomo guida la macchina e la donna beve il latte
	il papa tocca il gatto e il cane insegue il bambino
	il nonno tira il cane e la nonna accarezza il gatto
	il nonno beve il vino e il bambino mangia il gelato

	il gatto che il bambino guarda beve il latte
object relative	il bambino che la bambina guarda mangia la torta
	il cane che la nonna tira insegue il bambino
	la donna che il cane insegue accarezza il gatto
	il gatto che la bambina guarda morde il nonno
	l'uomo che il bambino guarda mangia la torta

Appendix B: the protocol

We report the experimental items for all tasks that were either adapted or designed for this protocol.

Task 1 (adapted from Terzi et al. 2014)

Images for each condition are shown below and the relevant number is indicated next to the item.

clitic condition

Il bambino lo copre *2*

The $child_{masc}$ him_{masc} covers

The child is covering him

La bambina la accarezza *5*

The $child_{fem}$ her_{fem} strokes

The child is stroking her

Il bambino lo pulisce *3*

The $child_{masc}$ him_{masc} washes

The child is washing him

Lo zio lo veste *6*

The uncle him_{masc} dresses

The uncle is dressing him

La zia la lava *1*

The aunt her$_{fem}$ washes

The aunt is washing her

La mamma la insapona *4*

The mum her$_{fem}$ washes-with-soap

The mum is washing her with soap

Reflexive condition

Il papà si pulisce *3*

The dad himself wipes

The dad is wiping himself

Lo zio si veste *6*

The uncle himself dresses

The uncle is dressing himself

Il bambino si copre *2*

The child himself covers

The child is covering himself

La mamma si insapona *4*

The mum herself washes-with-soap

The mum is washing herself with soap

La bambina si accarezza *5*

The child herself caresses

The child is caressing herself

La bambina si lava *1*

The child herself washes

The child is washing herself

Control (lexical NP)

La nonna accarezza la bambina *5*

The grandma caresses the child

The grandma is caressing the child

La bambina insapona la mamma *4*

The child$_{fem}$ washes-with-soap the mum

The child is washing the mum with soap

Lo zio copre il bambino *2*

The uncle covers the child

The uncle is covering the child

Il bambino veste lo zio *6*

The child dresses the uncle

The child is dressing the uncle

La bambina lava la zia *1*

The child$_{fem}$ washes the aunt

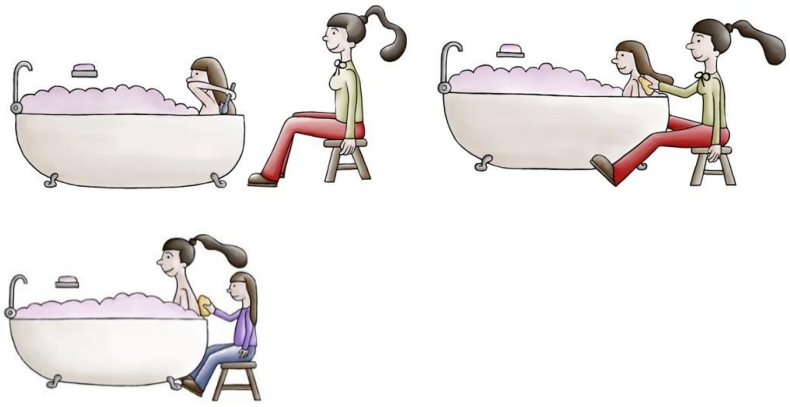
The child is washing the aunt

Il papà pulisce il bambino *3*

The dad wipes the child$_{masc}$

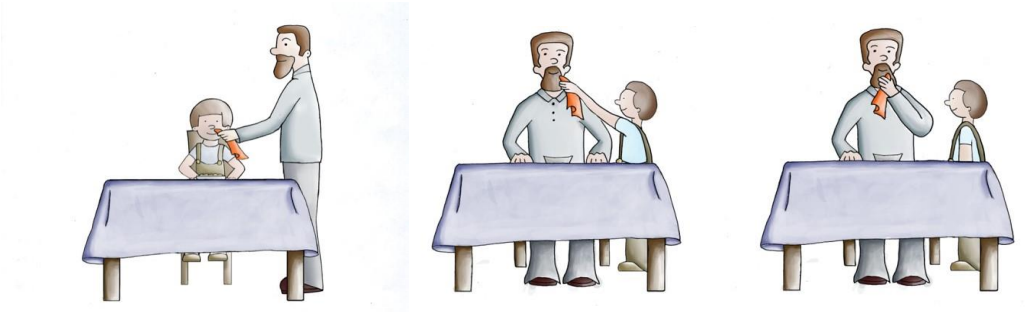
The dad is wiping the child

Images

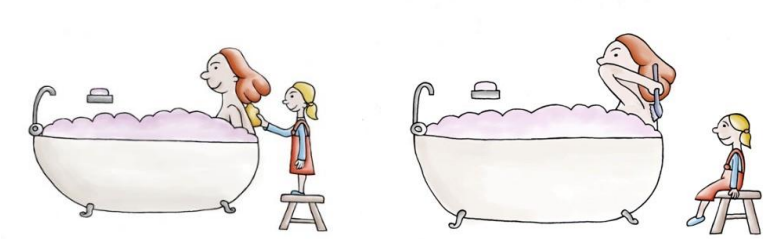


1

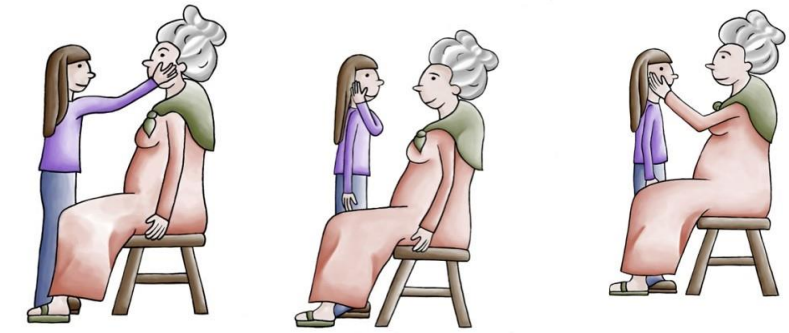
2



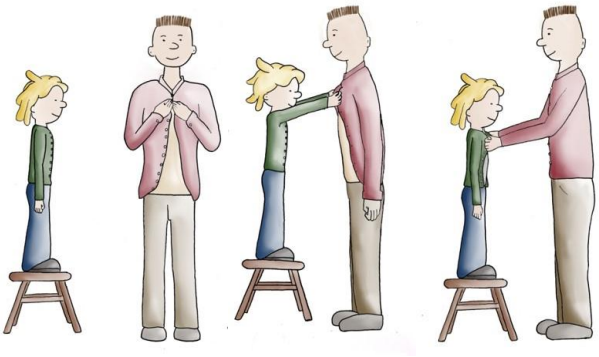
3



4



5



6

Task 2 (adapted from Arosio et al. 2014)

Relevant images follow each item.

clitic condition

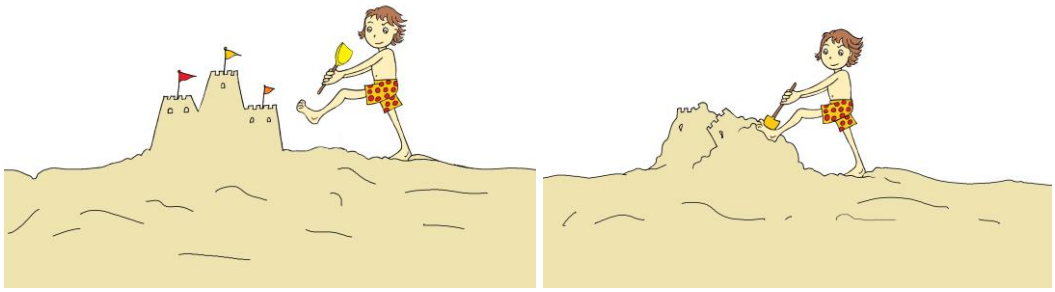
Prompt: In questa scena, un bambino vuole distruggere un castello di sabbia. Guarda, cosa fa il bambino al castello?

In this scene, a boy wants to destroy a sandcastle. Look, what is the boy doing to the sandcastle$_{masc}$?

Target: Lo distrugge

pro it$_{masc}$ destroys

he's destroying it



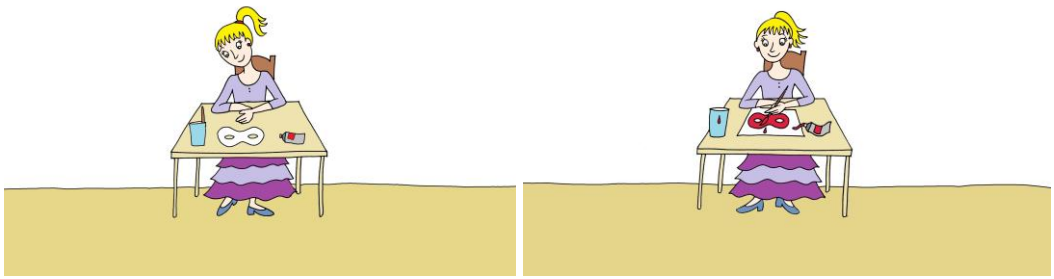
Prompt: In questa scena, una signora vuole dipingere una maschera. Guarda, cosa fa la signora alla maschera?

In this scene, a lady wants to paint a mask. Look, what is the lady doing to the mask$_{fem}$?

Target: La dipinge

pro it$_{fem}$ paints

She's painting it



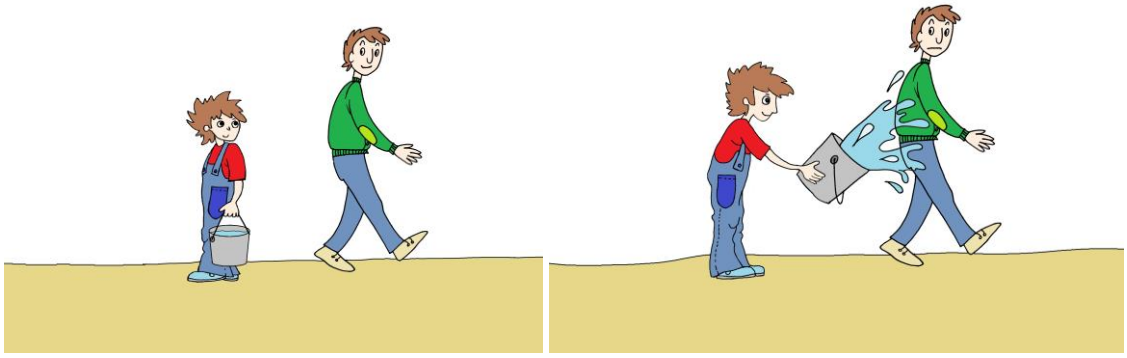
Prompt: In questa scena, un bambino vuole bagnare un signore. Guarda, cosa fa il bambino al signore?

In this scene, a boy wants to wet a man. Look, what is the boy doing to the man?

Target: Lo bagna

pro him wets

he wets him



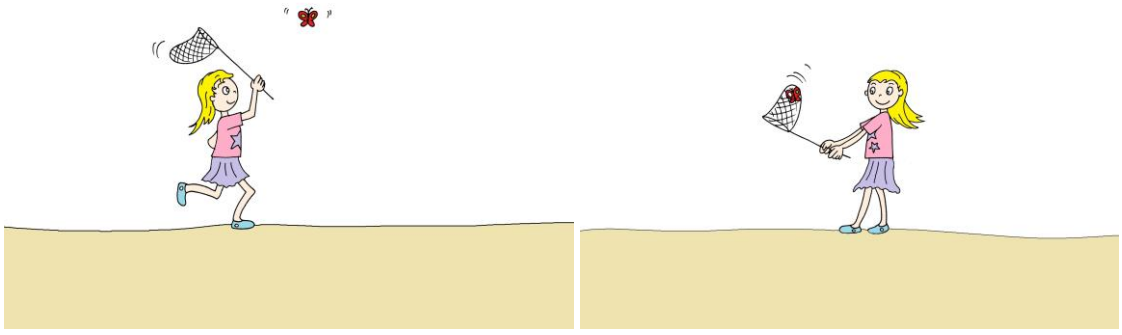
Prompt: In questa scena, una bambina vuole catturare una farfalla. Guarda, cosa fa la bambina alla farfalla?

In this scene, a girl wants to catch a butterfly. Look, what is the girl doing to the butterfly$_{fem}$?

Target: La cattura

pro it$_{fem}$ catches

she's catching it



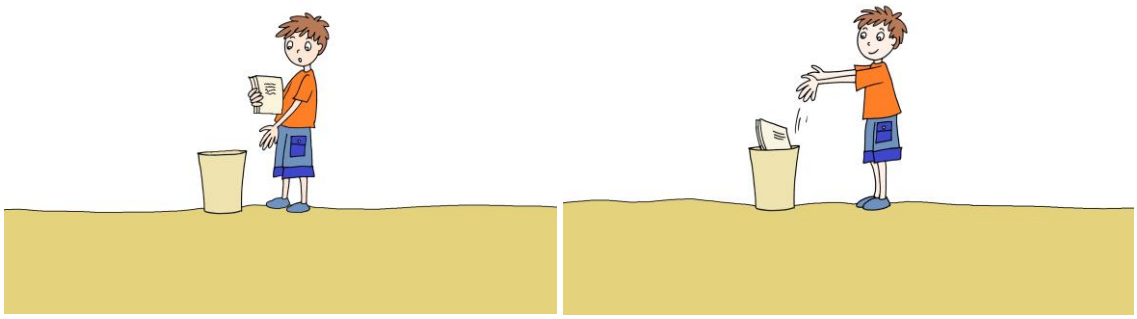
Prompt: In questa scena, un bambino vuole buttare un libro. Guarda, cosa fa il bambino al libro?

In this scene, a boy wants to throw away a book. Look, what is the boy doing to the book$_{masc}$?

Target: Lo butta

pro it$_{masc}$ throws away

he's throwing it away



Prompt: In questa scena, una mucca vuole leccare una rana. Guarda, cosa fa la mucca alla rana?

In this scene, a cow wants to lick a frog. Look, what is the cow doing to the frog$_{fem}$?

Target: La lecca

pro it$_{fem}$ licks

It's licking it

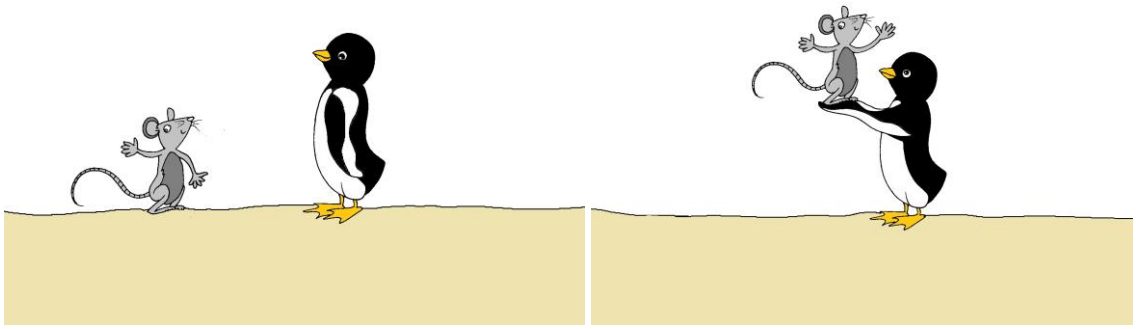
Prompt: In questa scena, un pinguino vuole sollevare un topolino. Guarda, cosa fa il pinguino al topolino?

In this scene, a penguin wants to lift a mouse. Look, what is the penguin doing to the mouse$_{masc}$?

Target: Lo solleva

pro it$_{masc}$ lifts

it's lifting it



Lexical NP condition

Prompt: In questa scena, un bambino vuole mangiare un gelato. Guarda, cosa fa il bambino?

In this scene, a boy wants to eat an ice-cream. Look, what is the boy doing?

Target: Mangia il gelato

pro eats the ice-cream

he's eating the ice-cream

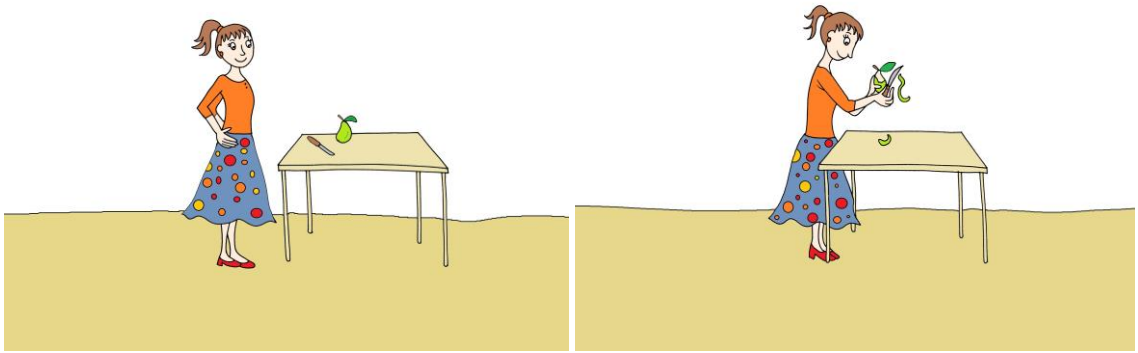
Prompt: In questa scena, una signora vuole sbucciare una pera. Guarda, cosa fa la signora?

In this scene, a lady wants to peel a pear. Look, what is the lady doing?

Target: Sbuccia la pera

pro peels the pear

she's peeling the pear



Prompt: In questa scena, un bambino vuole lavare un cane. Guarda, cosa fa il bambino?

In this scene, a boy wants to wash a dog. Look, what is the boy doing?

Target: Lava il cane

pro washes the dog

he's washing the dog

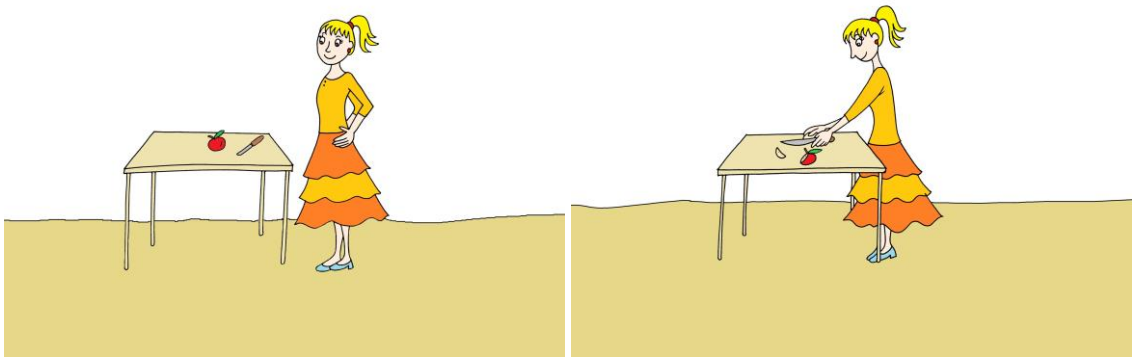
Prompt: In questa scena, una signora vuole tagliare una mela. Guarda, cosa fa la signora?

In this scene, a lady wants to cut an apple. Look, what is the lady doing?

Target: Taglia la mela

pro cuts the apple

she's cutting the apple



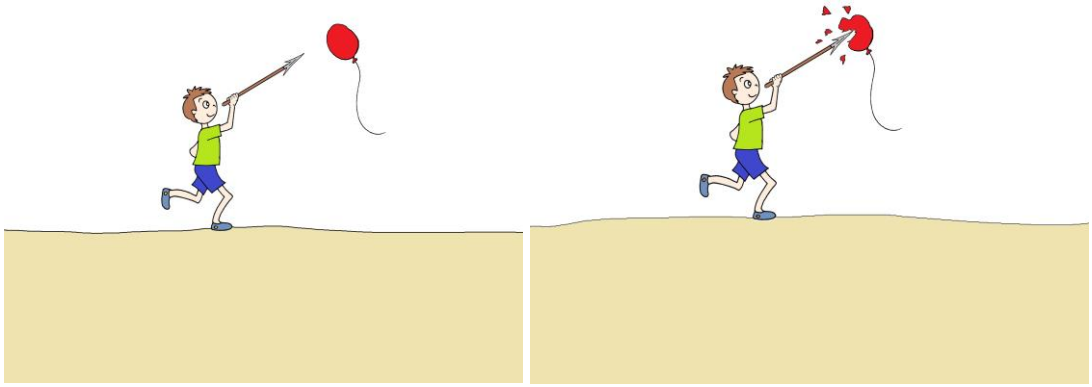
Prompt: In questa scena, un bambino vuole bucare un palloncino. Guarda, cosa fa il bambino?

In this scene, a boy wants to pierce a balloon. Look, what is the boy doing?

Target: Buca il palloncino

pro pierces the balloon

he's piercing the balloon



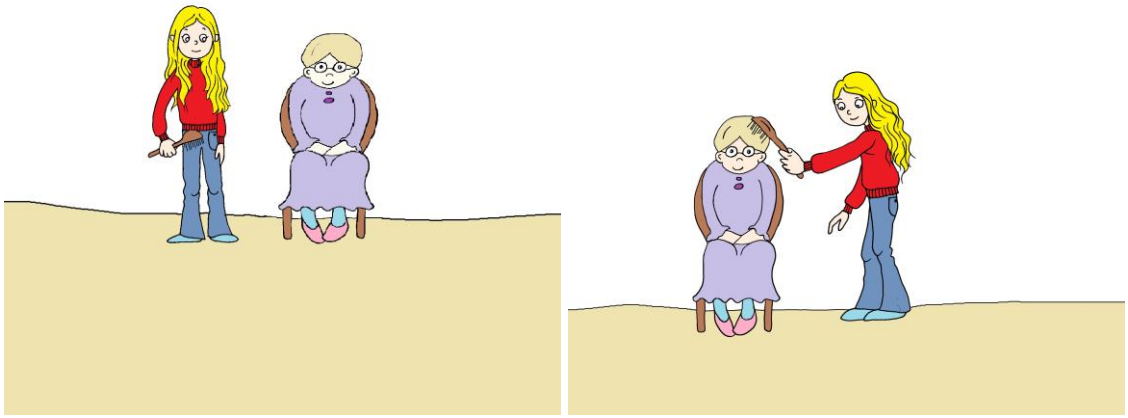
Prompt: In questa scena, una bambina vuole pettinare la nonna. Guarda, cosa fa la bambina?

In this scene, a girl wants to comb her grandma. Look, what is the girl doing?

Target: Pettina la nonna

pro combs the grandma

she's combing her grandma



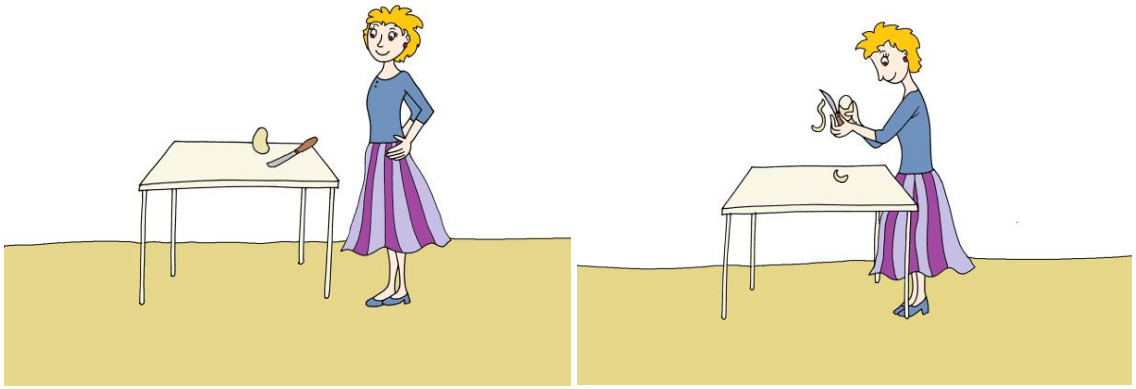
Prompt: In questa scena, una signora vuole pelare una patata. Guarda, cosa fa la signora?

In this scene, a lady wants to peel a potato. Look, what is the lady doing?

Target: Pela la patata

pro peels the potato

she's peeling the potato



Task 3

Images for each condition are shown below and the number indicated next to the item.

Proclisis

Prompt: In questa storia si parla della mamma, di Martino, e di un libro. Cosa fa la mamma a Martino? *1-2*

In this story, we talk about the mum, Martino, and a book. What does the mum do to Martino$_{masc}$?

Target: Gli legge il libro

pro to-him reads the book

she reads him the book

Prompt: In questa storia si parla del papà, di Martino, e di un flauto. Cosa fa il papà al flauto? *4-5*

In this story, we talk about the dad, Martino, and a recorder. What does the dad do to the recorder$_{masc}$?

Target: Lo regala a Martino

pro it$_{masc}$ gifts to Martino

he gifts it to Martino

Prompt: In questa storia si parla di un portiere, di un calciatore, e di un pallone. Cosa fa il calciatore al pallone? *7-8*

In this story, we talk about a goalkeeper, a footballer, and a football. What does the footballer do to the football$_{masc}$?

Target: Lo passa al portiere

pro it$_{masc}$ passes to-the goalkeeper

he passes it to the goalkeeper

Prompt: In questa storia si parla di una maestra, di un'alunna, e di un mappamondo. Cosa fa la maestra al mappamondo? *10-11*

In this story, we talk about a teacher, a pupil, and a globe. What does the teacher do to the globe$_{masc}$?

Target: Lo dà all'alunna

pro it$_{masc}$ gives to-the pupil

she gives it to the pupil

Prompt: In questa storia si parla di un gelataio, di una ragazza, e di un gelato. Cosa fa il gelataio alla ragazza? *13-14*

In this story, we talk about an ice-cream man, a girl, and an ice-cream. What does the ice-cream man do to the girl?

Target: Le vende il gelato

pro to-her sells the ice-cream

he sells her the ice-cream

Prompt: In questa storia si parla di un commesso, di una signora, e di un maglione. Cosa fa il commesso alla signora? *16-17*

In this story, we talk about a shop assistant, a lady, and a pullover. What does the shop assistant do to the lady?

Target: Le mostra il maglione

pro to-her shows the pullover

he shows her the pullover

Prompt: In questa storia si parla di Sara, di Martino, e di una merenda. Cosa fa Sara a Martino? *19-20*

In this story we talk about Sara, Martino, and a snack. What does Sara do to Martino?

Target: Gli ruba la merenda

pro to-him takes the snack

she takes his snack

Prompt: In questa storia si parla di una nonna, di un bambino, e di una fiaba. Cosa fa la nonna al bambino? *22-23*

In this story, we talk about the grandma, the child, and a tale. What does the grandma do to the child$_{masc}$?

Target: Gli racconta la fiaba

pro to-him tells the tale

she tells him the tale

Prompt: In questa storia si parla di una maestra, di un allievo, e di una pagella. Cosa fa la maestra alla pagella? *25-26*

In this story, we talk about a teacher, a pupil, and a school report. What does the teacher do to-the school report$_{fem}$?

Target: La consegna all'allievo

pro it$_{fem}$ gives to-the pupil

she gives it to the pupil

Prompt: In questa storia si parla di un macellaio, di una signora, e di una bistecca. Cosa fa il macellaio alla signora? *28-29*

In this story, we talk about a butcher, a lady, and a steak. What does the butcher do to the lady?

Target: Le vende la bistecca

pro to-her sells the steak

he sells her the steak

Prompt: In questa storia si parla di un ragazzo, di una ragazza, e di una lettera. Cosa fa il ragazzo alla lettera? *31-32*

In this story, we talk about a boy, a girl, and a letter. What does the boy do to the letter$_{fem}$?

Target: La consegna alla ragazza

pro it$_{fem}$ gives to-the girl

he gives it to the girl

Prompt: In questa storia si parla di un medico, di una paziente, e di una medicina. Cosa fa il medico alla medicina? *34-35*

In this story, we talk about a doctor, a patient, and a medicine. What does the doctor do to the drug$_{fem}$?

Target: La dà alla paziente

pro it$_{fem}$ gives to-the patient

he gives it to the patient

Enclisis

Prompt: In questa storia si parla della mamma, di Martino, e di un libro. Arriva Maui. Cosa dice alla mamma di fare, al libro? *1-3*

In this story, there are the mother, Martino, and a book. Here comes Maui. What does Maui tell the mum to do to the book$_{masc}$?

Target: Di leggerlo a Martino

to read-it$_{masc}$ to Martino

to read it to Martino

Prompt: In questa storia si parla del papà, di Martino, e di un flauto. Arriva Maui. Cosa dice al papà di fare a Martino? *4-6*

In this story, we talk about the dad, Martino, and a recorder. Here comes Maui. What does he tell the dad to do to Martino?

Target: di regalargli il flauto

to gift-to-him the recorder

to gift him the recorder

Prompt: In questa storia si parla di un portiere, di un calciatore, e di un pallone. Arriva Maui. Cosa dice al calciatore di fare, al portiere? *7-9*

In this story, we talk about a goalkeeper, a footballer, and a football. Here comes Maui. What does he tell the footballer to do to the goalkeeper?

Target: di passargli il pallone

to pass-to-him the football

to pass him the football

Prompt: In questa storia si parla di una maestra, di un'alunna, e di un mappamondo. Arriva Maui. Cosa dice alla maestra di fare all'alunna? *10-12*

In this story, we talk about a teacher, a pupil, and a globe. Here comes Maui. What does he tell the teacher to do to the pupil?

Target: di darle il mappamondo

to give-to-her the globe

to give her the globe

Prompt: In questa storia si parla di un gelataio, di una ragazza, e di un gelato. Arriva Maui. Cosa dice al gelataio di fare al gelato? *13-15*

In this story, we talk about an ice-cream man, a girl, and an ice-cream. Here comes Maui. What does he tell the ice-cream man to do to the ice-cream$_{masc}$?

Target: di venderlo alla ragazza

to sell-it$_{masc}$ to-the girl

to sell it to the girl

Prompt: In questa storia si parla di un commesso, di una signora, e di un maglione. Arriva Maui. Cosa dice al commesso di fare al maglione? *16-18*

In this story, we talk about a shop assistant, a lady, and a pullover. Here comes Maui. What does he tell the shop assistant tot do to the pullover$_{masc}$?

Target: di mostrarlo alla signora

to show-it$_{masc}$ to-the lady

to show it to the lady

Prompt: In questa storia si parla di Sara, di Martino, e di una merenda. Arriva Maui. Cosa dice a Sara di fare alla merenda? *19-21*

In this story we talk about Sara, Martino, and a snack. Here comes Maui. What does he tell Sara to do to the snack$_{fem}$?

Target: di rubarla a Martino

to take-it$_{fem}$ to Martino

to take it from Martino

Prompt: In questa storia si parla di una nonna, di un bambino, e di una fiaba. Arriva Maui. Cosa dice alla nonna di fare alla fiaba? *22-24*

In this story, we talk about the grandma, the child, and a tale. Here comes Maui. What does he tell grandma to do to the tale$_{fem}$?

Target: di raccontarla al bambino

to tell-it$_{fem}$ to-the child

to tell it to the child

Prompt: In questa storia si parla di una maestra, di un allievo, e di una pagella. Arriva Maui. Cosa dice alla maestra di fare all'allievo? *25-27*

In this story, we talk about a teacher, a pupil, and a school report. Here comes Maui. What does he tell the teacher to do to the pupil$_{masc}$?

Target: di consegnargli la pagella

to hand-to-him the school report

to hand him the school report

Prompt: In questa storia si parla di un macellaio, di una signora, e di una bistecca. Arriva Maui. Cosa dice al macellaio di fare alla bistecca? *28-30*

In this story, we talk about a butcher, a lady, and a steak. Here comes Maui. What does he tell the butcher to do to the steak$_{fem}$?

Target: di venderla alla signora

to sell-it$_{fem}$ to-the lady

to sell it to the lady

Prompt: In questa storia si parla di un ragazzo, di una ragazza, e di una lettera. Arriva Maui. Cosa dice al ragazzo di fare alla ragazza? *31-33*

In this story, we talk about a boy, a girl, and a letter. Here comes Maui. What does he tell the boy to do to the girl?

Target: di consegnarle la lettera

to hand-to-her the letter

to hand her the letter

Prompt: In questa storia si parla di un medico, di una paziente, e di una medicina. Arriva Maui. Cosa dice al medico di fare alla paziente? *34-36*

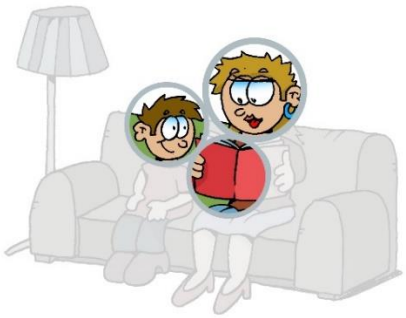
In this story, we talk about a doctor, a patient, and a medicine. Here comes Maui. What does he tell the doctor to do to the patient$_{fem}$?

Target: di darle la medicina

to give-to-her the medicine

to give her the medicine

Images



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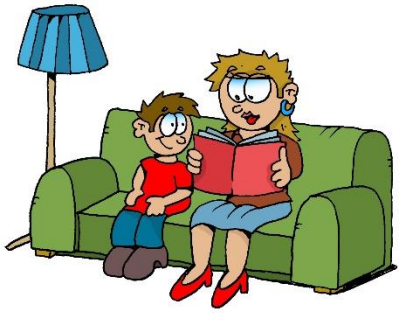

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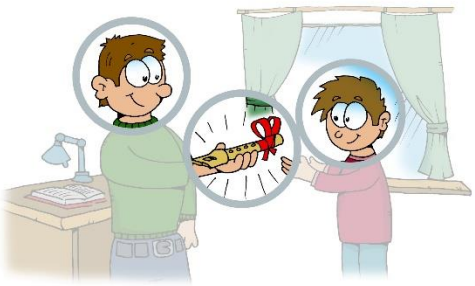

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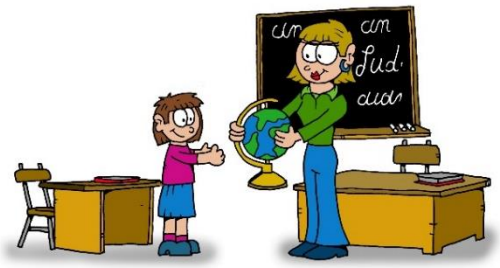

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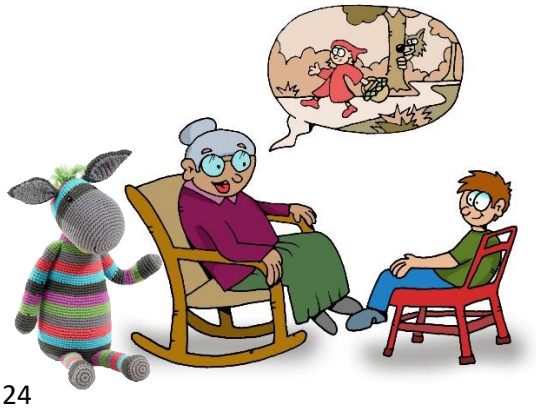

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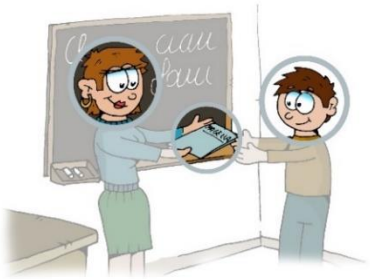

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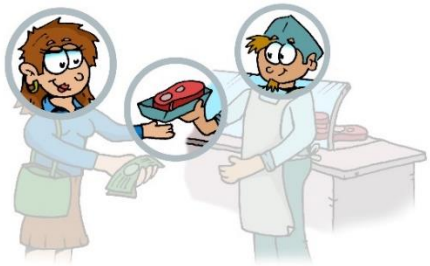

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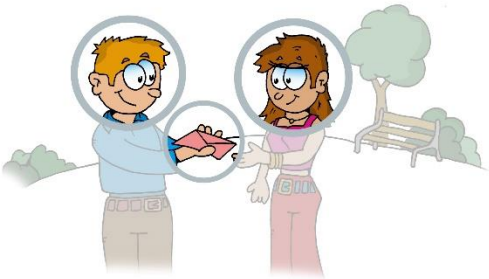

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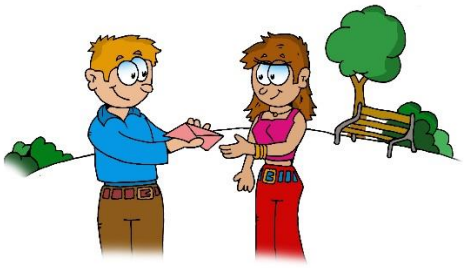

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Task 4

Images for each condition are shown below and relevant number is indicated next to the item.

proclisis

Prompt: In questa scena io lancio la palla a te. Cosa faccio io? *1*

In this scene, I throw the ball to you. What am I doing?

Target: Mi lanci la palla

pro to-me throw the ball

you're throwing me the ball

Prompt: In questa scena io leggo un libro a te. Cosa faccio io? *2*

In this scene, I read a book to you. What am I doing?

Target: Mi leggi un libro

pro to-me read a book

you're reading me a book

Prompt: In questa scena io mostro un'immagine a te. Cosa faccio io? *3*

In this scene, I show an image to you. What am I doing?

Target: Mi mostri un'immagine

pro to-me show an image

you're showing me an image

Prompt: In questa scena io rubo la merenda a te. Cosa faccio io? *4*

In this scene I take the snack from you. What am I doing?

Target: Mi rubi la merenda

pro to-me take the snack

you're taking the snack from me

Prompt: In questa scena tu scrivi una lettera a me. Cosa fai tu? *5*

In this scene, you write a letter to me. What are you doing?

Target: Ti scrivo una lettera

pro to-you write a letter

I'm writing you a letter

Prompt: In questa scena tu regali un fiore a me. Cosa fai tu? *6*

In this scene you give a flower to me. What are you doing?

Target: ti regalo un fiore

pro to-you give a flower

I'm giving you a flower

Prompt: In questa scena tu rubi la penna a me. Cosa fai tu? *7*

Target: ti rubo una penna

pro to-you steal a pen

I'm stealing your pen

Prompt: In questa scena tu porti il quaderno a me. Cosa fai tu? *8*

In this scene you take the notebook to me. What are you doing?

Target: Ti porto il quaderno

pro to-you take the notebook

I'm taking you the notebook

enclisis

Prompt: In questa scena Maui ti dice di mostrare un disegno a me. Cosa ti dice Maui? *12a*

In this scene Maui tells you to show a drawing to me. What is Maui telling you?

Target: di mostrarti un disegno

to show-to-you a drawing

to show you a drawing

Prompt: In questa scena Maui ti dice di dare un regalo a me. Cosa ti dice Maui? *14a*

In this scene Maui tells you to give a gift to me. What is Maui telling you?

Target: di darti un regalo

to give-to-you a gift

to give you a gift

Prompt: In questa scena Maui mi dice di comprare un fumetto a te. Cosa mi dice Maui? *10a*

In this scene, Maui tells me to buy a magazine to you. What is Maui telling me?

Target: di comprarmi un fumetto

to buy-to-me a magazine

to buy me a magazine

Prompt: In questa scena Maui mi dice di regalare un videogioco a te. Cosa mi dice Maui? *11a*

In this scene, Maui tells me to give a videogame to you. What is Maui telling me?

Target: Di regalarmi un videogioco

to give-to-me a videogame

to give me a videogame

Prompt: In questa scena Maui mi dice di togliere il cappello a te. Cosa mi dice Maui? *13a*

In this scene, Maui tells me to take the cap off from me. What is Maui telling me?

Target: Di togliermi il cappello

to take-to-me the cap

to take the cap off me

Prompt: In questa scena Maui mi dice di dare la cartella a te. Cosa mi dice Maui? *15a*

In this scene, Maui tells me to give the backpack to you. What is Maui telling me?

Target: Di darti la cartella

to give-to-you the backpack

to give you the backpack

Prompt: In questa scena Maui ti dice di riempire il bicchiere a me. Cosa ti dice Maui? *16a*

In this scene Maui tells you to fill the glass to me. What is Maui telling you?

Target: Di riempirti il bicchiere

to fill-to-you the glass

to fill your glass

Prompt: In questa scena Maui ti dice di dare una bambola a me. Cosa ti dice Maui? *9a*

In this scene, Maui tells you to give a doll to me. What is Maui telling you?

Target: di darti una bambola

to give-to-you a doll

To give you a doll

Task 4 cluster

Images for each condition are shown below and indicated next to the item.

Prompt: in questa scena cosa faccio alla merenda? *4*

In this scene, what am I doing to the snack$_{fem}$?

Target: me la rubi

pro to-me it$_{fem}$ steal

you're stealing it from me

Prompt: in questa scena cosa fai tu al disegno? *12*

In this scene, what are you doing to the drawing$_{masc}$?

Target: te lo mostro

pro to-you it$_{masc}$ show

I'm showing it to you

Prompt: in questa scena cosa fai tu con l'acqua? *16*

In this scene, what are you doing with water$_{fem}$?

Target: te la verso

pro to-you it$_{fem}$ pour

I'm pouring it to you

Prompt: in questa scena cosa faccio io con la palla? *1*

In this scene, what am I doing with the ball$_{fem}$?

Target: me la lanci

pro to-me it$_{fem}$ throw

you're throwing it to me

Prompt: in questa scena cosa faccio io con l'immagine? *3*

In this scene, what am I doing with the image$_{fem}$?

Target: me la mostri

pro to-me it$_{fem}$ show

you're showing it to me

Prompt: in questa scena cosa fai tu con il regalo? *14*

In this scene, what are you doing with the gift$_{masc}$?

Target: te lo do

pro to-you it$_{masc}$ give

I'm giving it to you

Prompt: in questa scena cosa fai tu con la bambola? *9*

In this scene, what are you doing with the doll$_{fem}$?

Target: te la passo

pro to-you it$_{fem}$ pass

I'm passing it to you

Prompt: in questa scena cosa fai tu con il libro? *2*

In this scene, what are you doing with the book$_{masc}$?

Target: te lo leggo

pro to-you it$_{masc}$ read

I'm reading it to you

Prompt: in questa scena cosa fai tu con la lettera? *5*

In this scene, what are you doing with the letter$_{fem}$?

Target: te la scrivo

pro to-you it$_{fem}$ write

I'm writing it to you

Prompt: in questa scena cosa fai tu con la penna? *7*

In this scene, what are you doing with the pen$_{fem}$?

Target: te la rubo

pro to-you it$_{fem}$ steal

I'm stealing it to you

Prompt: in questa scena cosa faccio io con il cappello? *13*

In this scene, what am I doing with the cap$_{masc}$?

Target: me lo togli

pro to-me it$_{masc}$ take off

you're taking it off from me

Prompt: in questa scena cosa faccio io con lo zaino? *15*

In this scene, what am I doing with the backpack$_{masc}$?

Target: me lo dai

pro to-me it$_{masc}$ give

you're giving it to me

Prompt: in questa scena cosa fai tu con la rosa? *6*

In this scene, what are you doing with the rose$_{fem}$?

Target: te la do

pro to-you it$_{fem}$ give

I'm giving it to you

Prompt: in questa scena cosa faccio io con il giornalino? *10*

In this scene, what am I doing with the magazine?

Target: me lo compri

pro to-me it$_{masc}$ buy

you're buying it to me

Prompt: in questa scena cosa fai tu con il quaderno? *8*

In this scene, what are you doing with the notebook$_{masc}$?

Target: te lo passo

pro to-you it$_{masc}$ pass

I'm passing it to you

Prompt: in questa scena cosa faccio io con la console? *11*

In this scene, what am I doing with the console$_{fem}$?

Target: me la dai

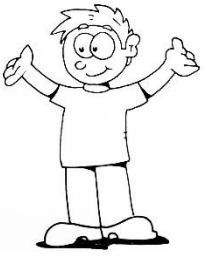
pro to-me it$_{fem}$ give

you're giving it to me

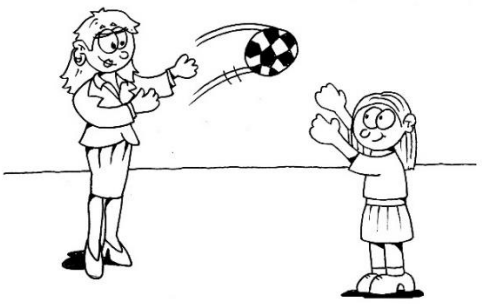
Images

Experimenter:

Male and female version of the participant:



Images for the items, shown in the female version:



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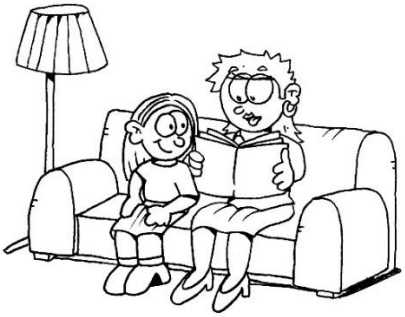

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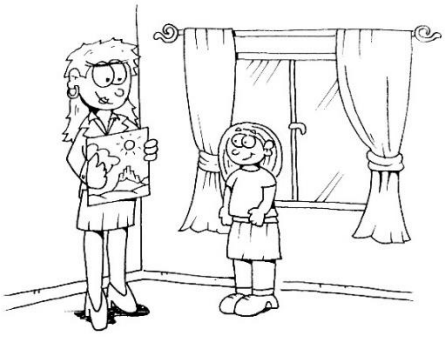

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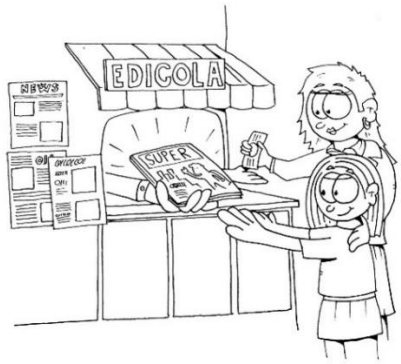

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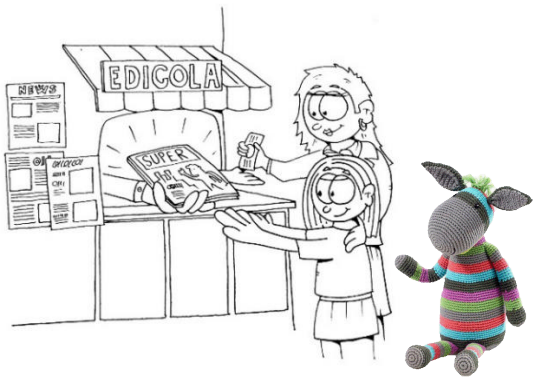

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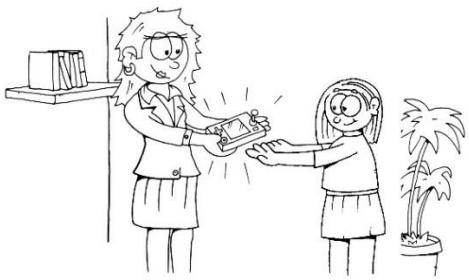

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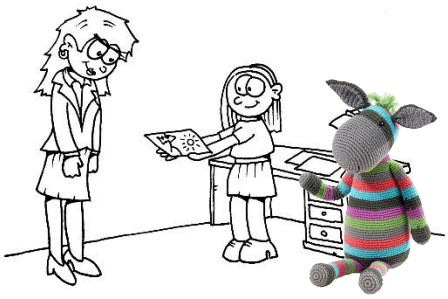

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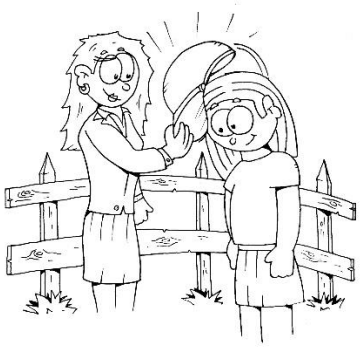

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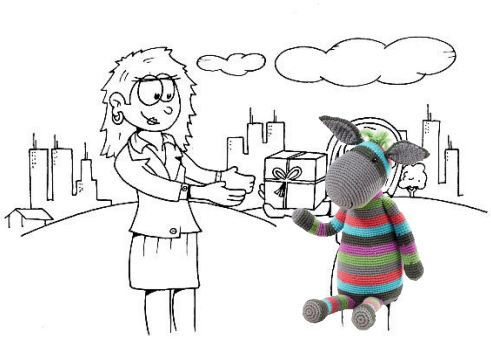

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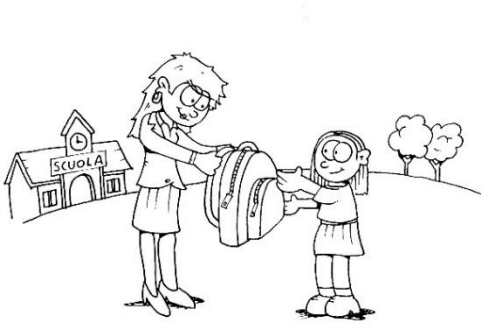

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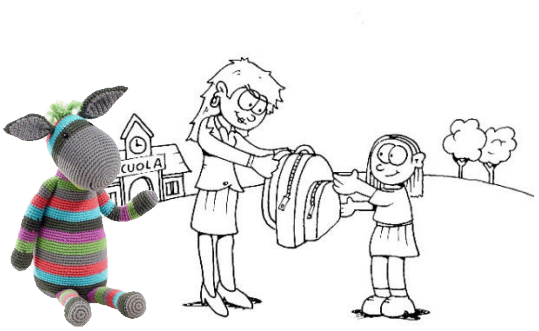

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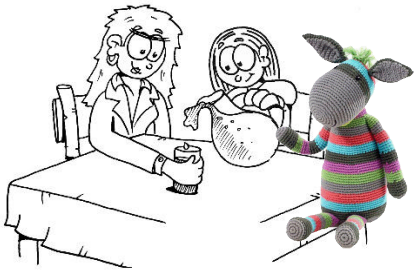

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