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CLITIC PRODUCTION IN ITALIAN AGRAMMATISM

Eleonora Rossi



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Eleonora Rossi

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A Daniele

‘In individuals who are neither paralyzed nor idiots, the abolition of speech is a symptom of sufficient importance, that it seems useful to designate it by a special name. I have given it the name of aphemia’

Paul Broca

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CHAPTER 1

PRELIMINARY NOTIONS

The topic developed in this thesis combines two contiguous fields of research, both dealing with language but having squinted focuses. The first field is represented by theoretical linguistics with its continuous quest for an explicit and fulfilling description of natural language and a satisfactory explanation about its machinery. The second is neurolinguistics, where theories examine the neuro-processing of language in the brain, and specifically a pathological form of it, i.e. aphasia. Despite the fact that these two research fields could be perceived as independent, and indeed they are considered so by a part of the research community, we believe that they complement each other, and the research presented in this thesis stands as proof of this. On the one hand, to properly develop this research, linguistic theoretical knowledge and linguistic theories were needed as a basis for the assumptions and research questions. On the other hand, the data gathered from speakers showing a linguistic damage served as a basis to discuss linguistic theories and proposed new data to understand how the linguistic machinery works. Working on the edge of two different, though contiguous, fields of linguistic research means sharing the tools to interpret both assumptions and data. In order to do this an understanding is required of the basic concepts and terminology of the two theoretical fields which are interpolated in this thesis.

The goal of this introductory chapter is, therefore, to provide an understanding of the essential notions that will be used throughout the thesis. In the first section, the general linguistic framework is introduced, in which the proposals are tested, and some basic concepts and terminology are outlined. In the second section a brief overview on aphasia is presented, and in particular on Broca's and agrammatic aphasia, describing its main neurolinguistic characteristics. Finally, in the last section, the major theories are outlined that have been developed in recent years to account for the impairment patterns described in agrammatic aphasia.

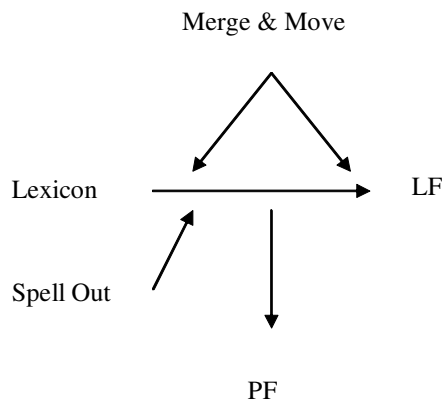
1.1 The linguistics framework

In the course of this thesis, several linguistic theories will be mentioned which have been developed within the syntactic field as a theoretical base for a number of linguistic phenomena related to pronominal clitics in general, and specifically to Italian ones. The various theories mentioned have been developed within the general assumptions of UNIVERSAL GRAMMAR (UG),

and within the spirit of TRANSFORMATIONAL-GENERATIVE GRAMMAR (TGG) with its various developments, and specifically in the framework of its most recent development, the MINIMALIST PROGRAM (Chomsky, 1995). As a consequence, this work settles itself in the framework of the Minimalist Program, considering it to be the common field where syntactic theories and data from aphasic speech can be interpreted and discussed. Unfortunately, the number of conceptual and terminological assumptions related to it is too large to receive a full description here. It is therefore assumed that the reader is acquainted with the main assumptions and terms used in syntactic theory. Nevertheless, in the next paragraphs some major concepts and terminology will be introduced that will be used recurrently in the following chapters.

1.1.1 *The model*

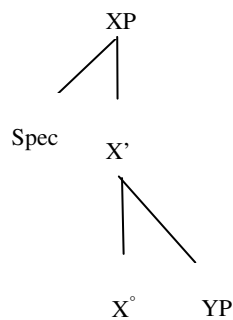
Within the latest version of the Minimalist Program, language is viewed as having a central word stock, i.e. the Lexicon where all the words known by an individual are stored. Moreover, two abstract levels of representation are assumed; that is to say an abstract representation of the meanings of words (LF), and an abstract representation of the sound of words (PF). When an individual is producing a sentence, words which are taken from the Lexicon enter a grammatical derivation. The words are therefore processed by two operations, called Merge and Move. The first unites two lexical entries, combining them, whereas the second takes one lexical element and moves it from its original position in order to combine it with another lexical element. Both of them combine two elements to form a third one. At any point of this process, a non-transformational operation can send the structure so far derived to the phonological component. This operation is called Spell Out. Once Spell Out applies, the sentence is pronounced. This model can, therefore, be schematically represented as follows:



1.1.2 *A formal representation of the sentence*

Since Jackendoff's proposal (1977) of the so called X'-theory (X-bar theory) which has been

widely accepted within the Minimalist Program, the formal representation of a sentence is a layered projection formed by several PHRASES, which are the ‘bricks’ of the sentence itself. The general idea of X’-theory implies a layered projection scheme. All phrases are headed by HEADS (conventionally signalled as X°), and heads are ‘zero projections’; that is to say they do not project any other phrase. Moreover, a complement combines with the head, to project X' , and a specifier combines with the top-most X' to form the MAXIMAL PROJECTION (conventionally signalled as XP). A typical phrase will therefore have the following representation:



A sentence can contain many phrases, which are generated within syntax: the noun phrase (NP), the verbal phrase (VP), the inflectional phrase (IP) which since Pollock (1989) is considered to be split in to Tense Phrase (TP) and Agreement Phrase (AgrP), the complementizer phrase (CP), and others which will not be mentioned here. The general assumption is that a sentence is constructed in a bottom-up fashion, and that VP constitutes the lexical domain and all the higher projections constitute the functional domain.

1.1.3 Syntactic movement

As mentioned, a lexical entry has a semantic definition and a phonological definition. Moreover, every lexical element is supposed to have syntactic features, which are needed to identify this lexical item during the course of the derivation. A general distinction has to be made between elements which display a content, i.e. word stems, and elements which do not have it, i.e. inflectional morphemes or functional words. A word stem and an inflection usually enter into a grammatical relationship. According to the Minimalist Program all words enter the derivation fully inflected into the lexical domain, and these elements carry with them crucial features which are associated with the inflectional affixes. In the functional domain, the various heads consist of features that are associated with morphology, including case features. Crucially, the features of the elements in the lexical domain have to match the features represented in the functional heads.

It is exactly feature checking which triggers the movement of elements from the lexical domain to the functional domain, where the features associated with the inflection match the features displayed in the functional heads. Feature checking triggers head movement as well as XP-movement. Head movement applies whenever a head of a projection moves to another head projection, whereas when a whole constituent is moved together with all its complements, this is called XP-movement. Features are nevertheless non-interpretable elements. That is why they have to be eliminated during the derivation. It is therefore assumed that whenever a feature is checked in the course of the derivation it is automatically eliminated. Therefore, what triggers syntactic movement is feature checking between the features linked to the lexical entry in the lexical domain, with the features displayed in the heads of the projections in the functional domain.

1.2 Aphasia

Aphasia is a language impairment due to brain damage in the language areas. Depending on the location of the damage, it can display different linguistic characterizations. In the literature there are many types of aphasia described, for example, Broca's aphasia, Wernicke's aphasia, conduction aphasia and anomic aphasia, but the first two types are the most common ones, and the most widely described. In Broca's aphasia, the brain damage is localized in the frontal lobe (typically Brodmann's areas 44 and 45), and the resulting speech is non-fluent but language comprehension is relatively well-preserved. This type of aphasia takes its name from the neurologist who first described it. Indeed Paul Broca, in 1861, described the case of a patient (Monsieur Leborgne, nicknamed 'Monsieur Tan') who had 'lost' the ability to speak. His language was characterized by poor speech production and a quite well-preserved comprehension. His speech production was impaired to such an extent that the only words he could produce were 'tan tan', from whence he received his nickname. The post-mortem examination revealed that Monsieur Tan's brain had a 'chronic and progressive softening of the second and third left frontal convolution'.¹

In the second type of aphasia the brain damage is more posterior (in the posterior part of the superior temporal gyrus; Brodmann's area 22), and the resulting language damage is characterized by fluent speech with paraphasias and poor comprehension. This fluent type of aphasia takes its name from the German neurologist Carl Wernicke who was the first to describe the characteristics of this linguistic deficit. From now on, this work will focus on Broca's

¹ Citations from Schiller, F. (1992): 'Paul Broca: Explorer of the brain'.

aphasia, and in particular agrammatic aphasia, which is the type of aphasia that is of central interest here.

1.2.1 Broca's aphasia and agrammatism: characterizations

The term 'Broca's aphasia' has been used for a long time to address generally a language impairment characterized by non-fluent speech production, and relatively spared comprehension. Agrammatism has been described as a specific type of Broca's aphasia. The main difference between Broca's aphasia and agrammatism (which are often used as synonyms) is that, in agrammatism, even if the main deficits are still detectable in speech production, language comprehension has been shown to be impaired as well (Caramazza & Zurif 1976; Grodzinsky, 2004; Luzzatti, 2001; Shapiro, 1990). Agrammatism is in general characterized by poor grammar, a decrease in speech rate, omission and/or substitution of function words, and frequent use of uninflected verbs. This co-occurrence of symptoms is often described as 'telegraphic speech'. Goodglass (2001) describes agrammatism with the following characteristics:

- Omission and/or within-class substitution of function words
- Substitution of verb stem or infinitive for tensed forms
- Reduced use in coordination and subordination
- Fragmentary, incomplete sentences and phrases
- Loss of speech melody
- Loss of comprehension of inflections and function words
- Loss of comprehension of complex syntactic structures

1.3 On agrammatism: Neurolinguistic theories

In recent years many accounts and theories have been developed to explain agrammatic deficits. They can be subdivided into three main families according to the linguistic approach used. In the late 1970s a phonological approach to describe agrammatism was suggested, but morphological approaches, and syntactic accounts of agrammatism have been proposed as well. Some try to account for both modalities of language, i.e. production and comprehension, while others focus only on one modality. In the next paragraphs the key accounts of agrammatic aphasia will be introduced, along with the relevant theories pertaining to them.

1.3.1 The phonological account

A phonological account of agrammatism was proposed by Kean (1977). In her article Kean states:

We argue here that recent characterizations of [Broca's aphasia] as a language deficit involving the compromise of phonetic, phonological, syntactic and semantic functions is untenable. It is our hypothesis that the manifested linguistic deficits of Broca's aphasics can only be accounted for in terms of the interaction between an impaired phonological capacity and otherwise intact linguistic capacities [...]. It is our argument that by assuming all aspects of the language faculty to be intact, save for the phonological, we can predict that there will be a systematic variation in the likelihood of omission of function words and grammatical morphemes which parallels the variation in the way these elements are treated within the normal language processing system. (Kean, 1977, p. 10)

Kean assumes that a phonological word is an element that can carry stress, and that a phonological clitic is an element that cannot carry stress. In this framework agrammatism is therefore defined as the deficit in the ability to process (receptively or expressively) phonological clitics, that is to say elements which do not carry a phonological stress. As a consequence, Kean's prediction is that people with agrammatic aphasia will have problems with clitics, and specifically that clitics will be omitted from their language. Similarly, she expands the account to other elements of language, as determiners, and bound morphological elements (as verb morphology). In conclusion, Kean's account can be defined as a purely phonological one. Despite the fact that Kean's theory has received much attention during those years, more recent accounts of agrammatism reveal that an exclusive phonological account cannot solely explain the variety of error patterns observed in various languages. The data presented in this thesis will be used as evidence to counter this account.

1.3.2 Agrammatism: morphology or syntax breakdown?

Cross-linguistic comparisons have played an important role in clarifying one basic question in aphasiology: what is the underlying deficit driving agrammatic speech production? Are we facing a morphological breakdown or can it be accounted for with another explanation? For a long time definitions of agrammatism were based on morphological accounts, but the conclusions derived from these reports were mainly based on studies performed with English-speaking patients, apart from some studies, such as those performed by Bates & Wulfeck (1989; 1991), where even if there was a loss of bound morphology the result still was meaningful speech production. Many cross-linguistic studies have shown that morphology per se is relatively spared in agrammatism but it is mainly impaired when a syntactic process is involved. For

example, Italian is defined as a morphologically rich language where both bound and free morphemes are basic in speech production, as in verb inflections, gender agreement in past participles and in compounds where morphemes clearly signal the agreement for all these categories, as shown in Table 1.

Table 1: Example of a verb declination

To write	PERSON	SINGULAR	PLURAL	FEM	MASC
Io scriv-o	1st	+		+	+
Tu scriv-i	2nd	+		+	+
Egli/Ella scriv-e	3rd	+		+	+
Noi scriv-iamo	1st		+	+	+
Voi scriv-ete	2nd		+	+	+
Essi/e scriv-ono	3rd		+	+	+

Furthermore, in the Italian past participle, gender and number spread into the participle form, when the auxiliary is formed with the verb “to be” (the auxiliary “to have” is also used but in these cases the morphological marking between auxiliary and past participle is not the same):

(1)

- a. Anna_{fem.sing} è andat-a_{fem.sing} a casa
Anna went home
- b. Gianni_{masc.sing} è andat-o_{masc.sing} a casa
Gianni went home
- c. Anna e Carla_{fem.plur} sono andat-e_{fem.plur} a casa
Anna and Carla went home
- d. Paolo e Gianni_{masc.plur} sono andat-i_{masc.plur} a casa
Paolo and Gianni went home

The fact that morphology itself is not impaired is demonstrated by the finding that Italian agrammatic speakers do not omit all morphemes to the same extent, but they make many substitutions (the omission of bound morphology, in fact, would result in a nonsensical word). Miceli, Silveri, Villa & Caramazza (1984) showed that free morphemes are omitted or

substituted; bound morphemes are never omitted but only substituted. Furthermore, another characteristic of agrammatic aphasia is the defective production of verbs, often lacking inflection for Tense and Agreement. This generalization could be valid for English where the omission of the inflectional morpheme results in the bare stem, which is still legal. Again in Italian, verbs show inflectional morphology bound to the verb stem, i.e. *lav-o* (I wash). Producing a bare verb stem would not only be an ungrammatical production but a non-legal one from a grammatical point of view. The data from Italian agrammatic speakers show that the inflectional morphemes of verbs are substituted or the infinitival morphology is used, but the bare verb stem is never produced (1989; Rossi and Bastiaanse, 2007). The same can be seen in German where agrammatic patients usually produce the infinitive form of the verb, which is indeed inflected, like *Les-en* (to read). That is why a simple ‘stripping’ account, as defined but rejected by De Bleser, Bayer & Luzzatti (1995), from a bare morphological base cannot justify the agrammatic verb production not only of morphologically rich inflected languages like Italian and German but also of Russian and Hebrew. In their study, Luzzatti & De Bleser (1996) conclude that inflectional morphology of simple and derived nouns is not impaired, whereas the so called ‘syntax dependent morphology’ (i.e. the derivation of compounds) is significantly affected. These results corroborate the statement that morphology per se is not the underlying level of disorder in agrammatism, but in a more precise account, agrammatism is the result of a morphosyntactic disruption. Furthermore, several studies by Bastiaanse and colleagues (Bastiaanse, 1995; Bastiaanse & Van Zonneveld, 1998; Bastiaanse & Van Zonneveld, 2005) deepen the definition of agrammatism, suggesting that the basic speech problems for these patients are not verb inflections and morphology per se, but the deficit is strongly related to syntax and that it is especially related to problems when a sentence has a derived order.

To conclude, it is highly unlikely that agrammatic aphasia could be considered to be caused by a purely morphological breakdown. More and more data is accumulating to support the idea that agrammatism is the result of a breakdown of the morpho-syntax at the syntactic level. In the next paragraphs a syntactic approach to agrammatism with its most relevant theories will be outlined.

1.3.3 The syntactic account

Within theories of neurolinguistics, a syntactic approach has been developing, closely related to the theories of grammar, and specifically to syntactic theories. The main idea of the syntactic approach is that agrammatism can generally be described as a grammatical deficit, that is, the impairments in the language of agrammatic speakers can be explained assuming a deficit at a syntactic level. Within this general approach, some specific theories have been formulated to

explain the linguistic deficit of agrammatism by means of a single specific impairment within one of the syntactic functions described in syntactic theories as, for example, the TRACE DELETION HYPOTHESIS (TDH), proposed by Grodzinsky (2000), which accounts for the comprehension deficits observed in agrammatism as a consequence of the deletion of traces of moved elements.² Within the syntactic account, three theories will be described that are proposed in the literature, which try to give an account of agrammatism for both modalities of language, i.e. production and comprehension.

The first account is the so-called ECONOMY OF DERIVATION proposed by Hagiwara (1995). In the framework of the early Minimalist Program (Chomsky, 1993) Hagiwara proposes that the lower the position of a functional head and its projection in the sentence structure hierarchy, the more accessible it is to an agrammatic speaker. This theory is based on the analysis of spontaneous speech and on the results from an acceptability sentence judgment task, of four Japanese agrammatic speakers. For the grammaticality judgment task, agrammatic speakers had to judge sentences of the type:

(2)

- a. Taro-wa kinoo rykou-ni dekake-*ru/-ta
-TO yesterday a trip go- *PRES/-PAST
Taro *go/ went on a trip yesterday
- b. Oba-ga Nagoya-*kara/-ni sunde-imasu
aunt-NOM Nagoya-*from/-in live-PRES
My aunt lives in Nagoya

In the first example the violation between tense and adverb has to be detected, whereas in the second there is an incorrect use of a postposition (postpositions are considered to be functional elements and can be located within the subject related particles). In the assumption of the minimalist framework, the subject agreement (AgrS) and Topic are located in a higher position in the tree with respect to Tense (TP). Therefore, Hagiwara's hypothesis predicts that agrammatic speakers will perform better in detecting the ungrammaticality in the first example, and will perform less well in detecting the ungrammaticality in the second example. This is the actual pattern that Hagiwara observed in Japanese patients. Dutch data brings forth a different

² We will not describe TDH in depth, given that it focuses on language comprehension, and we will focus instead on language production.

pattern which contrasts with Hagiwara's account. Dutch agrammatic speakers (Bastiaanse, Rispens, Ruigendijk, Rabadan & Thompson 2002) were indeed impaired in producing structures at the Complementizer Phrase (CP)—confirming the Hagiwara data—but they also performed poorly in moving the verb to the Inflectional Phrase (IP). Along the lines of Hagiwara the movement to IP should at least be less impaired than the production of CP.

The second theory proposed is the TREE PRUNING HYPOTHESIS (TPH) proposed by Friedmann and Grodzinsky (1997) and Friedmann (2001; 2002). After analyzing several data sets from Hebrew and Palestinian Arabic agrammatic speakers, the authors concluded that the impairment in agrammatic production is highly selective, and lends itself to characterization in terms of a deficit in the syntactic tree. In other words, in agrammatic speech an element is affected depending on its position in the syntactic tree. The main idea is that the phrases themselves are not impaired, but their accessibility depends on their position in the syntactic tree: according to TPH the syntactic tree of agrammatic aphasic speakers is pruned at the Tense node. The claim that the syntactic tree of agrammatic speakers is pruned between the Tense and Agreement node is supported by the data presented by the authors: aphasic speakers of Hebrew and Arabic can project AgrP and, therefore, agreement is intact (agreement errors: 3.9%), but they failed to project (or access) TP (tense errors: 42.4%). Generalizing, the authors concluded that elements located in high nodes of the tree are impaired, while lower structures are spared. Nevertheless, this hypothesis has been challenged as well, and the data seems to disconfirm the TPH. Bastiaanse & Thompson (2003) tested two different types of sentences—declarative sentences, where the auxiliary is in the Inflectional phrase (IP), and yes/no questions where the auxiliary has to be moved to the Complementizer phrase (CP). They did find a significant difference in the production of auxiliaries in these two types of sentences. Following the TPH instead, the expectations would be of a better performance for the sentences where the verb stays in its base-generated position, i.e. a lower position in the tree. Hagiwara's 'Economy of Derivation' and Friedmann's 'TPH' both assume a representational deficit, but the first one implies a hierarchy in the representational deficit, while the second implies a sharper duality and an exact location within the syntactic tree for the deficit.

The last, and most recent, syntactic approach is the 'Derived Order Problem Hypothesis' (DOP-H) proposed by Bastiaanse and Van Zonneveld (2005). This hypothesis is meant to explain the problems in agrammatic speech production and comprehension, and attempts to avoid postulating impairments at specific syntactic 'operations' or specific part of the syntactic tree, but giving a more general approach. DOP-H starts from the assumption that every language has a basic word order, for example Subject–Verb–Object (SVO) in English and Subject–Object–Verb

Preliminary Notions

(SOV) in Dutch, and that all the other word orders which differ from the basic ones are derived. Whenever a new word order is derived, this results in a difficulty in producing and/or comprehending that given derived structure. For example, in Dutch, DOP-H predicts that matrix clauses, in which the verb is moved to the second position and therefore the word order is derived from the basic one, are difficult. The pattern is confirmed in the study by Bastiaanse and Thompson (2003), which shows that English sentences with a derived word order (i.e. yes/no questions) are more impaired than sentences where the word order is not derived, i.e. declarative sentences which similarly display an auxiliary. It is worth noting that DOP-H only takes into account so-called overt movements, i.e. visible movements. DOP-H does not predict any difficulty for other types of movement described in the linguistic theory, such as covert movement.

CHAPTER 2

ON CLITICS

2.1 Clitics: general characterizations

Clitics are a special type of pronoun. They exhibit a number of specific syntactic properties which enable them to be labelled as ‘clitics’. That clitics constitute a special grammatical category has been clear since Kayne’s work (1975). Despite being classified as pronouns, clitics display certain properties which are different from typical pronouns (or full NP). These differences led several authors (Cardinaletti, 1999; Cardinaletti & Starke, 1999; Kayne, 1991) to assume that clitics can be divided into three sub-categories: strong pronouns, weak pronouns and clitics. Strong pronouns behave like real NP; clitics behave neither like strong pronouns nor like fully specified nouns. Weak pronouns constitute a special category which shows some characteristics of strong pronouns and some of clitics. This work will focus on the differences between full NPs, strong pronouns and clitics, disregarding the category of weak pronouns. The first characteristic which differentiates full NPs and strong pronouns from clitics, is the ability to bear contrastive stress.

(1)

- a. Camilla suona il violino non il flauto
Camilla plays the violin not the flute

- b. Camilla ha invitato me non te
Camilla invited me not you

- c. *Camilla mi ha invitato non ti ha invitato
Camilla me invited not you
‘Camilla invited me not you’

In (1a) and (1b) the full noun ‘flauto’ and the strong pronoun ‘me’, can bear contrastive stress (underlined), whereas the clitic pronoun in (1c) cannot bear contrastive stress, leading to an ungrammatical sentence. Another test to distinguish clitics from full NPs and pronouns is

conjunction. A full NP or a strong pronoun can be conjoint, as shown in (2a) and (2c), whereas a clitic pronoun cannot, as shown in (2b) and (2d).

(2)

- a. Clara legge e racconta la storia
Clara reads and tells the story

- b. *Clara *la* legge e racconta
Clara it reads and tells
'Clara reads it and tells it'

- c. Clara ascolta me e te
Clara listens to me and you

- d. *Clara *mi e ti* ascolta
Clara me and you listens
'Clara listens to me and to you'

Another difference between NPs, strong pronouns and clitics is their distribution in the clause. Clitics cannot occupy the position in the clause that is usually occupied by full NPs or strong pronouns.

(3)

- a. Chiara legge il giornale
Chiara reads the newspaper

- b. *Chiara legge lo
Chiara reads it
'Chiara reads it'

- c. Chiara saluta Gianni e Luigi
Chiara greets Gianni and Luigi

- d. Chiara saluta loro

Chiara greets them
'Chiara greets them'

- e. *Chiara saluta li
Chiara greets them
'Chiara greets them'

Examples (3a), (3c) and (3d) show that full NPs and strong pronouns share the same position in the clause, whereas clitics cannot surface in those positions, as (3b) and (3e) demonstrate. That full NPs and strong pronouns do not share the same positions in the clause is shown in particular sentence constructions, such as object fronting.³ Examples (4a) and (4b), which respectively show a full noun and a strong pronoun, show that it is possible for these two categories to undergo object fronting. This is not the case for clitic pronouns, as exemplified in (4c).

(4)

- a. Marco, non l' ho visto
Marco, I did not see him
'Marco, I did not see him'
- b. Lui non l' ho visto
Him, I did not see him
'I did not see him'
- c. *Lo, non l' ho visto
Him, I did not see him
'I did not see him'

Furthermore, there are special typologies of sentences, such as imperative sentences, and

³ We will name 'object fronting' sentences where the object is fronted in the first position in the clause. Object fronting is commonly used in colloquial Italian as a means to stress the object. Object fronting can not be considered an instance of reduplication, given the specific pattern of intonation it bears. Furthermore, standard Italian does not allow the co-existence of a clitic and a full NP/strong pronoun.

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sentences having a non-finite verbal construction⁴ which apparently would seem not to follow this generality, i.e. in these constructions the clitic apparently surfaces in the same position as full nouns or strong pronouns. Nevertheless, once an element, for example an adverb, is introduced in the clause it becomes clear that even in these sentences clitics do not occupy the same position as full nouns or strong pronouns. Consider the following examples:

(5)

- a. *Bevi il vino!*
Drink the wine!

- b. *Bevilo!*
Drink it!

- c. *Bevi subito il vino!*
Drink immediately the wine!

- d. *Bevilo subito!*
Drink it immediately!

- e. *Guarda lei!*⁵
Look her!
'Look at her!'

- f. *Guardala!*
Look her!
'Look at her!'

- g. *Guarda sempre lei!*
Look always her!

⁴ The examples here just have an explanatory function. The special case of imperatives and non-finite verbal construction in Italian will be analyzed in depth in another section of this work.

⁵ In this case the sentence is grammatical. The best formulation would nevertheless be in a contrastive environment, like '*Guarda lei non lui!*' ('Look at her not at him!')

‘Look always at her!’

h. *Guardala sempre!*

Look her always!

‘Look always at her!’

(6)

a. *Mangiare il pollo sarebbe un errore*

To eat the chicken would be a mistake

b. *Mangiarlo sarebbe un errore*⁶

To eat it would be a mistake

All sentences in (5) and in (6) are grammatical. The fact that in affirmative imperative sentences clitics surface after the verb is related to the characteristics of imperative verbs. This topic will be addressed in chapter 6. As far as sentences with non-finite verbs and the relative position of clitics are concerned, this will be treated in paragraph 2.3.2. The final difference between clitics and full NPs or strong pronouns is that clitics cannot appear alone. Examples (7a) and (7b) show that a full noun and a strong pronoun can stand alone, whereas a clitic pronoun cannot, as in (7c).

(7)

a. *Cosa hai mangiato? La mela*

What did you eat? The apple

b. *Chi hai visto? Lei*

Whom did you see? Her

c. **Chi hai visto? La*

Whom did you see? Her

⁶ The reader should note that this word order is typical of Italian and Spanish. For other Romance languages, such as French, the correspondent couple of sentences for (6) would be: ‘Manger le poulet serait un erreur’; ‘Le manger serait en erreur’, where the clitic does not surface in the same position as the full complement.

A summary of the different characteristics of fully specified nouns and strong pronouns on the one hand, and clitics on the other, is shown in Table 2.

Table 2: Characteristics of strong pronouns and clitics

	Strong Pronouns	Clitics
Contrastive stress	+	-
Conjunction	+	-
Distribution in the clause like full NPs	+	-

2.2 Syntactic theories on clitics

2.2.1 General overview

What the term ‘clitic’ embodies is still a matter of debate and discussion. Clitics have been analyzed at several linguistic levels. The primary approach to clitics came (within the generative grammar framework) from Kayne’s pioneering work on the French clitic system (Kayne, 1975). His—and other generativists’—working approach is syntactic in nature assuming that clitics are elements which undergo specific syntactic operations. A lexical approach to the topic has been taken forward by Zwicky (1977) who accounts for clitics from a morpho-phonological viewpoint and abstracts from a purely syntactic view of the topic. Nespor and Vogel (1986) analyse clitics within a purely phonological framework, proposing a ‘Clitic Group’ as one of the prosodic constituents in the prosodic hierarchy. Despite the relevance of the lexical and phonological approaches, this introduction limits itself to mentioning them for sake of completeness, giving instead a fuller description of the various syntactic theories on clitics which have been proposed. Within the main syntactic analyses of clitics which have been proposed, there are three main approaches: a movement approach, led by the works of Kayne (1975; 1991) and Sportiche (1990), a base-generated approach put forward by Rivas (1977) and Borer (1984) and a mixed approach recently proposed by Sportiche (1995). One major assumption common to all three approaches is the syntactic independency of clitics as a grammatical category. What has been a big source of debate is the position in which clitics are generated, the relation between clitics and the related fully specified complements, and what the syntactic rules are that clitics undergo. In the next paragraph each of these approaches will be explained.

2.2.2 The movement approach

Kayne’s original approach on pronouns and clitics (1975) has been addressed as a pure ‘movement’ approach. According to Kayne, clitics surface in their final position after a movement operation called CLITIC PLACEMENT (CL-PL). CL-PL moves clitics from their base

position to their surfacing position. This approach is grounded in linguistic assumptions supported by empirical linguistic observations, such as the complementary distribution which holds between clitics and fully lexicalized complements. A clitic object (direct or indirect) and a full NP cannot coexist in one clause, as shown by the ungrammaticality of (8c) and (9c).⁷

(8)

a. Vedo Gianni
See Gianni
'I see Gianni'

b. Lo vedo
Him see
'I see him'

c. *Lo vedo Gianni
Him I see Gianni

(9)

a. Regalo un libro ad Anna
I give a present to Anna

b. Le regalo un libro
Her I give a present
'I give her a present'

c. *Le regalo un libro ad Anna
Her I give a present to Anna

The same complementarity rule holds for pronouns in the NP-like strong form. Indeed, (10c) and (11c) are ungrammatical constructions. (10a) and (11a) are grammatical, even though they would not be the preferred form used by speakers (in this case Italian speakers). The preference would

⁷ The impossibility of two nominal elements coexisting in the same clause derives from Case theory. Case cannot be realized in two different nominal elements. We reported here some Italian examples. In Kayne's original work French examples were used. The complementarity rule holds for both Italian and French.

be to use them within a contrastive focus environment.⁸

(10)

- a. Maria vede noi
Maria sees us

- b. Maria ci vede
Maria us sees
'Maria sees us'

- c. *Maria ci vede noi
Maria us sees us

(11)

- a. Scriverò una lettera a lui
I will write a letter to him

- b. Gli scriverò una lettera
Him I will write a letter
'I will write a letter to him'

- c. *Gli scriverò una lettera a lui
Him I will write a letter to him

Such a status, together with other linguistic evidence, led Kayne to postulate that strong pronouns are generated as an expansion of NP. This assumption permits the direct generation of sentences expressing a 'strong pronoun'. After that, via the Clitic Placement Rule (CI-PI), strong pronouns are transformed and moved to their surfacing position. Citing Kayne's (1975) original formulation:

⁸ An example of a contrastive sentence in Italian where the use of a strong pronoun is required follows from example (10a) above:

'Maria vede noi non voi'
'Maria sees us not you'

The same construction would not be grammatical with the use of clitic pronouns:

*'Maria ci non vi vede'
'Maria us not you sees'

...Assume that pronouns can occur freely under the node NP. This assumption is independently necessary to generate sentences containing the strong forms of the pronouns. Let's further assume that there is a transformation called Clitic Placement (CI-PI) that moves direct and indirect object pronouns to preverbal position under certain conditions...CI-PI would apply, moving the object pronoun to the left of the verb (Kayne, 1975, p. 74).

A sentence such as (13) would then be derived from a structure such as (12), where 'noi' is the strong form of the pronoun and 'ci' is the correspondent weak clitic form of the strong pronoun 'noi'.⁹

(12) Maria chiama noi
 Maria calls us

(13) Maria ci chiama
 Maria us calls
 'Maria calls us'

Additional support for the movement approach can be found in sentence constructions with a clitic and past participle. In Italian (as well as in French), whenever a clitic is present in a sentence with a past participle, the clitic has to agree with the past participle's features. In (14b) the clitic correctly agrees with the past participle (masculine plural), whereas in (14c) the sentence is grammatically incorrect: the clitic and past participle do not share the same features.

⁹ In Italian, the strong and the weak form of personal pronouns always have a different phonological form.

Person	Strong	Weak
1st sing	Me	Mi
2nd sing	Te	Ti
3rd sing	Lei/Lui	La/Lo
1st plur	Noi	Ci
2nd plur	Voi	Vi
3rd plur	Loro	Li

(14)

- a. Marco ha letto i giornali
Marco reads the newspapers

- b. Marco li ha letti
Marco them has read
'Marco read them'

- c. *Marco lo ha letti
Marco it has read
'Marco read it'

A special point of discussion for the movement approach is served by sentences containing infinitive verbs. In this respect French and Italian display different word orders.

(15)

- a. La voir serait fantastique
Her to see would be fantastic
'To see her would be fantastic'

- b. *Voir la serait fantastique
To see her would be fantastic

(16)

- a. Vederla sarebbe fantastico
To see her would be fantastic

- b. *La vedere sarebbe fantastico
Her to see would be fantastic
'To see her would be fantastic'

In clauses with an infinitival verb, French displays a clitic-verb order, whereas Italian displays the opposite pattern, i.e. verb-clitic order, as shown in examples (15) and (16). Taking for granted the assumption that clitic movement is left-adjunction, Kayne (1991) assumes that in French, infinitival verbs only move to *Inf_n* (a functional projection with nominal properties, supposedly positioned lower than *I*) and that the clitic eventually left-adjoints it. In Kayne's original formulation clitics surface attached to the verb of which they are the complement, but this is not the case with infinitival constructions where clitics may not move up to a higher verb from an infinitival complement. Clitic climbing is de facto ruled out in French infinitival constructions,¹⁰ as shown in (17b).

(17)

- a. Elle voudrait le manger
She would like it to eat
'She would like to eat it'

- b. *Elle le voudrait manger
She it would like to eat

Summarizing the ideas of the movement approach, clitics are the weak form of corresponding strong pronouns (or full NPs). Strong pronoun forms are generated as an expansion of NP. CI-PI will eventually apply and cliticise them in their surfacing position. From Kayne's original work it is not quite clear, after CI-PI has been applied, what the nature is of what remains after movement. In the light of later developments (Kayne, 2000), what remains after CI-PI has to be considered a trace.

2.2.3 The base-generated approach

The base-generated approach originally proposed by Rivas (1977) and Borer (1984) departs from the movement approach. The main claim of the base-generativists is that clitics are base-generated where they surface. Clitics are generated by a Phrase-Structure Rule which generates a superclitic node that dominates all clitics. The superclitic node is generated linearly before the verb in case the clause shows a finite verb, resulting in a clitic-verb order. Evidence for this theory finds its root in sentences in which there is an obligation that requires a doubling

¹⁰ According to Kayne, French clitics do not move up from sentential complements at all.

construction, i.e. the presence of both the clitic and the full noun or strong pronoun, as in certain varieties of Spanish, i.e. River Plate Spanish (Rivas, 1977). Sentence (18a), which displays both a clitic and a strong pronoun, is grammatical in River Plate Spanish whereas (18b) and (18c) are ungrammatical, given that they miss an obligatory element.¹¹

(18)

- a. La conozco a ella
Her I know to her
'I know her'

- b. *Conozco Maria
I know Maria

- c. *Conozco a ella
I know to her
'I know her'

Nevertheless, there are linguistic constructions which require only a strong pronoun (or full NP) or only a clitic. Therefore, a theory which accounts for the three possibilities is needed, i.e. Cl + NP; only Cl; only NP. Following Rivas's (1977) proposal, clitics are base generated in their surface position by the Phrase-Structure Rule; therefore, movement of the clitic is not involved. At the end of the syntactic derivation both clitics and full NP are present in the structure. After the Phrase-Structure rule has been applied, a rule of Cl/NP deletion (which takes into consideration all the relevant grammatical requirements of a given clause) will delete either the clitic or the NP or neither of them.¹² Nevertheless, within the base-generated approach clitic movement has been postulated, too. Indeed, in some Romance languages such as Italian and Spanish there are sentence constructions where a clitic can be placed either before or after the verb (the first case is commonly addressed as clitic climbing). These sentences are those which contain modal, causative or aspectual verbs. This 'double' construction is possible with both

¹¹ The reader should note that this is valid only when the NP is animate. When the NP is inanimate the doubling construction is no longer grammatical, as shown below:

(4) *La conozco esta poesia
It I know this poetry
I know this poetry

¹² Cl/NP deletion is per definition a post syntactic rule, i.e. it applies after all syntactic rules have applied. Furthermore, Cl/NP deletion is language and dialect dependent.

direct and indirect objects as in (19) and (20).

(19)

- a. Marco vuole mangiare il gelato
Marco wants to eat the ice cream

- b. Marco vuole mangiarlo
Marco wants to eat it

- c. Marco lo vuole mangiare
Marco it wants to eat
'Marco wants to eat it'

(20)

- a. Carlo finisce di scrivere la lettera a Clara
Carlo finishes to write a letter to Clara

- b. Carlo finisce di scriverle la lettera
Carlo finishes to write her a letter

- c. Carlo le finisce di scrivere la lettera
Carlo her finish to write a letter
'Carlo finishes to write her a letter'

For these cases Rivas assumes a first syntactic rule, i.e. Verb Adjunction, which takes the lower verb and adjoins it to the upper verb. Verb Adjunction is a basic syntactic process which takes place in Romance languages and reduces a bisentential clause into a monosentential one.¹³ After Verb Adjunction applies, a rule of Clitic Gliding takes the clitic node (which is attached to the verb) and moves it to the left. In this way the clitic node will be attached to the adjacent verb. Clitic Gliding can apply if both verbs are dominated by the same verbal node and it applies

¹³ Within the movement approach Rizzi (1978) proposes a Restructuring rule, which optionally reanalyzes two verbs as a single verbal complex. This operation permits clitics to move over the verbal complex. Rizzi's approach will be discussed in section 2.4.

quasi-obligatorily.¹⁴ In summary, the base-generated approach proposes that full NP, strong pronouns and clitics are all base-generated where they surface by a Phrase-Structure rule. After other syntactic rules, such as the Case-Marking rule, the post-syntactic rule of Cl/NP deletion applies to delete either the NP or the clitic or neither of them. In the case of sentences which display a modal or an aspectual verb together with an infinitival verb construction, clitics are moved, via the quasi-obligatory Clitic Gliding rule to the adjacent upper verb. This is only possible after the Verb Adjunction rule has applied.

2.2.4 *The mixed approach*

It is in Sportiche (1995) that the movement approach and the base-generated approach receive a unifying view. Taking into consideration that indeed the two typologies of constructions (doubling constructions and non-doubling ones) are available in natural language, Sportiche proposes that clitics are base-generated as separate projections and that they eventually move to reach their final surfacing position. Sportiche starts his analysis from two basic assumptions. The first (which departs from the base-generated assumption that no movement is involved for clitics) is that clitic constructions do indeed involve movement. The second is that movement in any case does not mean movement of the clitic self (as postulated from the movement approach). Sportiche's main proposal is as follows:

...(1) all clitics are always base-generated in preexisting slots namely as X^0 heading their own projection and (2) clitic construction may also involve movement. Illustrating the basic idea with (1) [Marie les_i aura présentés XP_i à Louis] I suggest that the accusative clitic is a base-generated head call it Acc, selecting as its specifier an accusative DP^* . This selection must be satisfied by LF by moving DP^* to [spec, $AccP$]= DP^* as an instance of Spec/head licensing:

[$AccDP^*$ [[Acc les [...aura présentés DP^*_{+acc} ...]]] (Sportiche, 1995, p4).

Specifically, Sportiche's proposal assumes Clitic Voices. For every (non-reflexive) clitic (nominative, accusative, dative, locative) a Clitic Voice is represented in the syntactic structure. Let us call HP a generic Clitic Voice. Being H (the clitic) the head of HP and XP^* the relevant argument position associated with the clitic, HP^* needs to move to Spec HP (XP^*) in a

¹⁴ When Verb Adjunction does not apply, Clitic Gliding cannot take place. Moreover, Rivas assumes that Clitic Gliding is a quasi-obligatory rule. In the light of this definition we interpret Rivas's quasi-obligatoriness as optionality.

Spec/Head configuration. This movement is necessary to sanction agreement (in case, number and gender) between Cl and XP*. This agreement relationship is stated by the Clitic Criterion which states that at LF a clitic must be in a Spec-head relationship with a [+F]XP.¹⁵ This has to be reciprocal, i.e. an XP must be in a Spec/head relationship with a clitic. The Clitic Criterion must always be satisfied. Furthermore, Sportiche states some rules of clitic construction which he names clitic construction parameters:

- (21) Clitic construction parameters (Sportiche, 1995)
- a. Movement of XP* to XP^ occurs overtly or covertly¹⁶.
 - b. H is overt or covert
 - c. XP* is overt or covert

Via the Clitic criterion and the Clitic construction parameters Sportiche accounts for doubling structures and non-doubling structures. Whenever an XP* is overt, H is overt and there is covert movement to Spec HP; this gives rise to doubling structures. Whenever XP* is covert, and H is overt (movement of XP* to XP^ can be overt or covert; nevertheless, the Clitic Criterion has to be satisfied) the result is a typical sentence containing only a clitic. After XP* moves to XP^ what remains is analyzed as pro. XP* will receive a correct identification after it has moved to XP^.¹⁷

2.3 The Italian clitic system

2.3.1 Classification

Italian has a rich clitic system. First of all, clitics have a different phonological form to strong pronouns. In Italian it is therefore possible to distinguish a strong pronoun from a clitic pronoun. Moreover, clitics are specified for gender, number and person. Furthermore, they bear case features, i.e. they can be in the accusative or dative case; that is, they refer to a direct or indirect object. Accusative and dative clitics are homophonous to each other. Only in the third singular and plural person do they take a different form. Apart from clitics which refer to a direct or indirect object, Italian has more clitic categories, such as reflexive, partitive and locative clitics.

¹⁵ With [+F] is meant the group of features embedded in XP, i.e. case, gender and number.

¹⁶ With overt movement Sportiche assumes 'syntactic movement', i.e. phonologically realized.

¹⁷ Sportiche does not consider necessary to identify XP* as PRO. PRO would need a proper antecedent to be identified.

Table 3 gives an overview of the Italian clitic system.

Table 3: The Italian clitic system

	1st Sing.	2nd Sing.	3rd Sing.	1st Plur.	2nd Plur.	3rd Plur.
Accusative	Mi	Ti	Lo (masc.) La (fem.)	Ci	Vi	Li (masc.) Le (fem.)
Dative	Mi	Ti	Gli (masc.) Le (fem.)	Ci	Vi	Gli ¹⁸
Reflexive	Mi	Ti	Si	Ci	Vi	Si
Partitive				Ne		
Locative				Ci/vi		

2.3.2 The position of clitics in the clause

One fundamental characteristic of clitics is that they always need a host, which is usually the verb. Italian clitics can take different positions in the clause, depending on the clause structure and on the status of the verb. It is possible to distinguish three different ‘scenarios’: firstly, in sentence constructions which require a finite verb, clitics are obligatorily placed to the left of the verb or when an auxiliary is present, to the left of the auxiliary, as in (22a) and (22b). The position of clitics before the finite verb or before the finite auxiliary is addressed as PROCLISIS. Secondly, in clauses which require a non-finite verb construction clitics must be placed to the right of the non-finite verb, as in (23a) and (23b). In this case the position of the clitic is addressed as being in the ENCLISIS position. Finally, in the case of an infinitive verb being governed by modals (i.e. *dovere* –must-, *potere* –can-, *volere* –want to-), causative or aspectual verbs (i.e. *cominciare*–to begin, *continuare*–to go on, *finire*–to finish-), clitics are optionally placed to the right of the verb complex (enclisis), or to the left of it. Examples are shown respectively in (24a) and (24b).¹⁹ When the clitic is placed before the verbal complex, this is conventionally called CLITIC CLIMBING. A special mention is required for the position of clitics in imperative sentences. For now, it is enough to mention that with an affirmative imperative sentence, the clitic obligatorily appears after the verb, as shown in (25a), whereas in a negative imperative sentence, the clitic can be placed before the verb, or after the verb, as shown in (25b) and (25c).²⁰

¹⁸ The plural dative pronoun ‘loro’ like in:

‘Gianni da *loro* il regalo’ (Gianni gives them the ball)

is not a clitic pronoun but has been analysed as weak pronoun (Cardinaletti, 1991).

¹⁹ I will further denote this last structure as a result of a restructuring rule conceptualized by Rizzi (1978).

I will speak more about it in a dedicated paragraph in this chapter.

²⁰ The topic of clitics within imperative sentences will be treated extensively in chapter six.

(22)

- a. Marco lo compra
Marco it buys
'Marco buys it'

- b. Marco lo ha comperato
Marco it has bought
'Marco bought it'

(23)

- a. Marco promette di mangiarlo
Marco promised to eat it
'Marco promised to eat it'

- b. Vederla sarebbe stato bello
To see her would have been nice

(24)

- a. Marco deve mangiarlo
Marco must eat it

- b. Marco lo deve mangiare
Marco it must eat
'Marco must eat it'

(25)

- a. Cantala!
Sing it!

- b. Non la cantare!
Not it sing!
'Do not sing it!'

- c. Non cantarla!

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Not sing it!

‘Do not sing it!’

The following table exemplifies, for all the typologies of clitics, all the possible positions in which they can occur, depending on the different characteristics of the verb or of the sentence structure.

Table 4: Exemplification of clitic position in respect to verb types.

Direct object clitics		
Verb types	Full NP	Clitic
Finite	Maria mangia la mela	Maria <i>la</i> mangia
Composed	Maria ha mangiato la mela	Maria <i>la</i> ha mangiata
Imperative	Mangia la mela!	Mangiala!
Restructuring	Maria vuole mangiare la mela	Maria (<i>la</i>) vuole mangiar(<i>la</i>)
Non-finite	Vedo Maria mangiare la mela	Vedo Maria mangiar <i>la</i>
Indirect Object clitics		
Verb types	Full PP	Clitic
Finite	Maria scrive una lettera a Gianni	Maria <i>gli</i> scrive una lettera
Composed	Maria ha scritto una lettera a Gianni	Maria <i>gli</i> ha scritto una lettera
Imperative	Scrivi una lettera a Gianni!	Scriv <i>gli</i> una lettera!
Restructuring	Maria vuole scrivere la lettera a Gianni	Maria (<i>gli</i>) vuole scriver(<i>gli</i>) la lettera
Non-finite	Vedo Maria scrivere una lettera a Gianni	Vedo Maria scriver <i>gli</i> una lettera
Reflexive clitics		
Verb types	Strong pronoun	Clitic
Finite	Tu guardi te stessa	Tu <i>ti</i> guardi
Composed	Tu hai guardato te stessa	Tu <i>ti</i> sei guardata
Imperative	Guarda te stessa!	Guardat <i>i</i> !
Restructuring	Maria vuole guardare se stessa	Maria (<i>si</i>) vuole guardar(<i>si</i>)
Non-finite	Vedo Maria guardare se stessa	Vedo Maria guardar <i>si</i>
Partitive clitics		
Verb types	Full NP	Clitic
Finite	Mangio del pane	<i>Ne</i> mangio
Composed	Ho mangiato del pane	<i>Ne</i> ho mangiato
Imperative	Mangia del pane!	Mangian <i>e</i> !
Restructuring	Maria vuole mangiare del pane	Maria (<i>ne</i>) vuole mangiar(<i>ne</i>)
Non-finite	Vedo Maria mangiare del pane	Vedo Maria mangiar <i>ne</i>
Locative clitics		
Verb types	Full NP	Clitic
Finite	Vado a Roma	<i>Ci</i> vado
Composed	Sono andata a Roma	(Io) <i>ci</i> sono andata
Imperative	Vai a Roma!	Vacc <i>i</i> !
Restructuring	Maria vuole andare a Roma	Maria (<i>ci</i>) vuole andar(<i>ci</i>)
Non-finite	Vedo Maria andare a Roma	Vedo Maria andar <i>ci</i>

2.3.3 Clitic movement in Italian: *proclisis* and *enclisis*

As described in the previous sections, clitics often take a position in the clause other than the canonical complement positions. This statement is theoretically grounded in the notion of clitic movement within the derivational approach. Kayne (1991) assumes that clitics are introduced in postverbal positions, as well as lexically specified complements. They are eventually ‘cliticized’ by a movement transformation rule called Cl-Pl (Clitic Placement). Kayne’s original analysis of the French clitic system is confirmed by Rizzi (1982) for Italian. An example of clitic movement in a sentence with a finite verb is shown in (27). In (26), the direct object ‘la mela’ (the apple) is lexically specified whereas in (27) the complement is expressed by the clitic particle ‘la’ (inflected for gender and number). In this case the clitic is obligatorily moved before the finite verb.

(26) Marco mangia la mela
 Marco_(NP subj.) eats_{+fin} the apple_(NP obj.)
 ‘Marco eats the apple’

(27) Marco la mangia
 Marco it_{clitic obj. 3rd Sing.Fem} eats_{+fin}
 ‘Marco eats it’

Having as a background the general idea that clitics move, there are some basic questions that arise. The first regards the reason why they move, and what exactly triggers their movement. The second question regards their landing position. Furthermore, the type of movement should be explained. In order to answer these questions Belletti’s analysis of clitic movement (1999) will be assumed. In line with the Kaynian approach, Belletti assumes that clitics are part of an impoverished structure called DP, which is headed by the clitic itself. In a D-structure DP appears after VP. The first assumption in Belletti’s proposal is that clitic movement is triggered by feature checking. Specifically, clitics move because they have to check their case features. In languages such as Italian (subject-object languages) the nominative case is overtly checked in the specifier position of the AgrSP. The accusative case is checked in a lower position, i.e. in AgrOP. The relationship can also be described in terms of the strength of features: simplifying the theory, the nominative case has a strong feature to check, therefore it shows syntactic (overt) movement. The accusative case, on the other hand, does not contain strong features to be checked, therefore it is covertly checked at LF (Lexical Form). A clear example to show that

elements bearing the accusative case cannot overtly move is an ill-formed sentence such as (28), where the object 'il cane' (the dog) cannot overtly move between the auxiliary and the past participle.

(28)

*Maria ha il cane visto
Maria has the dog seen
'Maria saw the dog'

Nevertheless, per definition, object clitics bear strong case features; therefore, they obviously have to move to a proper projection to check them. Belletti assumes that this projection is represented by AgrO; although AgrO per se does not contain strong case features, it can nevertheless be the target of a syntactic movement. Furthermore, following Kayne's analysis (1991), Belletti assumes that clitic movement is a local and mixed movement. First, it has to be local because a clitic particle cannot be extracted from the clause it belongs to, as shown in (29).

(29)

*Lo penso che vedrò
Him I think I will see
'I think I will see him'

Furthermore, clitic movement is a mixed movement because it is composed by a movement as a maximal projection (as a first step) and subsequently by a proper Head movement to the designated functional projection (T°) together with the verb via case checking in AgrO $^{\circ}$. This double movement can be seen in the derivation for sentences with a past participle. Indeed, in Italian, whenever a clitic is present in a sentence together with a past participle, the clitic has to agree with the past participle's features. In (30b) the clitic correctly agrees with the past participle (masculine plural), whereas in (30c) the sentence is grammatically incorrect: clitic and past participle do not share the same features.

(30)

a. Marco ha letto i giornali
Marco read the newspapers

- b. Marco li ha letti
Marco them_{3rdplur} has read_{3rdplur}
'Marco read them'
- c. *Marco lo ha letti
*Marco it_{3rdsing} has read_{3rdplur}
'Marco read it'

The fact that the clitic agrees in the morphological features with the past participle can be taken as a sign that the clitic first enters a Spec/Head relationship with the AgrPstPrtP projection (therefore showing the existence of the first type of movement that the clitic performs). Belletti assumes that at this point the clitic moves as a head to AgrO. Nevertheless, it is a fact that in the final structure clitics appear before the finite verb or before the finite auxiliary. The verb is supposed to move to a higher projection, i.e. TP for Italian, where its features are checked, and the clitic appears linearly before it. According to Belletti's analysis, AgrO is not a strong case projection, but it indeed hosts a clitic with strong case features. Therefore, material which has strong features that need to be interpreted at PF cannot stay in projections which do not allow it. Therefore, AgrO must be voided prior to PF. At this point the clitic has to leave AgrOP and needs to incorporate itself with the verb. Belletti assumes that this can happen in two ways. The first one, with the verb moving through the head of AgrO taking the clitic with it to its way to AgrS. This could create some problems because the intervening clitic between V and T would block the correct checking of the verbal morphology. The second possibility is therefore to allow the verb to move directly to T and AgrS to properly check its features. Anyhow, per definition, clitics have strong features to check and unchecked strong features cannot be interpreted at PF (Chomsky, 1993). Therefore, at this point in the derivation, clitics incorporate to the verb via left-adjunction to be able to be interpreted at PF. This derivation definitely leads to proclisis. Belletti's analysis gives a clear explanation for the derivation of proclisis, i.e. when the clitic appears before a finite verb or before a finite auxiliary (in the case of complex tenses). As introduced before, in sentences with non-finite verbs the clitic position is post-verbal. Belletti proposes an analysis for this derivation as well. The basic assumption is the existence of a functional head called Inf, where infinitival verb morphology can be checked. This functional head is supposed to be quite low in the structure, and specifically it is supposed to be under AgrO. Assuming that the clitic is already filling the AgrO position and assuming that the infinitival verb has already checked its features in Inf, the verb can now freely pass through

AgrO (differently than what happens for the proclisis derivation) taking the clitic with it to complete the rest of the movement to AgrS. This derivation leads to enclisis, i.e. the clitic appears after the verb.

2.4 Restructuring

Consider the following examples:

(31)

a. Clara deve leggere il libro

Clara must read the book

b. Clara *lo* deve leggere

Clara it must read

‘Clara must read it’

c. Clara deve legger*lo*

Clara must read it

(32)

a. Clara ha dovuto leggere il libro

Clara has must read the book

‘Clara had to read the book’

b. Clara *lo* ha dovuto leggere

Clara it has must read

‘Clara had to read it’

c. Clara ha dovuto legger*lo*

Clara has must read it

‘Clara had to read it’

In Italian, the position of the pronominal clitic expressed in (31b), (31c), and in (32b), (32c), are both equally possible. Rizzi (1978; 1982) proposes a restructuring rule for Italian, which can

account for this double available position of the pronominal clitic.²¹ The following lines cite the description of ‘Restructuring’ as originally formulated by Rizzi (1978):

...I will argue for the existence of a restructuring rule in Italian syntax, that is, a rule that changes the structure of a phrase marker without affecting its terminal string...This rule...optionally transforms an underlying bisentential structure into a simple sentence, creating a unique verbal complex consisting of the main and the embedded verb.

In other words RESTRUCTURING combines two distinct verbs creating a single verbal complex. Restructuring does not apply to all verb categories, but it applies with certain ones, i.e. modal verbs (‘dovere’ to must; ‘potere’ to can; ‘volere’ to want), aspectual verbs (‘cominciare’ to begin; ‘finire’ to finish), and motion verbs (‘correre’ to run; ‘venire’ to come). If Restructuring applies, the two verbs are reanalyzed as one single verbal complex, allowing the other rules of clitic placement to be applied, i.e. the clitic can be placed before the verbal complex. On the contrary, if restructuring does not apply, the two verbs do not unite in a verbal structure and the only clitic placement rule which can apply would allow only enclisis, as in (31c). A clitic placement rule would not allow a clitic pronoun to precede an infinitival verb, leading to ungrammaticality, as exemplified in (33).

- (33) *Clara deve *lo* leggere
Clara must it read
‘Clara must read it’

Restructuring appears to be a necessary condition for clitic climbing to apply. If restructuring does not apply, clitic climbing cannot apply either.

In a later view these types of sentences have been analysed by Cardinaletti and Shlonsky (2004) and by Cinque (2004) tackling as the difference between the two verbs. According to these authors, the higher verb has to be considered a functional verb, while the lower one is considered as a lexical one. At this point, according to Cardinaletti and Shlonsky, clitics can appear either on the infinitival verb or in the functional domain of the higher verb. Moreover, Cardinaletti and

²¹ With restructuring, Rizzi accounts for a series of linguistic phenomena that we will not address in this thesis. We will focus on the relation between restructuring and clitic placement.

Shlonsky show that a clitic can be associated with the infinitival verb and yet the clause can be restructured. If this is the case, the fact that restructuring applies does not necessarily mean that the clitic has to climb over the first lexical verb.

2.4.1 On the availability of two positions in a restructuring context

As mentioned, standard Italian permits two positions for the clitic in restructuring contexts, i.e. the climbed position (before the verbal complex), or the enclisis position (after the non-finite verb). Similar to Italian, other Romance languages such as Spanish and Catalan, exhibit these two possibilities, whereas modern French only allows one construction, i.e. ‘je veux le manger’.

The reason why Italian can exhibit two positions for the clitic goes beyond the goal of this thesis. Nevertheless, a relevant topic here is the difference in the use of these two possibilities in modern Italian. Despite the scarcity of studies on this topic, it is generally assumed that the position of the clitic is related to idiolectic and regional variations. Benincá (1986) reports a summary of what can be evinced from various sources about the position of the clitic in ‘restructuring’ contexts. According to this report (which is the generally assumed picture), Italy can be divided into three macro regions. In the northern part of Italy (the Friulian region, Lombardy and Piedmont) it seems that the preferred (almost obligatory) position for the clitic is in enclisis. In other words, in the northern varieties of Italian, restructuring does not seem to apply, and as a consequence clitics cannot appear in the climbed position. In central Italy the choice seems to be more open, therefore allowing for both clitic positions, i.e. before or after the verbal complex. At the other extremity of the continuum there are the southernmost regions of Italy (Calabria, and in some parts of Apulia), where restructuring seems obligatory, letting the clitic always be produced in the climbed position. Despite the fact that the clitic position in restructuring sentences is influenced by idiolectic variations, both possibilities are grammatical. If relatively little is known about the position of clitics in restructuring contexts from a synchronic viewpoint, even less is known about this topic from a diachronic perspective. In ‘Grammatica dell’italiano antico’ (Grammar of ancient Italian: in preparation), the position of the clitic in restructuring contexts seems to be dual once again: both positions of the clitic are similarly represented in ancient Italian.²²

²² We received personal confirmation from this equality by the author of that specific chapter. We thank Anna Cardinaletti for the source, and for the personal communication.

2.5 Working assumptions

As a general theoretical framework related to clitics, this thesis will assume the movement approach as defined by Kayne (1975; 1991) and Rizzi (1978), which postulates that clitics are base generated in the same position of fully specified complements and they are eventually moved to the preverbal position in case the verb is finite by a Cl-PI rule. Specifically, this work will assume Belletti's account of clitic movement. Clitic movement is triggered by case checking, and it is assumed to be a two-step movement; first, as a movement to a maximal projection, and with a head-movement as the second step. The derivation of procliticization can be summarized as an instance of a double step movement with a movement as left-adjunction of the clitic on the verb, because of the impossibility of the finite verb to pass through AgrO, leading therefore to a clitic-verb order. Enclisis, instead, can be summarized as a double step movement, where the verb can freely pass through AgrO and can therefore take the clitic on its way to AgrS, leading to a verb-clitic order. In case a modal, aspectual or motion verb appears together with another lexical verb, it will be assumed that Restructuring in terms of Rizzi (1978), is a prerequisite in order for the clitic to appear before the first lexical verb available. In other words, we assume Restructuring as a prerequisite for clitic climbing.

CHAPTER 3

PREVIOUS STUDIES ON CLITIC PRODUCTION AND MAIN RESEARCH QUESTIONS

The goal of this chapter is to give an overview of previous studies which looked at pronominal clitics in language acquisition and studies which dealt with pronominal clitics in aphasia. Moreover, the main research question on which this thesis is based will be outlined.

3.1 Previous studies

3.1.1 Acquisition of clitics in Italian

The acquisition of clitics in Italian has been investigated by several authors. Antelmi (1997) investigated the development of several grammatical categories in the language of an Italian child, C., and she specifically deals with the development of pronominal clitics. Antelmi's research shows that the first instances of clitic productions in C. occur at around 22 months. At this stage all clitics appear as enclitics. Antelmi suggests that this can be a sign that children do not perceive clitics as separable elements from the verb. Another interesting point shown by this study is the preference to produce full NPs instead of the clitic counterpart until around the age of 27 months. After this age the tendency is inverted, in that children begin to use pronominal clitics more frequently than full NPs. Clitic omissions are observed as well, but they constantly diminish, until the point at which they disappear. Most interestingly, when restructuring sentences begin to be produced, two particularities can be observed. The first one is that in restructuring sentences clitics are produced less frequently and substituted more frequently with a full NP than in sentences with a simple verb construction. Secondly, when clitics are produced they are always in the enclisis position, and never in a climbed position.²³ Antelmi explains this by saying that children show a difficulty with climbing clitics before the verbal complex. Guasti (1994) investigated the language development of three Italian children, M., D. and G. In her study, the development of finite and non-finite verbs is predominantly analysed, but the

²³ This is particularly interesting given that the pattern of enclisis was different from the usual position in which clitics were produced in the specific area (the Florence region) where the children were coming from.

production of pronominal clitics is described as well. Her data set shows that in the early development of all three children, the majority of productions are represented by the use of full nouns where a clitic could be produced instead, and omissions of clitics in required contexts (until around 27 months). After that age the number of omissions is decreasing and clitics begin to appear more frequently. Moreover, Guasti shows that the presence of a clitic before a verbal complex, i.e. in the climbed position, only appears later on, at around 31 months. Guasti gives a linguistic explanation of the general difficulty in clitic production by saying that this reflects a difficulty in creating an A-chain, which constitutes the first step of clitic movement. Moreover, she explains clitic climbing as a movement operation that has to occur in two steps (versus the one occurring with simple verbs in one step), and this is the reason why clitic climbing is more difficult. Another interesting study from Bottari, Cipriani, Chilosi & Pfanner (2001) compares, using spontaneous speech analysis, the linguistic development of two Italian children with no history of language development problems; one is an aphasic child and 11 children diagnosed with SLI. The results show that children who are developing normally omit determiners and clitics at an early stage, but that these omissions decrease in the course of development. For children who are developing normally there was no difference in the omission rate between determiners and clitics. The aphasic child also presented omissions of determiners and of pronominal clitics, but in this child clitics were significantly more frequently omitted than determiners. SLI children omitted both determiners and clitics, determiners being significantly more often omitted than pronominal clitics.

All these studies present common observations. The first one is that pronominal clitics are acquired in a later stage of development, and that in early stages of language acquisition they are omitted or substituted by full NPs. Moreover, the first two studies show that when linguistic structures arise, which permit clitic climbing to appear, children produce clitics in the enclisis position.

3.1.2 Clitic production in agrammatism

There are very few studies that specifically deal with the analysis of clitic production in Italian agrammatic aphasia. So far, there are no studies with an experimental setting specifically designed to test clitic production in Italian agrammatism. In the literature three main studies have been found which analyse clitic production in the spontaneous speech of Italian non-fluent aphasic speakers. This work will report the results of these studies, as well as some other interesting studies, which nevertheless do not have Italian as the target language.

The first study is by Lonzi & Luzzatti (1993). In this study the goal of the authors is to check the

adverb distribution relevant to verb production. Nevertheless, some data about clitic production in spontaneous speech is presented. The three agrammatic speakers tested by these authors all present a typical agrammatic speech with omissions of pronominal clitics. The second study which deals with Italian aphasic spontaneous speech, and which looks at the production of clitics, is the study by Miceli, Silveri, Romani and Caramazza (1989). The third one is by Miceli and Mazzucchi (1990). In the first study the spontaneous speech of twenty agrammatic patients was analysed. The major outcomes were that the performance among participants varied with respect to the number of clitics produced. The error analysis revealed that the two typologies of errors were represented by omissions and/or substitutions of the clitic. Unfortunately, this study takes the data about clitics as a whole and it does not subdivide among types of clitics. Another drawback of this study is the absence of a control group. In the second study the results repeat the same pattern as those in the first. A very important contribution in the analysis of clitic pronouns in agrammatism comes from the work of Chinellato (2004) who shows that agrammatic speakers are heavily impaired in the production of both subject and object clitic pronouns in Venetian dialect. Both clitic types were always omitted by the agrammatic speakers. Looking at the studies which deal with other languages, one recent interesting report is that by Reznik, Dubrovsky and Maldonado (1995) which specifically looks at the production of clitics in the spontaneous speech of one Spanish agrammatic speaker. Firstly, it is particularly interesting because of the similarity in the clitic system between Italian and Spanish, and secondly, because it differentiates among different clitic types. The results from this study show that the aphasic speaker is impaired in the production of clitics, and that omissions prevail over substitutions. The authors perform a separate analysis for reflexive and personal clitics (personal clitics are typical in Spanish), but they do not have a separate analysis for the other types of clitics. Nevertheless, this study is the one which most explicitly focuses on the production of clitics in aphasic spontaneous speech. Another recent study by Stavrakaki & Kouvava (2003) investigates by analysis of their spontaneous speech the use of functional categories (among which is the clitic category) in two aphasic speakers of Greek. The results showed that object clitics were impaired (especially the third person clitic pronoun) in both aphasic speakers, and that the major type of error was that of clitic omissions.

3.2 Main research question

Clitics are complex grammatical elements as described in the theoretical linguistic literature, and in studies on language acquisition and aphasiological studies. From studies on language acquisition clitics have been reported to develop later than other grammatical elements. Studies

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from aphasia (although there are few) conclude that clitics are significantly impaired in agrammatic speech. These results converge in showing that clitics are indeed complex linguistic elements to process. What is still missing in the literature (at least for aphasiology) is a comprehensive account for clitic impairment. In other words, even though some data is described, a coherent explanation for the cause of the observed deficit is still missing.

The principal goal of this thesis is to study clitic production in agrammatic speech and more importantly to interpret the results to give an account of the underlying cause for (an eventual) clitic impairment in agrammatic speech. In doing this, the main linguistic theories dealing with clitics and the neurolinguistic theories (outlined in the previous chapters) dealing with agrammatism will be tested.

The following chapters will present a series of experiments designed to reach this goal. Chapter 4 will present the data on clitic production in spontaneous speech. Chapters 5 and 6 will present several experiments dedicated to clitic production in different sentence structures. Finally, chapter 7 will compare the results from chapters 5 and 6.

CHAPTER 4

CLITIC PRODUCTION IN SPONTANEOUS SPEECH

The goal of this chapter is to analyse the production of clitics in a corpus of spontaneous speech of seven agrammatic speakers and ten healthy controls. The corpus was collected by means of three tasks: a semi-structured interview including the questions from the Italian version of the Aachener Aphasia Test (AAT; Luzzatti, Willmes & De Bleser 1994), the description of the 'Cookie theft picture', taken from the Boston Diagnostic Aphasia Examination Test (BDAE; Goodglass & Kaplan, 1972), and the storytelling of the fairytale 'Little Red Riding Hood'. All the collected material was orthographically transcribed and subsequently divided into sentences, which served as units of analysis. The production of clitics was analyzed for both groups along various parameters. Data will be illustrated and results will be discussed.

4.1 Spontaneous speech analysis

Among the neuropsychological higher functions, language is the one which characterizes human beings. People constantly use their language abilities to communicate and exchange information. Brain damage in the language areas can alter these abilities at several levels. Many tests and experiments have been designed to disclose and interpret language impairments within specific modules of language (phonetic/phonology, morphology and syntax) and of specific elements within these modules. Spontaneous speech production is the first, most direct evidential fact that allows the gaining of information about the level and type of language impairment, abstracting from any test design. Eliciting spontaneous speech has the advantage of resembling a natural communication exchange (even if, as in every test set-up, some constraints still need to be applied) and it is the easiest possible testing procedure that can be applied immediately. Moreover, the analysis of spontaneous speech allows examination of all the linguistic parameters of interest (in this case, for example, clitics, or their position) which are naturally linked to other grammatical structures within a unit of speech. In other words, the analysis of spontaneous speech permits not only the analysis of the ways in which a specific grammatical element or structure are impaired, but more importantly, the analysis of them in relation to the other elements to which they are related.

4.1.2 Two models for speech production analysis

Two main sources were taken into consideration as a reference for how to transcribe and analyse the spontaneous speech collected for the experiment presented in this chapter. The first is represented by Menn & Obler's (1990) book which analyses agrammatic spontaneous speech in several languages, including Italian. The second is the study by Saffran, Berndt and Schwartz (1989) which gives some procedural guidelines for the quantitative analysis of spontaneous speech production in agrammatism. Menn and Obler's reference is important because of the specific chapter dedicated to Italian (Miceli & Mazzucchi, 1990). The study by Saffran et al., although it does not deal with Italian, gives specific guidelines on how to define and separate a clause within spontaneous speech. It is now worth giving a clearer outline of the two studies mentioned, highlighting the points which will be of major interest in the following paragraphs, such as the size of the sample, the characteristics of the transcripts, and the methodology followed to separate the spontaneous speech flow into suitable units of analysis.

In Menn & Obler's analysis, the size of the collected samples of spontaneous speech used by the authors is 250 words. Every spontaneous speech sample is transcribed using two types of transcriptions: a primary transcription and an interlinear morphemic translation. The first one is used to analyse general speech indexes such as speech rate, fluency and intonation patterns. To reach this goal, the transcript is tagged with different punctuation conventions. For example, three consecutive dots (...) signal a pause longer than two seconds, and a semi-colon (;) or a slash (/) signal falling intonation, in the absence of sentential punctuation marks. Moreover, in the primary transcription the speech flow is divided into 'syntactically-continuous phrases'. The boundaries of these phrases are principally settled when a) a pause of at least two seconds is noted, b) when there is a falling intonation pitch, c) by the omission of a major lexical word, and d) when the sentence is clearly finished. The primary transcription can be seen, therefore, as a first general analysis at the discourse level, where the parameters pertaining to speech at a sentence-level are encoded. The interlinear morphemic translation, on the other hand, is a revision of the actual primary transcription with the aim of making it more transparent for the reader. All the sentences abstracted from the primary translation are, therefore, written in columns, one by one, in a numerical order, and all the grammatical elements of the sentences are labelled. In the interlinear translation even the omitted elements in the sentence are provided in squared brackets, i.e. []. This translation therefore makes the grammatical structure of a sentence explicit and labels all grammatical elements in the clause. The major advantage of this second type of transcript is to highlight, sentence by sentence, the error patterns for each aphasic speaker, facilitating the interpretation of the various but subtle differences among them.

The other source used as a reference is the article by Saffran et al. The authors make use of a speech sample of 150 words (+ or – 10). Saffran et al. only use one transcript which is purified from some elements such as starters (then, ok, so), direct responses to the specific questions of the experimenter, direct speech and conjunctions (only in case they unite utterances which will be scored as separate sentences). Pauses and their exact duration in seconds are marked within the transcript, and prosodic contours are clearly signalled by means of upward-sloping lines to mark ascending intonation, downward-sloping lines to indicate falling pitch intonation, and straight lines to indicate no change in intonation. Regarding the division of the spontaneous speech into utterances, Saffran et al. apply four criteria. The syntactic indicator, the prosodic indicator, the analysis of pauses and the semantic indicator. The syntactic indicator is the first one that needs to be followed. It states that a grammatically well-formed sentence should be taken as an utterance. The second criterion is the prosodic indicator, which says that falling intonation suggests the end of an utterance. Moreover, long pauses may help to determine the end of an utterance, except in specific cases, where the patient systematically produces them. The last criterion is the semantic one, i.e. a semantically well-formed utterance has to be considered as a unit. According to the authors, when these four criteria are followed, spontaneous speech can be divided into utterances which are then classified as sentences if they further correspond to the following three typologies: Noun + Main verb, Noun + Copula + Adjective, and Noun + Copula + NP. All the other sentence typologies, i.e. those which do not meet these three criteria, are defined and marked by the authors as ‘topic-comment structures’. Topic-comment structures will enter the analysis as such, meaning that they will be analyzed separately from the well-structured sentences. Regarding connected sentences, Saffran et al. state briefly (without any further specification) that embedded sentences do not count as separate sentences.

For the present experiment the general guidelines proposed by these two studies have been followed, specifically adapting them for Italian. In the following paragraphs the research questions and the methodology used are presented.

4.2 Research questions and hypotheses

The main objective for this chapter is to describe and analyse the production of clitics in the spontaneous speech of seven Italian agrammatic speakers and to compare it to that of ten Italian non-brain-damaged speakers both from a quantitative and qualitative viewpoint. Given that spontaneous speech analysis does not allow the specific testing of any grammatical structure, this study presents itself with the characteristics of an exploratory overview on clitic production in

the two populations of interest. It will be possible, therefore, to state some general research questions and some expectations, but no specific hypotheses linked to a research design will be specified yet.

The first research question regards the production of pronominal clitics from a quantitative perspective, that is, whether there is a difference in the number of clitics produced between the two groups. Our expectation is that agrammatic speakers will produce overall fewer clitics than non-brain-damaged speakers as a reflection of the fact that clitics are complex grammatical elements to be processed. As far as the error pattern goes, it is expected that clitics will be omitted in sentences where they will be required. If this clitic production and error pattern should be observed in the data, it could be interpreted by supposing a deficit at the phonological, morphological or syntactic level. If the underlying deficit is phonological in nature, in the terms proposed by Kean (1977), a diminished number of produced clitics and a large number of omissions can be expected. The same outcome is expected if the underlying impairment is syntactic in nature. Finally, if a morphological deficit is the underlying cause for a deficit in clitic production, some errors would be expected at the morphological level.

In chapter 2 the Italian clitic system was described as having six types of clitics: direct object clitics, indirect object, reflexive, partitive, locative and impersonal clitics. The second research question asks whether there will be any difference in the number of clitics produced among the different types. A quantitative analysis of clitic types will be performed and results will be compared within and between the groups. The production pattern and the eventual differences between and within the groups will be interpreted in terms of possible underlying deficits affecting clitic production in agrammatism. The third research question regards the position of produced clitics, i.e. whether produced clitics will be correctly placed according to the hosting verb type, or according to the sentence structure. On the one hand, we expect that once agrammatic speakers produce clitics in sentences where the position of clitic is only possible in one position, i.e. in sentences containing a finite verb or a finite auxiliary, they will always be produced in a correct position, as a reflection of the correct cliticisation process. The same hypothesis holds for utterances with non-finite verbs which require clitics to be placed in the enclisis position. On the other hand, in the case of sentences which allow an optional clitic position to be produced, i.e. restructuring sentences or negative imperative sentences, no predictions can be made yet.

4.3 Methods

4.3.1 Participants

The analysis of clitic production presented in this chapter is based on the spontaneous speech material collected from nine Italian agrammatic speakers (eight males and one female. The age in years ranges from 25-72, with a mean of 52), and ten Italian non-brain-damaged speakers (three males and seven females. The age in years ranges from 28-68, with a mean of 42). All agrammatic speakers were recruited in two Italian rehabilitation centres in the north-eastern part of Italy.²⁴ Two agrammatic speakers had to be excluded from the data set given that one participant was only speaking in Venetian dialect and therefore his speech production would not have been comparable, and the other participant had to be excluded because his speech impairment prevented him from producing utterances longer than one word. All ten non-brain-damaged speakers were volunteers. Five of them were recruited from the same Italian area as the patients. The other five originally came from other cities in central Italy. None of them suffered from any previous brain damage or any major illness. All participants (agrammatic speakers and non-brain-damaged speakers) were right-handed. The general data about all participants is presented in Table 5. The neurological and linguistic characteristics of each agrammatic speaker are shown in Table 6. All agrammatic speakers were aphasic due to a single brain damage. Six participants, A2-A7, suffered a cerebral vascular accident (henceforth CVA) in the left hemisphere. One participant (A1) suffered brain trauma in the left hemisphere as a result of a motorbike accident. All patients were at least 12 months post-onset. For the linguistic diagnosis the Italian version of the Aachen Aphasia Test (Luzzatti et al. 1994), and the diagnosis of neuropsychologists and of speech therapists, were taken into consideration. Four agrammatic speakers (A1, A3, A4 and A6) were diagnosed as having Broca aphasia with agrammatism, one aphasic speaker (A5) was judged as a Broca aphasic, showing some characteristics of anomia, and two aphasic speakers (A2 and A7) were diagnosed as Broca aphasics with agrammatism showing a typical telegraphic speech. For all of them the degree of their aphasia was required to be moderate in order to allow speech production at least at the sentence level.

²⁴Medical Center Don Calabria (Verona); IRCSS S. Camillo Hospital (Venice).

Table 5: Participants. Generalities

Group	Participants	Age	Gender	Handedness	Region of origin
Non-brain-damaged speakers	C1	30	Male	Right-handed	North-Western Italy
	C2	30	Male	Right-handed	Central Italy
	C3	28	Female	Right-handed	North-Western Italy
	C4	62	Female	Right-handed	North-Eastern Italy
	C5	33	Female	Right-handed	Central Italy
	C6	34	Female	Right-handed	Central Italy
	C7	68	Male	Right-handed	North-Eastern Italy
	C8	35	Female	Right-handed	Central Italy
	C9	65	Female	Right-handed	North-Eastern Italy
	C10	32	Female	Right-handed	Central Italy
Agrammatic speakers	A1	72	Male	Right-handed	North-Eastern Italy
	A2	53	Male	Right-handed	North-Eastern Italy
	A3	25	Male	Right-handed	North-Eastern Italy
	A4	62	Male	Right-handed	North-Eastern Italy
	A5	34	Female	Right-handed	Central-North Italy
	A6	58	Male	Right-handed	North-Eastern Italy
	A7	53	Male	Right-handed	North-Eastern Italy

Table 6: Neurological and linguistic characteristics of agrammatic speakers

Participants	Years post-onset	Aetiology	Site lesion	Diagnosis
A1	3	CVA	Parietal left	Broca aphasia with agrammatism
A2	3	CVA	Parieto-Tempora left	Broca aphasia with agrammatism
A3	4	Brain trauma	Cortical subcortical left	Broca aphasia with agrammatism
A4	2	CVA	Fronto/parietal left	Broca aphasia with agrammatism
A5	8	CVA	Temporo/parietal left	Broca aphasia with agrammatism
A6	5	CVA	Frontal left	Broca aphasia with agrammatism
A7	2	CVA	Frontal left	Broca aphasia with agrammatism

4.3.2 Data Collection

All the spontaneous speech was taped with a digital recorder. The participant and the examiner would typically sit in front of each other in a quiet setting. Spontaneous speech was elicited by means of a semi-structured interview, which included the questions from the Italian Aachen Aphasia Test, and the description of the ‘Cookie theft picture’, from the Boston Diagnostic Aphasia Examination. Furthermore, the participants were asked to tell the fairytale of ‘Little Red

Riding Hood'. In order to help the participants recall the story, four illustrated drawings depicting the fairytale were shown.

4.3.3 Sample size

In the literature, there has been debate on which is the most suitable sample size to analyse spontaneous speech and yet there is no agreement on the topic. As previously mentioned, Menn and Opler use a sample of at least 250 words, whereas Saffran et al. make use of a speech sample of 150 words with a range of ten words. Moreover, Berndt, Haendiges, Mitchum & Sandson (1997) assume that a sample of at least 150 words is sufficient to analyze aphasic spontaneous speech. In contrast, Vermeulen, Bastiaanse & Van Wageningen (1989) and Bastiaanse & Jonkers (1998) suggest a sample of 300 words. Finally, Bird and Franklin (1996) used for their study all the spontaneous speech collected.

For the present work all the collected material has been used. The rationale behind this choice is twofold. First, by using all the collected material, the data set will be more representative than when a relatively small sample of varying length is used, which will be, in any case, an under-representation of the whole sample. Second, taking a random sample of spontaneous speech would prevent the analysis of spontaneous speech among the three types of elicitation material used in this study. When approaching the question of how large the sample of spontaneous speech should be this study was aware that by using all the collected spontaneous speech the sample sizes would vary among participants. By using suitable data transformation, and statistical analyses, the difference in sample sizes will be neutralized and, thus, the advantage of analysing all the collected material can be kept.

4.3.4 Transcription

All the collected spontaneous speech was orthographically transcribed in a normal text format which constitutes the first transcript. Both the questions and the comments of the examiner, as well as the answers of the participants, were transcribed, with a new paragraph denoting every conversational turn. Neologisms and/or phonological paraphasias were not transcribed phonetically. In this first transcript, intonation contours were marked throughout. Rising intonation was marked with ↑. Falling intonation was marked with ↓. No change in the intonation was signalled with →. The way intonation contours are marked in this work does not acknowledge the rich variety of intonation patterns described in the literature for Italian (Rossi, 1998); (Bertinetto & Magno Caldognetto, 1993); (Voghera, 1992); (Nespor & Vogel, 1986). However, marking intonation patterns revealed itself to be very important to determine sentence

boundaries within spontaneous speech, especially in the presence of ill-formed sentences or in the presence of connected or subordinate sentences. Finally, pauses longer than two seconds were marked using #.

Once all the spontaneous speech had been transcribed for both groups of participants, sentences were extracted from the first transcript. In order to optimize this procedure, all the spontaneous speech produced by the examiner was stripped out from the original transcript. As a second step, elliptical answers without a verb, or yes/no answers, were eliminated as well, as in the examples below.

Experimenter: Quanti figli ha?

How many children do you have?

Participant: Tre, due maschi e una femmina.

Three, two boys and one girl.

Experimenter: È sposato?

Are you married?

Participant: Sì

Yes

Starter words such as ‘allora’ (so), ‘vediamo’ (let’s see), and ‘ok’ were eliminated, as well as voiced starters with no meaning such as ‘mhhh’ or ‘ahh’. Repeated words or repetitions of sentence chunks were eliminated too. Consequently, the material was divided into single sentences which were transferred to a second transcript. Utterances were written in a serial order and numbered consecutively in a column. Two extra columns were then added. In the first, eventual errors were labelled, i.e. G=grammatical mistake, and S=semantic error. In the second, a specification and an explanation of the mistakes is provided. Omissions of verbs, or words which were identifiable in context, were provided between squared brackets, i.e. []. The words in brackets were added for purposes of clarity and they were not included in the analysis.

4.3.5 Sentence extraction

Four criteria were followed to extract sentences from the flow of spontaneous speech. These were the syntactic criterion, the prosodic criterion, the analysis of pauses (which will be called planning criterion) and the semantic indicator. These criteria were applied in the given order, but the presence of one criterion did not exclude the application of the others. Moreover, given that the language under analysis is Italian, these criteria were specifically adapted to it, taking into

consideration its syntactic and prosodic characteristics. The four criteria will be now described more in detail.

Syntactic criterion:

The first parameter that was taken into consideration was grammatical unity. A well-formed utterance was considered to be a grammatical unit and therefore a unit that could enter analysis.

Sentences with the following characteristics were considered as grammatical units:

Subject (or NP)+ inflected lexical verb

Carlo mangia

Carlo eats

Pro-drop subject + inflected lexical verb

Camminano

(They) walk

Subject + copula + (adjective or NP)

Carlo è pigro

Carlo is lazy

Fufi è un cane

Fufi is a dog

Pro-drop subject + copula + (adjective or NP)

È pigro

(He) is lazy

È un cane

(It) is a dog

Prosodic criterion:

Prosodic information was used as a second parameter to decide whether a sentence had to be considered a grammatical unit. Prosodic information revealed itself to be very important both for the interpretation of ill-formed sentences produced by agrammatic speakers, or in the case of connected speech, i.e. when sentences were linked to each other by grammatical connectors. It is

by now widely accepted that sentences have their specific intonation. Halliday (1970) proposes the existence of five sentential tones which are linked to special typologies of sentences (for these purposes We received personal confirmation from this equality by the author of that specific chapter only the first three will be taken into consideration): the falling tone, the rising tone and the flat tone. Bertinetto and Magno Caldognetto (1993) applied these tones to Italian. The falling tone is characterised by a falling pitch at the end of the utterance, especially in the vicinity of the last syllable and it is typical of declarative sentences. The ascending tone, on the contrary, shows a rising pitch in the final part of the utterance, which marks the typical intonation pattern of questions. Furthermore, in Italian the rising intonation in questions (at least for yes/no questions) is the only linguistic information which distinguishes them from declarative sentences, given their equality in the syntactic structure. The flat tone, on the contrary, does not show any particular modification in the pitch at the end of the sentence. It is quite a neutral tone and it is usually observed in suspended sentences, connected sentences or in hesitations and incomplete sentences. Canepari (1983) distinguishes among three fundamental tones in Italian: a conclusive tone, an interrogative tone and a suspensive tone. With the first, the speaker signals that the utterance is finished. With the second, the speaker conveys the information that she/he is posing a question and waits for an answer. The third type of tone is a medium one and signals that something will follow. Taking into consideration all this fundamental information, prosody needed to be taken into account for a clear understanding of when to consider an utterance terminated (or not) by the speaker. Nevertheless, a critical reader would remember that prosodic impairments are common in aphasia (Goodglass, 2001) and that eventual prosodic impairments would complicate if not prevent the use of prosody as an indicator for sentence boundaries. Two specifications need to be taken into account in this respect. The first is that among agrammatic speakers who participated in this study, none was reported to have major prosodic impairments. The second is that the decision about sentence boundaries was not only made on the basis of prosodic contours but also, as outlined previously, on the basis of the four major criteria employed together. In summary, following the theories on intonation patterns described in the literature for Italian, and having properly transcribed prosody throughout the transcripts for all participants, these criteria were followed: a clear falling pitch was considered to be supporting evidence for the end of an utterance, especially in combination with a pause. A rising intonation signalled a question, and a suspensive tone would signal the virtual continuation of an utterance.

Planning criterion:

Pauses can mark the end of a sentence and signal the change in conversational turns, and they

were used as a third criterion for sentence extraction. In this work pauses longer than two seconds are marked throughout the transcript using #. Another important function of the pause is as a marker for the end of sentences within the speech production of a single speaker. As pointed out by Bertinetto and Magno Caldognetto (1993), pauses within sentences can signal, together with the final falling pitch intonation, the boundaries of a sentence. Nespor and Vogel (1986) define the ‘intonational phrase’ (I) as the domain of an intonational contour. The end of an intonational phrase coincides with the position in which pauses may be introduced in the sentence. In the present study, pauses were an important contribution in determining sentence boundaries, especially in concomitance with a falling pitch. In summary, whenever a falling pitch and a pause were present, this was considered to signal the end of a sentence.

A decision that had to be made regarded sentences which were connected to each other through grammatical connectors. The main question was whether they were to be considered as one unit or as separate units. To understand the rationale behind the choices made in this chapter, a brief exposition of the Italian system is needed. In Italian, two or more clauses can be connected by several types of conjunctions and by sentential connectors. Following the classification proposed by Serianni (1989) Italian shows three typologies of possible connections: coordination, subordination, and juxtaposition. We will focus on the first two categories. In coordination, sentences are linked by various conjunctions and both sentences maintain their grammatical independence. This is to say that they are grammatical even if separated, as shown in (2) and (3).

- (1) Gianni mangia l’anguria *e* sputa i semi
Gianni eats the watermelon *and* spits the seeds

- (2) Gianni mangia l’anguria
Gianni eats the watermelon

- (3) Sputa i semi
(He) spits the seeds

In Italian there are five types of coordinations which are different in the semantic force they imprint on the two connected sentences. They are:

Copulative: When two sentences sum their semantic content
Mario sbuccia *e* mangia la banana

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Mario peels *and* eats the banana

Adversative: When there is a partial or total contraposition between the sentences

La pesca è troppo matura *ma* la mangio lo stesso

The peach is too ripe *but* I will eat it anyhow

Disjunctive: When there is a total disjunction between the sentences

Mangia il melone *oppure* buttalo nel cestino

Eat the melon *or* throw it into the trash bin

Conclusive: When a coordinate sentence logically follows the first one

La buccia dell'arancia è dura *dunque* bisogna sbuciarla

The peel of the orange is hard, *therefore* it is necessary to peel it

Explicative: When a coordinate sentence introduces an explanation or a specification

Preparate le carote *cioè* tagliatele a fette

Prepare the carrots *that is* cut them into slices

For every type of coordination several connectors can be used. In Table 7 for every coordination type the major conjunctions are schematized.

Table 7: Overview on Italian connectors

Type	Conjunction	English counterpart
Copulative	e	and
	anche	
	nè	
Adversative	pure	but
	ma	
	però	
	bensi	
	senonchè	
Disjunctive	tuttavia	or
	o	
	oppure	
	ovvero	
Conclusive	dunque	therefore
	quindi	
	perciò	
Explicative	pertanto	that is
	cioè	
	ossia	
	ovvero	

In subordination, the two (or more) linked sentences are in a hierarchical relationship. One sentence is the main clause (the governing one), whereas the other is the subordinate. In this case the subordinate sentence does not embody a grammatical sentence if taken separately. Subordinations are not as easily detectable as coordinations. Indeed, if coordination always has to contain a coordinating conjunction, a subordination can be explicit or implicit. Explicit subordinations are indeed characterised by the presence of a connecting complementizer (except in some rare cases) and by the use of a verb in a finite mood (indicative, conjunctive, conditional). Instead, implicit subordinations may be characterised by the absence of a subordinative conjunction but they always show the use of a verb in the non-finite mood (infinitival, participle or gerund). Two examples are shown, respectively, in (4a) and (4b).

(4)

- a. Anna pensa *che* tu debba mangiare l'anguria
Anna thinks *that* you should eat the watermelon

- b. Anna pensa *di* mangiare l'anguria
Anna thinks *to* eat the watermelon

The subordinate conjunctions used in Italian are too numerous to be cited here. Those found most frequently in the collected material will be mentioned here. They are shown as ‘che’ (that), ‘perché’ (because), ‘per’ (in order to), ‘se’ (if) and ‘siccome’ (given that).

To conclude, all four criteria previously described were taken into consideration to reach the best possible result for the division of the spontaneous speech flow into units of analysis. Spontaneous speech analysis requires more than the blind application of rules. For example, whenever a conjunction was found, this did not necessarily mean that the two sentences were considered as two separate ones. The intonation pattern and eventual pauses were taken into consideration before making any decision. Blindly applying a syntactic criterion (or any other) would have clashed with the other parameters, and it would have only given a partial view of the phenomenon.

4.3.6 Scoring

The production of clitics was scored as follows. The total number of clitics produced by a participant in an utterance was assigned a given numeric value. For example, in a case where a participant produced two clitics in one utterance the numeric value ‘2’ was assigned for the variable *number of clitics produced*. A variable *correctness* was furthermore assigned. Where the clitic was grammatically correct, the value ‘1’ was assigned. Where the clitic was omitted or grammatically incorrect, the value ‘0’ was assigned, together with the specification about the type of error. Moreover, produced clitics were classified according to a third variable, *type of clitic*. This variable included the six types of clitics recognizable within the Italian classification. As a last variable, the *position of clitics* was marked. This means that clitics were assigned the label of *proclitic* if they were produced before a finite verb or before a finite auxiliary, *enclitic* if they were produced after a non-finite verb or after a verbal complex in restructuring sentences, and *climbed* if they were produced before a verbal complex in restructuring sentences.

4.3.7 Statistical tools

In this paragraph the rationale behind the statistical analyses, and the statistical tools applied throughout the analysis sections, will be outlined. First, special attention must be paid to the sentence as a unit of analysis. The sentence is the main structure in which the grammatical constituents are put together to create a unit of speech. It is, therefore, considered to be the primary constituent within which grammatical elements find their locus and are linked to each other. This means that every element that will enter the analysis will be weighted according to

the sentence in which it finds its place. In other words, every raw count will be transformed in a proportion value which will quantify how much that given element appears in a given sentence. In practice, the total number of given grammatical elements produced by a participant is divided by the total number of sentences produced by that given participant. An analysis based on proportions will permit a direct comparison of the data between the two groups of participants, eliminating the parameter 'different number of sentences' among subjects.

As far as the statistical tools are concerned, a decision was made to include *a priori* all participants (both agrammatic and healthy participants) in the analysis. By doing this (i.e. not normalizing the data by excluding participants as outliers), the constraints of normality and of equality of variances between the two groups are no longer made and, therefore, non-parametric statistical tests were applied. For direct comparisons between two groups of data the Mann-Whitney-U test was used. To compare more than two groups of data, the non-parametric version of ANOVA, i.e. the Kruskal-Wallis test, was applied. Single contrasts within a Kruskal-Wallis test were run, also using a Mann-Whitney-U test. Because non-parametric statistical analysis was applied, median values and IQR values (as a measure of statistical dispersion of the data) are inserted throughout the results.

4.3.8 Summary

The spontaneous speech of seven agrammatic speakers and of ten non-brain-damaged speakers was recorded. All the collected material was orthographically transcribed using two different transcriptions. The first transcript contained all the spontaneous speech collected, both from the participants and the experimenter. All the intonation patterns were marked. For the second transcript, only the participants' spontaneous speech was taken into consideration. Elliptical sentences, false starts and repetitions were eliminated from the transcript. Within this transcript different errors were marked in a separate column. Following this procedure, all the spontaneous speech was divided into utterances (units of analysis). The process led to a final corpus of 1143 utterances. The corpus for the agrammatic speakers consisted of 391 utterances, and the one for the non-brain-damaged speakers consisted of 752 utterances. Produced clitics were analysed according to the variables: number of produced clitics, correctness, type of clitic and position of the clitic.

4.4 Results

4.4.1 Clitic production

The first analysis was run to check for a possible difference in the number of produced clitics in

spontaneous speech between agrammatic speakers and non-brain-damaged speakers. As previously mentioned, because of the difference in sample sizes among participants, all the raw data was transformed in proportion values. That is, for every participant, the total number of produced clitics was divided by the total number of sentences produced by that specific participant. Therefore, the resulting value was the proportion of clitics produced by every participant per sentence.. Table 8 shows the number of clitics produced, the number of sentences produced and the resulting proportion of clitics produced per sentence for all participants.

Table 8: Spontaneous speech: Number of clitics, number of sentences and proportion of clitics per sentence.

Group	Participants	Clitics produced	Sentences produced	Proportion of clitics produced
Non-brain-damaged speakers	C1	34	76	0.45
	C2	36	90	0.40
	C3	40	96	0.42
	C4	34	67	0.51
	C5	25	67	0.37
	C6	46	82	0.56
	C7	30	71	0.42
	C8	36	79	0.46
	C9	17	53	0.32
	C10	32	71	0.45
	Mean	330	752	0.44
Agrammatic speakers	A1	18	64	0.28
	A2	0	49	0.00
	A3	17	71	0.24
	A4	8	53	0.15
	A5	10	69	0.14
	A6	11	59	0.19
	A7	2	26	0.08
	Mean	66	391	0.17

A Mann-Whitney-U test was run under the null hypothesis that the two groups of participants produce the same proportion of clitics. The results confirm the alternative hypothesis, i.e. that they differ in the production of clitics. (Non-brain-damaged speakers: median=0.43; IQR=0.08; Agrammatic speakers: median=1.15; IQR=0.16; Z=-3.42; p<0.001). The group of agrammatic speakers produce significantly fewer clitics than the non-brain-damaged speakers.

Nevertheless, this difference could be the effect of a difference in sentence length among

participants. MLU (Mean Length of Utterance) was therefore calculated for every participant in both groups. The analysis reveals that there is a significant difference in MLU between the two groups (Non-brain-damaged speakers: median=10.32; IQR=1.24; B.d.a.s: median=6.06; IQR=0.40; Z=-3.41; p<0.001). Non-brain-damaged speakers produce longer sentences than agrammatic speakers. Table 9 shows the MLU mean value for every participant.

Table 9: Spontaneous speech: Mean MLU value for every participant.

Non-brain-damaged speakers		Agrammatic speakers	
Participants	MLU	Participants	MLU
C1	8.59	A1	6.27
C2	9.83	A2	5.45
C3	8.31	A3	6.14
C4	11.10	A4	6.26
C5	10.34	A5	6.06
C6	10.16	A6	5.86
C7	11.46	A7	5.88
C8	10.65		
C9	10.30		
C10	10.59		
Mean	10.1	Mean	5.98

To confirm that the difference in the production of clitics is not a bias due to the difference in sentence length, several analyses (using the Mann-Whitney-U test) were run on those groups of sentences which were of the same length, i.e. the same number of words, for both groups. In other words, the whole data set was stratified according to the number of words in a sentence, and a comparison was made between non-brain-damaged speakers and agrammatic speakers, where the given sentence length was present in all non-brain-damaged speakers and all agrammatic speakers. This was the case for MLU=4, MLU=5, MLU=6 and MLU=7. Whenever a sentence category was not representative for both groups the analysis was not performed. Results revealed that the difference in the production of clitics is still significant, even when the sentence length is equal for both groups. Table 10 summarizes the data and results.

Table 10: Spontaneous speech: Clitic production in sentences with equal length in both groups.

Sentence length (in words)	Group	Mean number of sentences	Mean number of clitics	Statistic values
4	Non-brain-damaged speakers	5	0.3	Z=-1.98 p=0.047
	Agrammatic speakers	9.8	0.1	
5	Non-brain-damaged speakers	7.4	0.3	Z=-2.50 p=0.012
	Agrammatic speakers	9.7	0.09	
6	Non-brain-damaged speakers	7.7	0.37	Z=-2.45 p=0.014
	Agrammatic speakers	7.2	0.16	
7	Non-brain-damaged speakers	7.3	0.4	Z=-2.75 p=0.006
	Agrammatic speakers	6.4	0.08	

The error analysis revealed that when producing clitics non-brain-damaged speakers did not make any errors, and few errors were made by the agrammatic speakers. Overall, the only type of error was the omission of the clitic in obligatory contexts (five cases). No errors for gender, person or number were observed. One participant, A1, produced in two cases a reflexive clitic when the context did not require it.

4.4.2 Clitic types

The second analysis was run in order to characterize the type of clitics that were produced by both groups, and to detect eventual differences in their use. As mentioned, all the produced clitics were subdivided in the six representative categories of the Italian clitic system:

- Direct object clitics
- Indirect object clitics
- Reflexive clitics
- Partitive clitics
- Locative clitics
- Impersonal 'si' clitics

In order to run the suitable analyses, the raw data were weighted according to the number of sentences produced by every participant. That is, the total number of clitics for every category was divided by the number of sentences produced by that specific participant. The resulting values, shown in Table 11 are the proportion values of produced clitics in each category for

every participant.²⁵

Table 11: Spontaneous speech: Mean number of clitics per sentence per participant for every category.

Group	Participants	Direct object	Indirect object	Reflexives	Partitives	Locatives	Impersonal
Non-brain-damaged speakers	C1	0.09	0.12	0.22	0.01	0	0
	C2	0.11	0.10	0.14	0.03	0	0
	C3	0.09	0.15	0.15	0	0.01	0
	C4	0.10	0.15	0.20	0	0	0.04
	C5	0.12	0.10	0.13	0.01	0	0
	C6	0.12	0.16	0.18	0.02	0.03	0.04
	C7	0.14	0.15	0.11	0.01	0	0
	C8	0.09	0.12	0.19	0	0.04	0.01
	C9	0.07	0.09	0.11	0	0	0.04
	C10	0.10	0.14	0.18	0.01	0.01	0
	Mean	0.1	0.12	0.16	0.009	0.009	0.01

Group	Participants	Direct object	Indirect object	Reflexives	Partitives	Locatives	Impersonal
Agrammatic speakers	A1	0.06	0.08	0.06	0.03	0	0.04
	A2	0	0	0	0	0	0
	A3	0.06	0.08	0.10	0	0	0
	A4	0.06	0	0.07	0	0	0.02
	A5	0.01	0.10	0.01	0	0.01	0
	A6	0	0.08	0.1	0	0	0
	A7	0	0.07	0	0	0	0
		Mean	0.02	0.05	0.04	0.004	0.002

One of the research questions was whether there is any difference in the frequency of production among clitic categories, both within the non-brain-damaged speakers and the group of agrammatic speakers, and whether the patterns of the two groups differ significantly.

A Kruskal-Wallis test was first run within the group of non-brain-damaged speakers under the null hypothesis that there is no difference in the number of clitics produced among clitic types. The analysis reveals that there is a significant difference among clitic categories (Chi-Square=48.19; df=5; p<0.001). Contrasts were then run specifically to detect which were the relevant differences. The first contrast reveals that direct object, indirect object and reflexive clitics are produced more frequently than partitive, locative and impersonal clitics. Moreover, reflexive clitics are produced more often than both direct object and indirect object clitics. There was no difference in the frequency of production between direct and indirect object clitics. The last contrasts reveal no difference in the frequency of production among partitive, locative and

²⁵ Data are reported to two decimal places.

impersonal clitics. A second Kruskal-Wallis test was run for the group of agrammatic speakers. The analysis showed that there is a difference in frequency in the use of clitic categories (Chi-Square=14.57; df=5; p=0.012). Specifically, the contrast revealed that direct object, indirect object and reflexive clitics are produced more frequently than partitive, locative and impersonal clitics. Different to the non-brain-damaged speakers, no significant difference was seen among direct object, indirect object and reflexive clitics. Similarly, no difference was found among partitive, locative and impersonal clitics.

To answer to the second question, i.e. if the patterns differ between the two groups, a direct comparison for every clitic category between the two groups was performed. All the analyses were run with a Mann-Whitney-U test. Results reveal that agrammatic speakers produce fewer direct object clitics (non-brain-damaged speakers: median=0.09; IQR=0.03; agrammatic speakers: median=0.01; IQR=0.05; $Z=-3.43$; $p=0.001$), indirect object clitics (non-brain-damaged speakers: median=0.13; IQR=0.05; agrammatic speakers: median=0.07; IQR=0.08; $Z=-3.24$; $p=0.001$), and reflexive clitics (non-brain-damaged speakers: median=0.16; IQR=0.07; agrammatic speakers: median=0.06; IQR=0.09; $Z=-3.42$; $p=0.001$) than non-brain-damaged speakers. The difference did not turn out to be significant for partitive, locative and impersonal clitics.

4.4.4 Clitic position

The third research question regarded the position of produced clitics. The position of the produced clitics by non-brain-damaged speakers and agrammatic speakers was analysed according to the characteristic of the verb they were produced together with. Results show that when clitics were produced in an obligatory clitic placement context (i.e. together with a finite verb, or a finite auxiliary, which require proclisis, or in infinitival and embedded clauses which require enclisis) they were always produced in a correct position for both groups of participants. The resulting data are shown in Table 12.

Table 12: Clitic position in obligatory contexts for both groups. Raw counts are presented.

Group	Before finite verb	Before finite auxiliary	After non-finite verb
Non-brain-damaged speakers	174	88	63
Agrammatic speakers	35	28	3

The number of sentential contexts in which clitics can be placed optionally in two positions (i.e. restructuring sentences and negative imperative sentences) was counted for each participant, and

it was eventually divided by the specific number of sentences produced to calculate the proportion of optional sentential contexts over the number of sentences for every participant. Results reveal that non-brain-damaged speakers produced seven negative imperative sentences and only one negative imperative sentence was produced by one agrammatic speaker. Moreover, non-brain-damaged speakers produced more restructuring sentences than agrammatic speakers (non-brain-damaged speakers: median=0.034; IQR=0.044; agrammatic speakers: median=0.014; IQR=0.016; Mann-Whitney U test. $Z=-2.05$; $p=0.04$). Whenever a negative imperative sentence or a restructuring sentence were produced, the presence of a clitic and its position with respect to the verbal complex were evaluated. The descriptive analysis shows that non-brain-damaged speakers produced seven cases of a negative imperative sentence with a clitic. In four cases the clitic was placed in the enclisis position and in three in the proclisis position. In the only negative imperative sentence produced by one agrammatic speaker the clitic appeared in the enclisis position. When restructuring sentences were produced, agrammatic speakers did not produce any clitic in combination with a restructuring sentence. On the other hand, among the non-brain-damaged speakers, there were five cases where a clitic was used in a restructuring sentence. Out of these five instances, in three cases the clitic was produced in a climbed position and in two in an enclisis position. Data are shown in Table 13. These data points are probably too few to verify the regional distribution of clitics in optional contexts as proposed by Benincà (1986) which was introduced in chapter two. Nevertheless we can describe the following. Regarding negative imperative clauses there were three cases of proclisis and four cases on enclisis. Two out of the three cases of proclisis were produced by participant C8 who comes from the Tuscany region, i.e. in the central part of Italy. The third case was produced by participant C10 who comes from the central part of Italy as well. Three out of the four cases of enclisis were produced by three participants from Northern regions of Italy (C9, and C7). One case of enclisis has been produced by participant C6 which comes from central Italy. Regarding restructuring contexts the three cases of clitics produced in climbed position were produced by two participants coming from the central part of Italy (C5, and C10), and one participant coming from a northern region (C3). These data are in line with the regional variation described by Benincà (1986) at least regarding participants coming from the northern regions. Nevertheless a broader corpus of spontaneous speech in which parts of speech coming from all Italian regions would be more informative.

Table 13: Clitic position in negative imperative and restructuring sentences. Raw counts are presented.

Negative imperative sentences		
	Proclisis	Enclisis
Non-brain-damaged speakers	3	4
Agrammatic speakers	-	1
Restructuring sentences		
	Climbed	Enclisis
Non-brain-damaged speakers	3	2
Agrammatic speakers	-	-

4.5 Discussion and conclusions

In this chapter the production of clitics was analysed in the spontaneous speech of seven Italian agrammatic speakers, and ten Italian healthy speakers. The goal of analysing clitic production in spontaneous speech was explanatory, i.e. to describe clitic production in agrammatic and healthy speakers in a non-test situation.

Firstly, the data sets collected show that there is a significant difference in the number of produced clitics between the two populations of interest, that is, agrammatic speakers produce significantly fewer clitics than healthy controls, and that the only error type that observed was omission of clitics. No errors at the morphological level were observed. These results are in line with other studies on clitic production in agrammatism (some of which were outlined in chapter 3). Nevertheless, the question about the underlying deficit causing an impaired clitic production in agrammatic speakers is still open. This work proposed that a diminished number of produced clitics and a high number of clitic omissions can be explained by assuming an impairment at the phonological or syntactic level. Secondly, the data presented in this chapter show that there is a difference in the number of produced clitics among the different types of clitics. Agrammatic speakers produce fewer direct object, indirect object and reflexive clitics than non-brain-damaged speakers. The difference was not a significant result in locative, partitive and impersonal clitics. This dichotomy cannot be explained with a frequency account, i.e. by saying that direct objects, indirect object and reflexive clitics are produced significantly less frequently because they are less frequent in normal language, in that data show that for the group of non-brain-damaged speakers these three types of clitics are more frequently produced than the other three. This specific result partially disconfirms the phonological account as the underlying impairment for clitic production in agrammatism, in that if clitics are meant to be phonologically difficult to produce, a similar impairment should have been observed among all clitic categories. Instead, this result is interpreted by saying that what differentiates direct, indirect and reflexive

clitics from locative, partitive and impersonal clitics is the amount of case features they bear. The first three all bear feature specifications for person and number, whereas the last three do not. Another point of discussion concerns the position of clitics with respect to their host and with respect to specific structures. It was expected that in utterances where clitics have to be produced in a certain position, they would always be produced in a correct position. The data sets presented here support the hypothesis. Secondly, for sentences which allow an optional position for clitics, i.e. restructuring sentences and negative imperative sentences, no specific predictions had been made. Results show that only one agrammatic speaker produced a negative imperative sentence together with a clitic, and that in this case the clitic was produced in an enclisis position. Secondly, agrammatic speakers did not produce any restructuring sentences with the concomitant production of a clitic. Therefore, it was not possible to assess in which position clitics would have been produced.

In conclusion, the results presented in this chapter show that agrammatic speakers are indeed impaired in clitic production compared to healthy speakers. The error pattern shows omissions of clitics and a significant difference between agrammatic and healthy speakers in the number of direct, indirect and reflexive clitics produced, whereas no difference was observed for partitive, locative and impersonal clitics. Data about the position of produced clitics are too scarce here to be given any explanation. From these data sets the preliminary conclusion can be drawn that the underlying disorder affecting clitic production in agrammatic aphasia most probably does not find its roots in a phonological, nor in a morphological deficit, but most probably in a deficit at the syntactic level.

CHAPTER 5

CLITIC PRODUCTION IN DECLARATIVE SENTENCES

5.1 On linguistic structures and clitic position

As introduced in chapter 2, clitics can have different positions in the clause. One fundamental characteristic of clitics is that they always need a host, which is usually the verb. Depending on its characteristics there are three main positions available for clitics. The first case is represented by sentence constructions which require a finite verb. In this case, clitics are obligatorily placed to the left of the finite verb or, when an auxiliary is present, to the left of the finite auxiliary (proclisis), as in (1a) and (1b).

(1)

- a. Daniele *la* beve
Daniele it drinks
'Daniele drinks it'

- b. Daniele *lo* ha assaggiato
Daniele it has tasted
'Daniele tasted it'

In constructions where a non-finite verb is required, clitics are obligatorily placed to the right of the non-finite verb (enclisis), as in (2a) and (2b).

(2)

- a. Daniele promette di mangiar*lo*
Daniele promises to eat it
'Daniele promises to eat it'

- b. Cantar*la* sarebbe stato divertente
To sing it would have been funny

Finally, in cases where an infinitive verb is governed by a modal verb (i.e. *dovere*—must-, *potere*—can-, *volere*—want to), a causative verb or an aspectual verb (i.e. *cominciare*—to begin, *continuare*—to go on, *finire*—to finish) clitics are optionally placed to the right, or to the left of the verb complex as in (3a) and (3b). In the first case the clitic is referred to as being in the enclisis position, whereas in the second case it is referred to as being in the climbed position.

(3)

a. Marco *deve* *mangiarlo*

Marco must eat it

‘Marco must eat it’

b. Marco *lo* *deve* *mangiare*

Marco it must eat

‘Marco must eat it’

According to Rizzi (1978; 1982) the position of the clitic before the verbal complex is possible only after Restructuring has applied. Restructuring combines the two distinct verbs (for example, a modal verb and an infinitive verb) creating a single verbal complex. If restructuring has applied the clitic pronoun can be extracted and can be moved to the main verb. On the contrary, if restructuring does not apply, the two verbs do not unite in a single verbal structure and clitic placement gives rise to only one construction, i.e. enclisis, as in (3a).

At this point a fundamental observation has to be made: if restructuring has applied, proclisis and climbed positions can be reinterpreted as being derived from the same syntactic operation, i.e. CI-PI (clitic placement), which moves clitics either before the finite verb or finite auxiliary in the case of proclisis, or before the verbal complex in the case of climbing.

However, if restructuring is not applied, the two verbs will constitute two distinct entities, therefore allowing only one possible position for the clitic, i.e. enclisis. It is worth remembering, as pointed out in chapter 2, that little is known about the distribution of clitics in restructuring contexts in standard Italian. Summarizing what has previously been presented, the position of clitics in these sentential constructions seems to follow a regional variation. In the north of Italy enclisis seems to be the preferred position, whereas in the south of the country climbing seems to be the preferred one. In the central Italian regions, the two positions are supposedly present without preference. It is important to note that both enclisis and climbed positions are

grammatical in Italian.

5.2 Experimental goals and hypotheses

5.2.1 Experimental goals

From the results on clitic production in spontaneous speech it has been shown that agrammatic speakers show reduced clitic production in that they produced significantly fewer clitics than non-brain-damaged speakers. Moreover, results showed that direct object clitics, indirect object clitics and reflexive clitics seem to be the most affected categories. On the basis of these results, it can be concluded that direct, indirect and reflexive clitics are more complex because they bear more case-related features. Regarding the question of what could be the underlying cause for clitic impairment, it is preliminarily concluded that the underlying disorder cannot be explained by assuming a deficit at the phonological level, nor at the morphological one, but most probably by assuming a deficit at the syntactic level.

One of the characteristics of the linguistic analysis of spontaneous speech is that speech production is free, therefore no constraints are applied on the linguistic structures that have to be used. That is why, in the light of the observed results on clitic production in spontaneous speech, specific experiments for the production of pronominal clitics were developed. The main goal of these sets of experiments will be to understand better which is the underlying deficit causing an impairment in clitic production. More specifically, the goal will be to try to disclose whether the underlying deficit is phonological, morphological or syntactic in nature. In order to do that, the production of clitics in different types of sentences will be tested and the error pattern analysed. It was decided to test the production of direct object clitics (accusative clitics) and indirect object clitics (dative clitics) only. This decision was twofold: on the one hand, from the results on spontaneous speech, these two clitic categories were the most frequently used by both agrammatic and non-brain-damaged speakers. The other frequently produced clitic category was represented by reflexive clitics. Nevertheless, it was decided not to include reflexive clitics in the experiment design. Direct and indirect object clitics are those which have a direct reference to a fully specified grammatical element (an object or a person), whereas reflexives do not (at least for inherent reflexives). Also, direct and indirect object clitics are more comparable because they can easily be tested using the same prompting sentences.

Another goal of these sets of experiments will be to prompt the production of clitics in different sentence structures which require different positions for clitics relative to their host. This will allow the making of precise predictions on the position in which clitics will be produced by agrammatic speakers depending on the type of deficit assumed to be the underlying one.

Specifically, two main contexts in which clitics can appear in Italian will be tested, i.e. the OBLIGATORY CONTEXT, where clitics are obligatorily placed before a finite verb or a finite auxiliary,²⁶ and the OPTIONAL CONTEXT, where clitics can optionally be placed either before or after a verbal complex (in restructuring sentences). Furthermore, within the obligatory context, two conditions will be tested: the BEFORE FINITE VERB condition ('Daniele *la* mangia', 'Daniele it eat'), where the clitic has to be placed before a simple finite verb, and the BEFORE FINITE AUXILIARY condition ('Daniele *la* ha mangiata', 'Daniele it has eaten'), where the clitic has to be placed before an auxiliary. In optional contexts, on the other hand, participants will be virtually free to choose where to produce the clitic. The two available positions to produce clitics will be the enclisis position ('Daniele vuole mangiar*la*', 'Daniele wants to eat it'), where the clitic appears after the verbal complex, and the climbed position ('Daniele *la* vuole mangiare', 'Daniele it wants to eat'), where the clitic appears before the verbal complex.

5.2.2 Hypotheses

With these experiments several hypotheses can be confronted that could explain why pronominal clitics are difficult to produce for aphasic speakers and, specifically, for agrammatic speakers, and an attempt will be made to understand which is the underlying deficit in clitic production.

If the underlying deficit which leads agrammatic speakers to be impaired in clitic production is phonological in nature, as proposed by Kean (1979), a homogeneous impairment of clitics can be expected throughout all the tested conditions, and there should not be a difference in performance across the different clitic positions and different clitic types. If the underlying disorder is morphological in nature, we would expect a relatively large number of errors at the morphological level, and a relatively low number of omissions or substitutions of clitics with the relevant full NP. Moreover, the number of morphological errors should be similar across clitic types. Finally, if the underlying disorder is syntactic in nature, difficulties would be expected in the syntactic operations related to clitic production. The first possible reason for assuming a syntactic impairment of clitics relies on the fact that clitics have to undergo overt syntactic movement in order to check their case features, i.e. what was addressed as Clitic Placement (CI-PI) (Kayne, 1991). It is exactly CI-PI being a syntactic operation that could be difficult for agrammatic speakers, leading to impaired clitic production. This hypothesis will be addressed as

²⁶ Another obligatory context that could have been tested is infinitival sentences, in which clitics have to be placed after the infinitival verb. We decided though to avoid testing these constructions given their low frequency in spoken Italian and the relevant difficulty in testing them with aphasic participants.

the CLITIC PLACEMENT DEFICIT HYPOTHESIS (CL-PL-DH). Abstracting from a purely syntactic and representational explanation, and looking towards a more neurolinguistic one, clitics could be difficult because they have to be produced in a different position to the default order of constituents in the sentence. This idea is reflected in Bastiaanse and Van Zonneveld's DERIVED ORDER PROBLEM HYPOTHESIS (DOP-H) (Bastiaanse & Van Zonneveld, 2005). Assuming that the CL-PL-DH is valid, the prediction here regarding clitic production in quantitative terms is that, being CL-PL impaired, agrammatic speakers should be equally impaired in clitic production across conditions. Moreover, assuming that CL-PL is difficult, one consequence could be its 'deletion', i.e. its non application. It is therefore expected that omissions of clitics and substitutions with the relevant NPs will predominantly be made. Moreover, being case a syntactic property and being case checking the reason why clitics undergo CL-PL, a difference is expected in the number of correct clitics produced between direct and indirect object clitics, in that indirect object clitics bear a specification for person which direct object clitics do not have²⁷. Regarding the position of clitics, the CL-PL-DH predicts that in obligatory contexts, once clitics are produced they will appear in the correct position, as CL-PL correctly applied. Regarding the position in restructuring contexts, where clitics can be placed optionally in two positions, i.e. either before or after the verbal complex, CL-PL-DH predicts that agrammatic speakers will produce the same number of clitics before and after the verbal complex, or that their performance will resemble the one of non-brain-damaged speakers, given that both positions require CL-PL to apply.

On the other hand, if the DOP-H is valid it is expected that there will not be any difference between the number of clitics produced between sentences displaying a finite verb and a finite auxiliary. Both sentence constructions imply that the order of the sentence constituents is derived. Moreover, DOP-H predicts that when clitics are correctly produced in obligatory contexts, they will nevertheless be produced in a correct position. Regarding clitic production in optional sentences, the DOP-H predicts that agrammatic speakers will produce more clitics in the enclisis position (i.e. after the verbal complex) than in the clitic position (i.e. before the verbal complex), in that in the first case the order of the constituents in the sentence is not derived whereas in the second case the order is derived. Moreover, the position of clitics being equal, DOP-H does not predict any difference in the production between direct and indirect object clitics.

²⁷ In this claim we follow Anagnostopoulou (2003). The topic whether indirect object clitics bear an extra specification for person is still controversial in the literature.

In summary, the Cl-PI-DH predicts that clitic production will be equally impaired across conditions, and that clitic omissions or substitutions with relevant full NPs will be the most frequent types of errors. Moreover, the Cl-PI-DH predicts that indirect object clitics will be more impaired than direct object clitics. The DOP-H predicts that clitic production will be impaired, but it predicts that in restructuring contexts clitics will preferably be produced after the verbal complex, i.e. when the order of the constituents is not derived.

5.3 Methods

5.3.1 Experimental design

To verify the hypotheses mentioned, two tests for clitic production were developed. One test prompted the production of direct object pronominal clitics, i.e. accusative clitics, and the second prompted the production of indirect object clitics, i.e. dative clitics.

Both tests used the technique of a sentence completion task, a technique in which the experimenter produces a sentence which participants need to complete producing a relevant contrasting sentence. In this experimental setting, the prompting sentences produced by the experimenter had the following general structure: time adverb + subject + (negative particle) + pronominal clitic + verb + contrastive conjunction + time adverb + subject...

An example of a general prompting sentence is as follows:

Experimenter: 'Ieri Maria non l'ha aperto, ma oggi Maria...'

'Yesterday Maria not it has opened, but today Maria...'

(Yesterday Maria did not open it, but today Maria...)

Participant: '...lo apre'

'...it opens'

(Opens it)

As well as the sentences participants were presented with a coloured picture of the relevant object and the name of the object on a computer screen. In the specific case of the previous example the picture represented a present. It was decided to present only the picture of the relevant object and not the action related to it, because the experiment's focus is on clitic production and not on verb production. By showing the picture of the object, the experiment aimed to focus the attention of the participant on the object of the action and not on the action itself; therefore, the test focused on clitic production.

5.3.2 Experimental design for direct object clitics

The test designed for the production of direct object clitics included sixty prompting sentences, thirty of which prompted the production of clitics in sentences with finite verbs (finite main verbs or auxiliaries), and thirty which prompted the production of clitics in sentences with modal verbs and an infinitival verb, i.e. restructuring sentences. In the first case, the position of clitics relative to the host (finite verb or auxiliary) is therefore obligatorily pre-verbal, whereas in the second case the position of clitics is optionally pre-verbal complex or post-verbal complex. These two conditions will be labelled, therefore, as OBLIGATORY CONDITION and OPTIONAL CONDITION. Within the obligatory condition, fifteen sentences prompted the production of a negative sentence in the perfect tense; therefore, an auxiliary and a past participle had to be produced, whereas the other fifteen prompted the production of affirmative sentences in the present tense. Two examples are shown below:

Experimenter: ‘Oggi Maria *la* scrive, ma ieri Maria...’

‘Today Maria it writes but yesterday Maria...’

(Today Maria writes it, but yesterday Maria...)

Participant: ‘...non *l’ha* scritta’

‘...not it has written’

(...did not write it)

Experimenter: ‘Ieri Maria non *l’ha* bevuto, ma oggi Maria...’

‘Yesterday Maria not it has drunk, but today Maria...’

(Yesterday Maria did not drink it, but today Maria...)

Participant: ‘...*lo* beve’

‘...it drinks’

(...drinks it)

Within the optional condition all thirty prompting sentences were constructed with the modal verb ‘volere’ (want), plus a lexical verb which changed from item to item, and the relevant clitic particle. It was decided to keep the modal verb constant to limit the linguistic load already produced by the intrinsic difficulty of producing a complex verbal structure such as a restructuring sentence. Because one goal of the test is to check the position in which clitics will be produced relative to the verbal complex, in half of the prompting sentences (fifteen) clitics were presented after the verbal complex (i.e. in the enclisis position), whereas in the other half of

the sentences clitics were presented before the verbal complex (i.e. in the climbed position). Given the optionality for the position of the clitic, there is no expected clitic position in the answer produced by the participants. Nevertheless, the position of the clitic in the prompting sentences could create a bias for the position in which the clitic has to be produced. It was therefore fundamental to have half of the prompting sentences which prompted the clitic before the verbal complex and half of the sentences in which the clitic was prompted after the verbal complex. The following examples illustrate two prompting sentences with the two possible answer options. In the first, the clitic is presented after the verbal complex, i.e. in the enclisis position, and in the second it is presented before the verbal complex, i.e. in the climbed position.

Experimenter: ‘Maria non vuole tagliar*lo*, invece Gianni...’
 ‘Maria not wants to cut it, instead Gianni ...’
 (Maria does not want to cut it, Gianni instead...)

Participant: ‘...vuole tagliar*lo*’ or ‘... *lo* vuole tagliare’
 ‘...wants to cut it’ or ‘...it wants to cut’
 ‘...wants to cut it’

Experimenter: ‘Maria *la* vuole guardare, invece Gianni...’
 ‘Maria it wants to watch, instead Gianni...’
 (Maria wants to watch it, Gianni instead...)

Participant: ‘...non vuole guardar*la*’ or ‘... non *la* vuole guardare’
 ‘...not wants to watch it or ’...not it wants to watch’
 (...Does not want to watch it)

5.3.3 Experiment design for indirect object clitics

The test designed for the production of indirect object clitics is similar to the previous one. The test consisted of a total of sixty prompting sentences. Thirty prompted the production of clitics in the obligatory condition, and thirty prompted the production of clitics in the optional condition. Within the obligatory condition, fifteen sentences prompted the production of a sentence in the perfect tense (the assumption being that the clitic had to be produced before the finite auxiliary), and the other fifteen sentences prompted the production of sentences in the present tense; therefore clitics had to be produced before the finite verb. Relevant examples are shown below:

Clitic Production in Declarative Sentences

Experimenter: ‘Oggi Maria *mi* invia la lettera, ma ieri Maria...’
‘Today Maria me sends the letter but yesterday Maria...’
(Today Maria sends me the letter but yesterday Maria...)

Participant: ‘...non *mi* ha inviato la lettera’
‘...not me has sent the letter’
(...did not send me the letter)

Experimenter: ‘Ieri Maria non *mi* ha inviato la lettera, ma oggi Maria...’
‘Yesterday Maria not me has sent the letter but today Maria...’
(Yesterday Maria did not send me the letter but today Maria...)

Participant: ‘...*mi* invia la lettera’
‘...me sends the letter’
(...sends me the letter)

As in the previous test, the thirty prompting sentences in the optional condition were constructed with the modal verb ‘volere’ (want) plus another verb which changed from item to item. Again, in fifteen prompting sentences clitics were presented after the verbal complex, whereas in the other half of the sentences clitics were presented before the verbal complex. Even in this case, the position for the indirect clitics in the answer produced by the participants can have two positions, i.e. before the verbal complex (climbing position) or after the verbal complex (enclisis position), as in the following examples:

Experimenter: ‘Maria vuole *darti* il regalo, invece Gianni...’
‘Maria wants to give you the present, instead Gianni...’
(Maria wants to give you the present, Gianni instead...)

Participant: ‘...non vuole *darti* il regalo’ or ‘... non *ti* vuole dare il regalo’
‘... not wants to give you the present’ or ‘not you wants to give the present’
(...does not want to give you the present)

Experimenter: ‘Maria non *gli* vuole raccontare una favola, invece Gianni...’
‘Maria not him wants to tell a fairytale, instead Gianni...’
(Maria does not want to tell him a fairytale, Gianni instead...)

Participant: ‘...vuole raccontargli una favola’ or ‘...*gli* vuole raccontare una favola’
‘...wants to tell him the a fairytale’ or ‘...him wants to tell a fairytale’

(...wants to tell him a fairytale)

The clitics prompted by the sixty prompting sentences were subdivided as follows: fifteen sentences prompted the use of the clitic in the first person singular, i.e. ‘mi’ (to me), fifteen prompted the use of second person singular clitics, i.e. ‘ti’ (to you), fifteen sentences prompted the use of the third person feminine singular, i.e. ‘le’ (to her), and fifteen sentences the use of the third person masculine singular, i.e. ‘gli’ (to him).

5.3.4 Participants and procedure

Seven agrammatic speakers and ten non-brain-damaged speakers participated in the experiments. The participants are the same as in the experiment on spontaneous speech production.²⁸ The experiment was run in a quiet room. The participant sat in front of a computer screen and the experimenter sat next to her/him. The experimental procedure was explained to the participant. There were four trial sentences for every test. In case the task was not clear, additional trial sentences were added until the task was understood by the participant. The entire experiment was recorded with a digital voice recorder. All the responses were eventually transcribed for analysis.

5.3.5 Scoring and data analysis

The production of all participants was scored as follows. For every prompting sentence three variables were taken into consideration. First, answers were analysed according to a variable SENTENCE STRUCTURE. If the structure of the sentence produced by participants was correct, i.e. according to the test requirements, a numeric value ‘1’ was assigned. If the structure of the sentence was not correct the numeric value ‘0’ was assigned. The changes in sentence structure were then analysed. Furthermore, clitic production was analysed, and a variable CORRECTNESS was assigned. In cases where the clitic was grammatically correct, the value ‘1’ was assigned. In cases where the clitic was omitted or grammatically incorrect the value ‘0’ was assigned, together with a specification about the type of error. As a last variable, the CLITIC POSITION was analysed. For the obligatory contexts whenever a clitic was correctly produced a dichotomic variable 0/1 was assigned to note whether the position of clitics was incorrect or correct, respectively. For the optional contexts, instead, whenever a clitic was correctly produced, it was labelled according to the position in which it was produced: CLIMBED if produced before the verbal complex, and ENCLITIC if produced after the verbal complex.

²⁸ We remind the reader of the tables presented in chapter 4, paragraph 3.1

As far as the statistical analysis is concerned, the chi-square test was used throughout, being the suitable test to analyse values resulting from dichotomic variables.

5.4 Results of the direct object clitics experiment

5.4.1 Overview

Overall (all conditions included) agrammatic speakers produced significantly fewer correct clitics than non-brain-damaged speakers ($\chi^2=266$; $df=1$; $p<0.001$); non-brain-damaged speakers produced 99.5% correct clitics, whereas agrammatic speakers produced 61% correct clitics. The error analysis revealed that the only type of error that non-brain-damaged speakers made was substituting the clitic with the relevant full noun in 0.5% of cases. Agrammatic speakers instead omitted clitics in 19% of the cases or substituted them with the full noun in 14% of the cases. Gender errors were produced 4% of the time and number errors 2% of the time.

5.4.2 Sentence structure

The present test was designed to prompt a total of sixty sentences, thirty of which prompted a sentence structure in which the position of the clitic to be produced was obligatorily pre-verbal (finite verb constructions), and thirty sentences which prompted the production of sentence structures where the position of the clitic produced was optionally pre-verbal complex or post-verbal complex (restructuring sentences). Within the obligatory condition, fifteen sentences prompted a sentence in the present tense, therefore prompting the production of the clitic before a simple finite verb, whereas the other fifteen sentences prompted the production of a sentence in the perfect tense, and thus the clitic had to be placed before a finite auxiliary. Despite the quite strict requirements of the test, and despite the fact that the participants were trained with several example items, the structure of the target sentence has been changed often, especially by the aphasic participants. Table 14 illustrates the performance of both groups regarding the structure of the sentence.

Table 14: Direct object clitic experiment: Sentence structure for non-brain-damaged speakers and agrammatic speakers in the three conditions. Row percentages.

Group	Condition	n	Correct	Perf→ Pres	Perf→ Past	Opt→ Obl	Obl→ Opt	Other
Non-brain- damaged speakers	Obligatory present tense	150	85	-	4	-	11	-
	Obligatory perfect tense	150	89	-	-	-	10	1
	Optional	300	99	-	-	1	-	-
Agrammatic speakers	Obligatory present verb	105	73	-	18	-	9	-
	Obligatory perfect auxiliary	105	59	29 *	-	-	10	2
	Optional	210	79	-	-	19	-	2

Legend:

Correct: Correct sentence structure; **Perf→Pres:** From a perfect tense to a present tense construction; **Pres→Perf:** From a present tense to a perfect tense construction; **Opt→Obl:** from an optional context to an obligatory one; **Obl→Opt:** From an obligatory context to an optional one; **Other:** other sentence structure changes.

***= Illegal change of structure**

In all the three conditions, agrammatic speakers changed the structure of the sentence more frequently than non-brain-damaged speakers. (Obligatory present verb condition: $\chi^2=5.6$; $df=1$; $p<0.02$. Obligatory perfect verb condition: $\chi^2=30$; $df=1$; $p<0.001$. Optional condition: $\chi^2=61.9$; $df=1$; $p<0.001$) The most frequent type of structure change made by non-brain-damaged speakers is the change from an obligatory sentence structure to an optional one (10.5% of the time, averaging together the two obligatory conditions). The other type of structure change made in 4% of cases is the change from an expected perfect tense structure into a present one. The most frequent structure change made by agrammatic speakers is the change from a perfect verb construction into a present one, when a perfect verb is required (29%). This change of structure is the only illegal change, i.e. which leads to an ungrammatical sentence. Agrammatic speakers also transform an obligatory structure to an optional one in 9.5% of the cases (averaging together the two obligatory conditions); they transform a present structure sentence into a perfect one in 18% of the cases; they transform an optional sentence structure into an obligatory one in 19% of cases.

For all the following analyses the assumption will be the correctness of sentence structure. It is only by taking into consideration the sentences produced with the sentence structure expected from the test design that we can correctly compare the other parameters about clitic production, especially the variable clitic position.

5.4.3 Production of direct object clitics

In paragraph 5.4.1 an overview on clitic production and a general outline of the type of errors related to it was presented. That overview did not take the correctness of the sentence structure into consideration. In the work that follows, a new detailed analysis is presented on direct object clitic production under the assumption of a correct sentence structure.

Overall the analysis shows a significant difference in the number of correct clitics produced between the two groups ($\chi^2=279$; $df=1$; $p<0.001$). Non-brain-damaged speakers produced 99.5% correct clitics and agrammatic speakers produced 57% correct clitics. The error analysis indicates that the only error non-brain-damaged speakers make is substituting clitics with a full NP in 0.5% of the cases. Agrammatic speakers omit clitics in 22% of cases and substitute clitics with the full NP in 15% of cases. In 4% of the cases agrammatic speakers produce a clitic but with an incorrect gender assigned, and 2% of the time they produce a clitic with an incorrect number. Table 15 shows the percentage values of correct clitics and errors for each participant of both groups.

Table 15: Direct object clitic experiment: Production of direct object clitics within a correct sentence structure. Row percentages.

Group	Participants	n	Correct	Omission	Full NP	Gender errors	Number errors
Non-brain-damaged speakers	C1	60	100	-	-	-	-
	C2	56	100	-	-	-	-
	C3	59	100	-	-	-	-
	C4	59	95	-	5	-	-
	C5	60	100	-	-	-	-
	C6	58	100	-	-	-	-
	C7	39	100	-	-	-	-
	C8	60	100	-	-	-	-
	C9	48	100	-	-	-	-
	C10	60	100	-	-	-	-
	Mean	559	99.5%	0%	0.5%	0%	0%
Agrammatic speakers	A1	43	58	30	-	5	7
	A2	46	-	48	50	2	-
	A3	47	64	15	19	-	2
	A4	52	75	8	17	-	-
	A5	36	61	3	19	14	3
	A6	36	100	-	-	-	-
	A7	44	41	52	-	7	-
	Mean	304	57%	22%	15%	4%	2%

From the seven agrammatic speakers, one participant (A6) performs within the normal range. A6 was therefore considered as an outlier and was excluded from the following analyses. As a second step, an analysis was run to see if for agrammatic speakers there is a difference in the number of correct clitics produced among the three conditions, i.e. the obligatory condition with the verb in the present tense (in which clitics have to be placed before the finite verb), the obligatory condition with the verb in the perfect form (in which clitics have to be placed before the finite auxiliary), and the optional condition with restructuring sentences (in which clitics can be placed in two positions, i.e. before or after the verbal complex). The analysis reveals that there is no difference in the production of correct clitics between these three conditions ($\chi^2=1.11$; $df=2$; $p=0.57$). Agrammatic speakers produce 45% of correct clitics in the obligatory condition with a present tense, 54% of correct clitics in the obligatory condition with a perfect tense, and 51% of correct clitics in the optional condition.

Even the type of errors do not differ among the three conditions ($\chi^2=8.25$; $df=6$; $p=0.22$). In all conditions the most frequent error is represented by omissions of the clitics followed by the substitution of the clitic with a full noun. Morphological errors are the least represented category. Table 16 and Table 17 show the results.

Table 16: Agrammatic speakers: Production of direct object clitics in the three conditions. Row percentages. Chi-square and p-values are presented.

Conditions	Type of production		
	n	Correct	Incorrect
Obligatory before finite verb	65	45	55
Obligatory before finite auxiliary	54	54	46
Optional	149	51	49
χ^2 value;(df=2)		1.11	
p-value		0.57	

Table 17: Agrammatic speakers: Error types in the three conditions. Row percentages. Chi-square and p-values are presented.

Conditions	n	Error type			
		Omissions	Full NP	Gender error	Number error
Obligatory before finite verb	36	47	39	11	3
Obligatory before finite auxiliary	25	48	28	12	12
Optional	73	56	37	5	2
χ^2 value;(df=6)		8.25			
p-value		0.22			

5.4.4 Clitic position

The test prompted sixty sentences in which the clitic had to be produced before the verb (finite verb or finite auxiliary) and sixty sentences in which the clitic could optionally be placed before or after the verbal complex. It was interesting to see, once clitics were correctly produced, in which position they were placed both in the obligatory and in the optional condition. In the two obligatory conditions, once clitics were correctly produced, they were always placed in the correct position by both non-brain-damaged speakers and by agrammatic speakers, i.e. when they produced clitics together with a finite simple verb, clitics were always produced before the simple verb, and when produced together with an auxiliary, they were always placed before the finite auxiliary. In the optional condition, participants were virtually free to choose where to place the clitic in the sentences they produced. To balance the position of the clitic in the prompting sentences, in fifteen of them (50% of the items) clitics were proposed after the verbal complex and in the other fifteen they were placed before the verbal complex. The first case is labelled as ENCLISIS PROMPTED, and the second as CLIMBING PROMPTED. The analysis revealed that agrammatic speakers²⁹ produced overall significantly more clitics in the enclitic position and fewer clitics in the climbed position than non-brain-damaged speakers. Specifically, agrammatic speakers produced 66% of clitics in the enclisis position and 34% of clitics in the climbed position, whereas non-brain-damaged speakers produced 28% of clitics in the enclisis position and 72% of clitics in the climbed position. Table 18 presents data and results.

Table 18: Position of correctly produced clitics in the optional condition. Row percentages. Chi-square and p-values are presented.

Group	n	Position	
		Enclisis	Climbed
Non-brain-damaged speakers	298	28	72
Agrammatic speakers	92	66	34
χ^2 value;(df=1)		42.84	
p-value		<0.01	

The subject by subject descriptive analysis reveals that five non-brain-damaged speaker participants (C2, C3, C4, C7 and C9) produced more clitics in the climbed position than in the enclisis position. For the other five non-brain-damaged speakers (C1, C5, C6, C8 and C10) there was no difference in the number of clitics produced between the two positions. Among

²⁹ For the analysis regarding clitic position, participant A6 is again included. Indeed, even though he performs within the normal range regarding clitic production, it is interesting to verify whether his performance will resemble that of non-brain-damaged speakers even in the clitic position.

agrammatic speakers, four participants (A1, A3, A5 and A7) produced more clitics in the enclisis position than clitics in the climbed position. For one participant, A4, there was no difference in the number of clitics produced between the two conditions. Therefore, participant A4 diverges from the performance of the other agrammatic speaker participants.³⁰ Finally, participant A6 followed the pattern of non-brain-damaged speakers, in that he produced 94% of clitics in the climbed position and 6% of clitics in the enclisis position. Table 19 presents the data about every participant.

Table 19: Subject by subject analysis for the position of correctly produced clitics in the optional condition.

Group	Participants	n	Position	
			Enclisis	Climbed
Non-brain-damaged speakers	C1	30	47	53
	C2	30	3	97
	C3	30	7	93
	C4	29	28	72
	C5	30	47	53
	C6	30	50	50
	C7	30	3	97
	C8	30	50	50
	C9	29	-	100
	C10	30	50	50
Agrammatic speakers	A1	17	100	
	A3	15	93	7
	A4	25	52	48
	A5	5	80	20
	A6	16	6	94
	A7	14	80	20

It was important to analyse which is the place of production relative to the position in which the clitic was prompted. The analysis reveals that when the clitic was prompted in the enclisis position, non-brain-damaged speakers produced a clitic in the enclisis position in 46% of the instances and 54% of the instances in the climbed position. Agrammatic speakers instead produced a clitic in the enclisis position in 89% of cases and only in 11% of the cases was it produced in a climbed position. The same analysis was run for the prompting sentences in which the clitic was presented in the climbed position. Results show that non-brain-damaged speakers produce a clitic in the climbed position in 89% of cases, whereas agrammatic speakers produce a clitic in the climbed position in 65% of cases. The difference between the two groups in both conditions is significant. Table 20 shows the data.

³⁰ Participant A2 is not included in this analysis given that he did not produce any clitics.

Table 20: Position of the produced clitics in the enclisis and in the climbed prompted condition. Row percentages. Chi-square and p-values are presented.

Enclisis prompted	n	Clitic placement	
		Enclisis	Climbed
Non-brain-damaged speakers	148	46	54
Agrammatic speakers	54	89	11
χ^2 value;(df=1)		29.84	
p-value		<0.01	

Climbed prompted	n	Clitic placement	
		Enclisis	Climbed
Non-brain-damaged speakers	150	11	89
Agrammatic speakers	38	34	65
χ^2 value;(df=1)		11.83	
p-value		<0.01	

A crucial issue is whether the position in which the clitics were produced by the participants was related to the position in which the clitics were presented in the prompting sentences. In other words, the question is whether the position of the produced clitic is influenced by the position of the clitic in the prompting sentences. The subject by subject analysis for both groups shows that for six of the non-brain-damaged speaker participants (C1, C4, C5, C6, C8, C10) the position of the produced clitic is significantly associated with the position of the clitic in the prompting sentences. Participant C8 is the only one who shows a negative association, i.e. when a clitic is prompted in the enclisis position C8 produces a clitic in the climbed position and vice versa. For the other four non-brain-damaged speakers (C2, C3, C7 and C9) the position of the produced clitic is not associated with the position of the prompted clitic. Among agrammatic speakers, two participants, A4 and A7, show a significant association between the position of the produced clitic and the position of the prompted clitic. The other three participants (A1, A3, A5 and A6) do not show any association between the position of the prompted clitic and the position of the produced clitic. Table 21 shows the relevant results.

Table 21: Association between the prompting position and the position of produced clitics. Row percentages.

Group	Participants	Prompting position	n	Position Produced Clitic		Association For all: df=1
				Enclisis	Climbing	
Non-brain-damaged speakers	C1	ENP	15	73	27	$\chi^2=8.5$
		CLP	15	20	80	p<0.05
	C2	ENP	15	7	93	$\chi^2=1$
		CLP	15	-	100	p=0.5
	C3	ENP	15	13	87	$\chi^2=2.1$
		CLP	15	-	100	p=0.2
	C4	ENP	15	57	43	$\chi^2=11.8$
		CLP	15	-	100	p<0.05
	C5	ENP	15	93	7	$\chi^2=26.2$
		CLP	15	-	100	p<0.05
	C6	ENP	15	100	-	$\chi^2=30$
		CLP	15	-	100	p<0.05
	C7	ENP	15	7	93	$\chi^2=1$
		CLP	15	-	100	p=0.5
	C8	ENP	15	7	93	$\chi^2=22.5$
		CLP	15	93	7	p<0.05
	C9	ENP	14	-	100	-
		CLP	15	-	100	-
	C10	ENP	15	100	-	$\chi^2=30$
		CLP	15	-	100	p<0.05
Agrammatic speakers	A1	ENP	14	100	-	-
		CLP	3	100	-	-
	A3	ENP	9	89	11	$\chi^2=.7$
		CLP	6	100	-	p=0.6
	A4	ENP	11	100	-	$\chi^2=18$
		CLP	14	14	86	p<0.05
	A5	ENP	3	67	33	$\chi^2=.8$
		CLP	2	100	-	p=0.6
	A6	ENP	5	20	80	$\chi^2=2.3$
		CLP	11	-	100	p=0.3
	A7	ENP	12	100	-	$\chi^2=18$
		CLP	2	-	100	p<0.05

5.5 Results of the indirect object clitics experiment

5.5.1 Overview, sentence structure and production data

In the test for the production of indirect object clitics, agrammatic speakers produced overall 31% correct clitics, 51% omissions, no substitutions of the indirect object clitic with a full noun or a strong pronoun, 3% gender errors and 15% person errors. Non-brain-damaged speakers produced 99% correct indirect object clitics. The only errors are represented by 1% of omissions. This general description does not take into consideration the change of sentence structure which, similar to what happened for the direct object clitic experiment, is produced by both non-brain-damaged speakers and agrammatic speakers. The most frequent change of sentence structure

made by non-brain-damaged speakers is the transformation of an obligatory sentence structure into an optional one (13%) and the change of tense from present to perfect tense (10%). Agrammatic speakers show a similar picture. The main difference is that agrammatic speakers transform, 18% of the time, an optional structure into an obligatory one. Data sets about sentence structure are shown in Table 22.

Table 22: Indirect object clitics: Sentence structure in the optional and obligatory conditions. Row percentages

Group	Condition	n	Correct	Perf→ Pres	Pres→ Perf	Opt→ Obl	Obl→ Opt	Other
Non-brain- damaged speakers	Obligatory	300	77	-	10	-	13	-
	Optional	300	100	-	-	-	-	-
Agrammatic speakers	Obligatory	210	79	1	7	-	9	4
	Optional	210	78	1	-	18	-	3

Legend:

Correct: Correct sentence structure; **Perf→Pres:** From a perfect tense to a present tense construction; **Pres→Perf:** From a present tense to a perfect tense construction; **Opt→Obl:** from an optional context to an obligatory one; **Obl→Opt:** From an obligatory context to an optional one; **Other:** other sentence structure changes.

Once the correct structure of the sentence has been taken into consideration a new analysis of the production of indirect object clitics has been made. The performance of non-brain-damaged speakers does not change, whereas for agrammatic speakers the result changes only partially. The production of correct indirect object clitics rises to 37% and the number of omissions drops to 43%. Furthermore, the error analysis shows that agrammatic speakers only omit indirect object clitics in 43% of cases and they never substitute them with a full NP. Gender errors are produced in 3% of the cases and person errors in 17% of the cases. As for direct object clitics, participant A6 produces all correct indirect object clitics, i.e. he scores within the normal range. Hence, he will be excluded from the analysis. An analysis was performed in order to compare the production of indirect object clitics, between non-brain-damaged speakers and agrammatic speakers. The analysis reveals that agrammatic speakers produce fewer correct indirect object clitics (23%) than non-brain-damaged speakers (99%). The difference is significant ($\chi^2=523.7$; $df=1$; $p<0.001$). Table 23 shows the results for every participant (even for participant A6).

Table 23: production of indirect object clitics with correct sentence structure. Row percentages.

Group	Participants	n	Correct	Omissions	Full NP	Gender errors	Person errors
Non-brain-damaged speakers	C1	56	100	-	-	-	-
	C2	58	100	-	-	-	-
	C3	60	100	-	-	-	-
	C4	60	100	-	-	-	-
	C5	45	100	-	-	-	-
	C6	46	98	2	-	-	-
	C7	45	100	-	-	-	-
	C8	60	100	-	-	-	-
	C9	35	95	5	-	-	-
	C10	60	100	-	-	-	-
	Mean	525	99%	1%	0%	0%	0%
Agrammatic speakers	A1	26	4	96	-	-	-
	A2	50	-	100	-	-	-
	A3	51	29	10	-	18	43
	A4	58	59	19	-	2	21
	A5	50	20	34	-	-	46
	A6	59	98	2	-	-	-
	A7	35	9	88	-	3	-
		Mean	329	37%	43%	-	3%

Furthermore, the production of indirect object clitics was analyzed under different conditions for the group of agrammatic speakers (given that the non-brain-damaged speakers scored at ceiling). The first analysis was to check whether there is a difference in production of indirect object clitics between the obligatory and the optional conditions. The analysis shows that there is no significant difference. Agrammatic speakers produced a correct indirect object clitic in 25% of cases in the obligatory condition and 21% of the time in the optional condition. The error analysis revealed that neither is there any difference between the two conditions in the type of error produced ($\chi^2=0.07$; $df=2$; $p=0.96$). In both conditions the major error type is represented by omissions of clitics (67% in both conditions). Table 24 and table 25 show the relative data and results.

Table 24: Production of indirect object clitics in the obligatory and the optional condition. Row percentages. Chi-square and p-values are presented.

Conditions	Type of production		
	n	Correct	Incorrect
Obligatory	137	25	75
Optional	113	21	79
χ^2 value;(df=1)		0.38	
p-value		0.39	

Table 25: Type of errors in the obligatory and optional condition while producing indirect object clitics. Row percentages. Chi-square and p-values are presented.

Conditions	Type of error			
	n	Omissions	Gender errors	Number errors
Obligatory	102	68	5	27
Optional	105	67	6	28
χ^2 value;(df=2)				0.07
p-value				0.96

Within the obligatory condition an analysis was made of whether there is a difference in the number of correct clitics when they have to be produced before a finite verb or before a finite auxiliary. In the first instance the analysis revealed that agrammatic speakers produced significantly more correct indirect object clitics when they had to produce them before a finite auxiliary ($\chi^2 = 10.84$; $df=1$; $p < 0.01$), but a subject by subject analysis revealed, however, that participant A4 was the only participant for whom this difference was actually significant ($\chi^2 = 15.30$; $df=1$; $p < 0.01$). Participant A4 classifies, therefore, as an outlier and he was eliminated for the second analysis, which revealed that there is no significant difference in the number of correct clitics produced between the two conditions under consideration. The error analysis also revealed that there is no difference in the type of errors produced between the two obligatory conditions ($\chi^2 = 1.12$; $df=2$; $p < 0.57$), clitic omissions being the most frequent error (ranging from 65% to 69% in the two conditions). Table 26 shows the data and statistical results.

Table 26: Production of indirect object clitics in the two obligatory conditions. Row percentages. Chi-square and p-values are presented.

Conditions	Type of production		
	n	Correct	Incorrect
Obligatory before finite verb	59	10	90
Obligatory before finite auxiliary	50	20	80
χ^2 value;(df=1)			2.08
p-value			0.18

5.5.4 Position of indirect object clitics

This test (as with the test for direct object clitics) prompted sixty sentences in which the indirect clitic had to be produced before the verb (finite verb or finite auxiliary) and sixty sentences in which the clitic could optionally be placed before or after the verbal complex. It was interesting to note that once a clitic was correctly produced it was placed in both the obligatory and the optional conditions.

In the obligatory condition when clitics were correctly produced, they were always produced in the correct position both for non-brain-damaged speakers and for agrammatic speakers; therefore, they were always placed before a finite verb or before a finite auxiliary when the structure required it.

In the optional condition the analysis shows that non-brain-damaged speakers produced 41% of indirect object clitics in the enclitic position and 59% of them in the climbed position. Moreover, for five non-brain-damaged speakers out of ten (C1, C4, C6, C7 and C10) the position in which the clitic was produced was significantly associated with the position in which the clitic was prompted. For the other five (C2, C3, C5, C8 and C9) the position in which they produced the clitic was not associated with the position in which the clitic was prompted. Agrammatic speakers produced a total of 57 correct indirect clitics in the optional condition.³¹ The analysis revealed that all of them were produced in the enclitic position, independent from the position in which the clitic was prompted. Only participant A6 produced 33% of clitics in the climbed position when they are prompted in that position. Overall, agrammatic speakers produced significantly more indirect clitics in the enclitic position than non-brain-damaged speakers. All data sets are schematized in Table 27 and Table 28.

Table 27: Position of correctly produced indirect object clitics in the optional condition. Row percentages. Chi-square and p-values are presented.

Group	n	Clitic placement	
		Enclitic	Climbed
Non-brain-damaged speakers	298	41	59
Agrammatic speakers	57	91	9
χ^2 value;(df=1)		47.76	
p-value		<0.01	

³¹ The clitic production of participant A6 was analysed as well, relative to the clitic position, even though he scores within the normal range regarding the number of correctly produced clitics.

Table 28: Association between the prompting position and the position of produced clitics. Row percentages.

Group	Participants	Prompting position	n	Position Produced Clitic		Association For all: df=1
				Enclisis	Climbed	
Non-brain-damaged speakers	C1	ENP	15	93	7	$\chi^2=9.6$ p<0.05
		CLP	15	40	60	
	C2	ENP	14	-	100	-
		CLP	15	-	100	
	C3	ENP	15	7	93	$\chi^2=1$ p=0.5
		CLP	15	-	100	
	C4	ENP	15	100	-	$\chi^2=6$ p<0.05
		CLP	15	67	33	
	C5	ENP	15	40	60	$\chi^2=2.7$ p=0.1
		CLP	15	13	87	
	C6	ENP	14	71	29	$\chi^2=4.2$ p<0.05
		CLP	15	33	67	
	C7	ENP	15	100	-	$\chi^2=15$ p<0.05
		CLP	15	33	67	
	C8	ENP	15	27	73	$\chi^2=2.1$ p=0.1
		CLP	15	7	93	
	C9	ENP	15	60	40	$\chi^2=2.1$ p=0.1
		CLP	15	33	67	
	C10	ENP	15	100	-	$\chi^2=30$ p<0.05
		CLP	15	-	100	
Agrammatic speakers	A1	ENP	-	-	-	-
		CLP	-	-	-	
	A2	ENP	-	-	-	-
		CLP	-	-	-	
	A3	ENP	3	100	-	-
		CLP	5	100	-	
	A4	ENP	8	100	-	-
		CLP	7	100	-	
	A5	ENP	2	100	-	-
		CLP	3	100	-	
	A6	ENP	14	100	-	-
		CLP	15	67	33	
	A7	ENP	-	-	-	-
		CLP	-	-	-	

Legend:

CP: Clitic Position; ENP: Enclitic Prompted; CLP: Climbing Prompted

5.6 Direct object clitics versus indirect object clitics

Table 29 summarises the data on clitic production for all agrammatic speakers for direct and indirect object clitics. The table shows that when a correct sentence structure is produced agrammatic speakers produce 57% of correct direct object clitics, whereas they produce 37% of indirect object clitics. The difference is significant ($\chi^2=23.31$; df=1; p<0.01).

Table 29: Production of direct and indirect object clitics. Row percentages.

Clitic type	n	Correct	Omissions	Full NP	Gender errors	Number errors	Person errors
Direct object clitics	304	57	22	15	4	2	-
Indirect object clitics	329	37	43	-	3	-	17

Furthermore, the error analysis shows that omissions are produced significantly more frequently when producing indirect object clitics ($\chi^2 = 7.8$; $df=1$; $p<.01$), and that substitutions of the clitic with a full NP happen only when producing direct object clitics; none of these substitutions happen when producing indirect object clitics. The analysis reveals that there is no difference in gender errors ($\chi^2 = 1.1$; $df=1$; $p=0.1$). Person errors are only produced when producing indirect object clitics (28% of errors). Data sets are presented in Table 30.

Table 30: Error production in direct and indirect object clitics. Row percentages.

Clitic type	n	Omissions	Full NP	Gender errors	Number errors	Person errors
Direct object clitics	131	51	37	8	4	-
Indirect object clitics	207	67	-	5	-	28

Moreover, cross-analyses reveal that both in the obligatory and in the optional conditions, agrammatic speakers produce significantly fewer correct indirect object clitics than direct object clitics. (Obligatory condition: $\chi^2 = 14.80$; $df=1$; $p<0.01$. Optional condition: $\chi^2 = 27.08$; $df=1$; $p<0.01$)

5.7 Discussion and conclusions

First, the data set presented in this chapter confirm that agrammatic speakers produce significantly fewer correct clitics than non-brain-damaged speakers. This is true for both direct and indirect object clitics, even though there is a significant difference between direct and indirect object clitics, indirect object clitics being significantly more difficult to produce for agrammatic speakers than direct object clitics. This was true for both the obligatory and the optional conditions. The error analysis reveals that when producing direct object clitics agrammatic speakers omit clitics in 22% of cases, and they substitute them with the relevant full NP in 15% of cases. Gender and number errors are produced in 4% and 2% of cases, respectively. When producing indirect object clitics, agrammatic speakers omit them significantly more often than direct object clitics (43%), and they never substitute an indirect object clitic with the relevant full NP or strong pronoun. Gender errors constitute 3% of errors and person errors constitute the 17% of them. For both direct and indirect object clitics, the

analyses revealed that there is no difference in the number of correctly produced clitics between the obligatory and the optional condition. Also, there is no difference in the number of correct clitics produced between the two obligatory conditions when the clitic has to be produced before the finite auxiliary or before a finite verb. As far as clitic placement is concerned, for both direct object and indirect object clitics in the two obligatory conditions whenever a clitic was correctly produced, it was always produced in a good position. On the other hand, when clitics were correctly produced in the optional condition the following data emerged. Overall, non-brain-damaged speakers showed a general preference to produce clitics in the climbed position, i.e. before the verbal complex, both for direct and indirect object clitics. Moreover, for half of non-brain-damaged speaker participants the position of the produced clitic was related to the position of clitics presented in the task, whereas for the other half the position of the produced clitic was not task related³². On the contrary, agrammatic speakers produced overall (direct object clitics and indirect object clitics) more clitics in the enclisis position than in the climbed position (79% of the total clitics produced in the optional condition are produced in the enclisis position). Crucially, agrammatic speakers produced them in the enclisis position even if clitics are presented in the climbed position in the prompting sentences. Only two agrammatic speakers (A4 and A6) produced more direct object clitics in the climbed position than in the enclisis position. When producing an indirect object clitic, all clitics produced are placed in an enclisis position. Only participant A6 produced 17% of indirect object clitics in the climbed position.

Interpreting the results according to the formulated hypotheses regarding the possible underlying disorder for clitic impairment in agrammatic speech, the following considerations arise. If the underlying disorder is at the phonological level, as proposed by Kean (1979), this work hypothesized that there should not be a difference in clitic production among the several tested conditions, and between the different types of clitics. First, these results show that there is a significant difference in the number of correctly produced clitics between direct and indirect object clitics and, secondly, there is a significant difference in the number of clitics produced between enclisis and the climbed position. If it was the case that the underlying disorder affecting clitic production is phonological in nature, neither the observed difference between direct and indirect object clitics, nor the difference in the number of produced clitics between

³² This pattern goes against the data reported in Benincá (1986). Even participants coming from the North-East part of Italy seem to prefer climbing over enclisis. It is yet unclear if this observed pattern is a pure language driven one or a task driven one. In any case, it could fortify the observed data from agrammatic speakers, in the sense that their performance cannot be interpreted as a bias due to their region of origin.

enclisis and the climbed position, should have been observed.

It is furthermore proposed that the underlying problem with clitic production could be found at the morphological level. If this was the main problem linked to clitic production, a relatively large number of morphological errors would be expected. Instead, data show that both for direct and indirect object clitics the largest number of errors are represented by omissions of the clitic and substitutions with the relevant full NP (this last error appears only with direct object clitics). Moreover, the small number of gender, number and person errors that could have been regarded as errors at the morphological level, are a reflection of case features, given that case is an inherent syntactic property of a lexical entry. Moreover, a morphological deficit is ruled out by the observed difference between direct and indirect object clitics. The present results suggest therefore that morphology does not seem to play a crucial role as an underlying deficit in clitic production in agrammatism.

The third underlying deficit which could cause a clitic production impairment is related to the syntactic component of the language. Specifically, the impairment could derive from a difficulty in operating Clitic Placement (CI-PI) which is the syntactic operation which overtly moves clitics to let them check their case features, i.e. what was called here the Clitic Placement Deficit Hypothesis (CI-PI-DH). Clitic pronouns bear strong case features that have to be checked and interpreted at the phonological level, and this is the main reason for them to move overtly in syntax. The CI-PI-DH predicted that if CI-PI is what is impaired, there should not be any difference in the number of correct clitics produced across conditions and, moreover, it predicted that omissions or substitutions of clitics with the relevant full NP were expected as error types as a reflection of the fact that CI-PI did not (correctly) apply. Our data confirm this hypothesis, i.e. there was no difference in correct clitic production across conditions, and the error pattern is mainly constituted by omissions of the clitics and with their substitution with a full NP. The CI-PI-DH additionally predicted that, in obligatory clitic placement conditions, if CI-PI has been correctly applied clitics will always be produced in a correct position. This prediction was supported by the data, i.e., whenever a clitic was correctly produced in obligatory contexts it was always produced in a correct position. Finally, the CI-PI-DH predicted that in the optional condition (where participants could chose whether to produce the clitic before or after the verbal complex), agrammatic speakers would have produced an equal number of clitics in the climbed and in the enclisis position, or their performance should have been similar to that of the group of healthy speakers. The data sets show that this last prediction is not verified. Agrammatic speakers produce overall 79% of clitics in the enclisis position and only 21% of them in the climbed position, whereas healthy speaker participants produce overall 65% of clitics in the

climbed position and 35% of clitics in the enclisis position. These data sets arise even taking into consideration participant A6, who performs within the normal range, at least as far as the number of correct clitics goes. The percentage of clitics produced in the climbed position would drop in case participant A6 would be eliminated from the analysis. Importantly, the fact that agrammatic speakers produced clitics that were still in the enclisis position even if the clitic was presented in the climbed position in the prompting sentences, shows that their pattern was not task-related.

The results here also show that indirect object clitics are more difficult to produce than direct object clitics. This result can be explained in terms of CI-PI-DH. The CI-PI-DH predicts that indirect object clitics should be more difficult to produce than direct object clitics because of the additional feature they bear, i.e. the specification for person. Person features are inherently linked to the clitic which at its turn in order to be correctly spelled out has to check its case features in syntax. As a consequence, checking more features renders the application of CI-PI more difficult. The results show that not only is there a difference between direct and indirect object clitics with respect to the number of correct clitics produced, but also a difference with respect to the error pattern. Specifically, these data sets show that direct object clitics are omitted or substituted with a relevant full NP, whereas indirect object clitics are never substituted with the relevant full NP. There can be several explanations for this phenomenon. First, in Italian, a full indirect complement is expressed with a preposition and a noun ('Dai la mela a Maria'; 'Give the apple to Mary'), whereas a full direct complement needs just a full NP. This could be an explanation as to why agrammatic speakers never substitute an indirect object clitic with the relevant indirect full NP. Producing a preposition and a full NP is a costly operation. Indeed, prepositions are known to be often omitted by agrammatic speakers, especially prepositions which are linked to syntax (Miceli, Silveri, Romani & Caramazza, 1989; Miceli & Mazzucchi, 1990). Moreover, the difference in production between direct and indirect object clitics could be explained in terms of complexity of the argument structures, in Thompson's terms (Thompson, Shapiro & Schendel, 1995; Thompson, 2003). Thompson, et al. (1995) elicited narrative speech by having the agrammatic speakers tell a fairytale. They reported that agrammatic speakers showed a tendency to produce verbs with no internal argument (i.e. intransitive verbs, such as *to swim*) or with only one internal argument (simple transitive verbs that only take an object, such as *to read*), whereas verbs with two internal arguments (so-called ditransitives, such as *to give something to someone*) and verbs with sentential arguments (such as *I believe that I will go*) are hardly ever produced. This finding, together with the results of additional experiments (Thompson, 2003) led to the ARGUMENT STRUCTURE COMPLEXITY HYPOTHESIS (ASCH) that states that the more complex the argument structure of a verb, the more difficult it is for

agrammatic speakers to produce it, and this is due to a disorder of retrieval or processing of the verb lemmas. Producing a verbal structure with two internal complements, i.e. typically a direct object and an indirect object, is more difficult than producing a verbal structure with only one internal complement. The observed difference in production between direct and indirect object clitics could mirror a difficulty in retrieving a more complex verbal structure, and this could result in a diminished number of indirect clitics produced.

The other hypothesis at the syntactic level that was proposed followed the idea of the Derived Order Hypothesis (DOP-H), saying that what is difficult for agrammatic speakers is to produce a word order which is derived from the basic order of constituents. For clitic production DOP-H predicts that there should not be any difference in the number of correct clitics in the obligatory condition between producing a clitic before a finite verb or a finite auxiliary, because both structures imply a derived order. The data sets show that there is a difference neither for direct nor for indirect object clitics. Again, whenever a clitic is correctly produced in an obligatory context, the expectation is that it will be placed correctly. If the problem is due to a difficulty in producing a derived order of constituents, the DOP-H predicted that (clitic position being the same) there should not have been a difference between direct and indirect object clitics. The results show that this prediction is falsified, i.e. indirect object clitics are more impaired than direct object ones. What differentiates DOP-H from CI-PI-DH was the prediction about production of clitics in the optional condition. Crucially, DOP-H predicts that agrammatic speakers will produce more clitics in the enclisis position (where the order of constituents is not derived) than in the climbed position (where the order of the constituents is derived). The data sets presented here confirm this prediction. Agrammatic speakers produce significantly more clitics in the enclisis than in the climbed position.

Finally, the data and results of these two experiments lead to the conclusion that the impairment in clitic production is not due to an impairment at the phonological level, nor at a morphological one, but these results can best be explained assuming an underlying deficit at the syntactic level.

The data sets presented in this chapter partially support and partially reject both the CI-PI-DH and the DOP-H. On the one hand, the observed error pattern (clitic omissions and substitutions), the fact that there was no difference in the number of correct clitics produced between the two obligatory conditions, and the difference in production between direct and indirect object clitics, support the predictions made by the CI-PI-DH. On the other, the observed difference in producing clitics in the enclisis position significantly more than in the climbed position is contrary to the prediction made by the CI-PI-DH. The DOP-H is similarly supported by the observed error patterns and by the fact that there was no difference in the number of clitics

produced between the two obligatory conditions. The fact that agrammatic speakers prefer to produce clitics in the enclisis position, i.e. where the order of constituents is not derived, supports the predictions made by the DOP-H, but the significant difference in the production of direct and indirect objects (when they are produced in the same derived order) does not support the predictions made by the DOP-H.

Therefore, no clear explanation is obvious regarding the underlying deficit that causes an impaired clitic production. The data sets presented in this chapter are not sufficient to make stable conclusions, and at the moment both the Cl-Pl-DH and the DOP-H could be valuable explanations.

Apostil

The data sets presented in this chapter show that in optional conditions healthy speakers show an overall preference for producing clitics in the climbed position, i.e. before the verbal complex. Specifically, when producing direct object clitics, five participants produce more clitics in the climbed position (irrespective of the position in which clitics were presented in the prompting sentences), and the other five produce approximately half of clitics in the enclisis position and half of them in the climbed position, showing a relation with the position of the clitic in the prompting sentences. For indirect object clitics the picture is similar: they generally show a preference for producing the clitic in the climbed position. Moreover, five participants produce the clitic in a similar position to the prompting sentences, and with the other five the position of the produced clitic is not task related. It is not possible at this point to give any particular explanation for this phenomenon. As explained in chapter 2 it can only be proposed that what plays a role in the position of clitics in optional contexts (in normal speech) is driven by some regional use of one structure in respect of another. Certainly, the position of clitics in the prompting sentences played a role, as shown by the fact that approximately half of the healthy control participants were influenced by the proposed clitic position.

CHAPTER 6

CLITIC PRODUCTION IN IMPERATIVE SENTENCES

6.1 Italian imperative sentences

6.1.1 True and suppletive imperative verbs

In Italian, an order can be given using a sentence with an illocutionary imperative force. In Italian, the imperative paradigm is specified for the second and third person singular forms,³³ and for the first and second person plural. The following sentences give relevant examples.

(1)

a. Mangia!

Eat_{2nd person sing.!}

b. Che mangi!

That (she/he) eat_{3rd person sing.!}

c. Mangiamo!

Let's eat_{1st person plur.!}

d. Mangiate!

Eat_{2nd person plur.!}

e. Che mangino!

That they eat_{3rd person plur.!}

Italian displays two different verb types to express an imperative sentence. The verb used in example (1a) is addressed as the TRUE IMPERATIVE whereas the verbs used in (1b), (1c), (1d) and (1e) are SUPPLETIVE IMPERATIVES (Zanuttini, 1996). True imperatives have a specific

³³ For the third person singular a verb in the subjunctive form has to be used. The same goes for the third person plural.

morphological form which differs from other verbs in other moods (i.e. indicative or subjunctive). Suppletive imperative verbs, instead, take as a surrogate other verbal forms, i.e. infinitival, indicative or subjunctive. Even though this work will not enter into a discussion of the morphological difference between true and surrogate imperative verbs, it will exemplify the syntactic differences and the difference in verb typology between them. The first observation comes when trying to substitute them in declarative sentences, as shown in the following examples.

(2)

- a. *Tu mangia sempre pane
You_{2nd person sing.} always eats_{3rd person sing.} bread

- b. Voi mangiate sempre pane
You_{2nd person plur.} always eat bread

- c. Noi mangiamo sempre pane
We_{1st person plur.} always eat bread

The ungrammaticality of (2a) is clear. A true imperative verbal form cannot substitute a verbal form in the indicative mood. Examples (2b) and (2c), in which a suppletive verb is used, are perfectly grammatical sentences, showing that a suppletive imperative verb is somehow different from a true imperative, and that it can be used in a declarative sentence. Because of these examples it is postulated that Italian displays only one true imperative verbal form, i.e. the second person singular.³⁴ The fact that true imperatives are different from verbs in other verbal forms is particularly visible for Italian verbs of the first declination (verbs ending in –are) in that the two verb forms are morphologically different. For the verbs of the other two declinations (i.e., the second, with verbs ending in –ere, and the third, with verbs ending in –ire) true imperatives are homophones, and homographs with the verbs in the indicative form, as shown in (3), (4) and (5).

³⁴ Among the Romance languages, some languages have patterns like Italian, showing only one form of true imperative verbs, like Catalan, whereas other languages, like Spanish, show two true imperative verbal forms (Zanuttini, 1997).

(3) Verbs of the first declination (verbs ending in –are)

a. *Mangia* la mela!

Eat 2nd person sing. the apple!

b. Tu *mangi* la mela

You 2nd person sing. eat the apple

(4) Verbs of the second declination (verbs ending in –ere)

a. *Mordi* la mela!

Bite 2nd person sing. the apple!

b. Tu *mordi* la mela

You 2nd person sing. bite the apple

(5) Verbs of the third declination (verbs ending in –ire)

a. *Pulisci* la mela!

Clean 2nd person sing. the apple!

b. Tu *pulisci* la mela

You 2nd person sing. clean the apple

From these examples it is clear that true imperative verbs differ from suppletive ones, not only at the morpho-phonological level but most probably at a syntactic level, as well. In the next paragraph the structure of Italian negative clauses and their relation to imperative sentences will be described. It is exactly by describing this relation that more insight will be provided into the syntax of (true and suppletive) imperative verbs.

6.1.2 Negative clauses, negative markers and imperative sentences

Romance languages use negative markers to negate a clause, which are a separate element in the clause. In certain languages negative markers are obligatorily placed in the pre-verbal position (Italian ‘non’, Spanish ‘no’) and they have to be adjacent to the finite verb (or to the relevant auxiliary), whereas in other languages such as the Italian Piedemontese or Occitan the negative marker has to be placed after the verb. Examples (6a) and (6b) illustrate two negative sentences

from Italian and Spanish, respectively. Examples (7a) and (7b) show the use of post-verbal negative markers in Piedemontese and Occitan.³⁵

(6)

a. Maria *non* ha mangiato
Maria not has eaten
'Maria did not eat'

b. Ivan *no* beve
Ivan not drinks
'Ivan does not drink'

(7)

a. Maria parla *nen*
Maria speaks not
'Maria does not speak'

b. Maria parle *pas*
Maria speaks not
'Maria does not speak'

A third possibility is represented by languages in which the two negative markers are both present in the clause. The most familiar example is French which uses both negative markers: one ('ne') in the preverbal position and the other ('pas') in the postverbal position. Even though standard Italian needs only one pre-verbal negative marker to negate a clause, vestiges of the existence of post-verbal negative markers are still visible in some constructions, in which the pre-verbal negative marker is followed by some post-verbal particles which enhance the negativity of the clause.³⁶ An example from French is shown in (8a), and an example from Italian is shown in (8b).

³⁵ Examples (7a) and (7b) are reported from Zanuttini (1997).

³⁶ We report here the most typical post-verbal negative particles used in Italian, i.e. 'mica'. Note that in some variants of Italian, like Casalasco, (a variant of Italian spoken in the Lombardy region) only the

(8)

- a. Julie *ne* mange *pas* la pomme
Julie not eats not the apple
'Julie does not eat the apple'

- b. Giulia *non* mangia *mica* la mela
Giulia not eats not the apple
'Giulia does not eat the apple'

Even though this work will not enter into the details of the syntax of French negative clauses, it is important to mention that from Pollock's work on French (Pollock, 1989) and from Zanuttini's work on Italian (Zanuttini, 1997; 2001) a fundamental difference between preverbal and postverbal negative markers arises regarding their syntactic status. Preverbal negative markers are functional heads; postverbal negative markers are not (Zanuttini, 1996; 2001; Pollock, 1989). Preverbal negative markers head the functional projection NegP, which Zanuttini (2001) assumes (for Italian), to be lower than TP and higher than VP.

It is exactly the link between imperative verbs (in specific true imperatives) and negative sentences which makes possible an understanding of the morphosyntactic differences between true and suppletive imperatives. The following examples taken from Italian introduce the reasoning.

(9)

- a. Mangiate la torta!
(You_{2nd person plur.}) eat the cake!

- b. Non mangiate la torta!
(You_{2nd person plur.}) not eat the cake!
Do not eat the cake!

(10)

post-verbal negative particle is used, as in: 'Sta' *mia* sbraia!' (Do not scream!), or 'Gianni l'ha *mia* magna' al pom' (Gianni did not eat the apple).

- a. Mangiamo la torta!
Let's eat _{1st person plur.} the cake!

- b. Non mangiamo la torta!
Let's not eat _{1st person plur.} the cake!

(11)

- a. Mangia la torta!
Eat_{2nd person sing.} the cake!

- b. *Non mangia la torta!
Not eat_{2nd person sing.} the cake!

Whenever an imperative sentence is negated, the negative particle 'non' enters the structure of the clause. Suppletive imperative verbs can be perfectly negated by the pre-verbal negative marker as shown in (9b) and (10b). True imperatives, on the contrary, cannot be negated by a pre-verbal negative marker, as the ungrammaticality of (11b) shows.

In languages which display the use of postverbal negative markers (like Occitan or Piedemontes), a true imperative verb can be negated by the negative post-verbal marker, as shown in (12a) and (12b).

(12)

- a. Parla nen! (Piedemontes)
Speak_{2nd person sing.} not!
'Do not speak!'

- b. Parle pas! (Occitan)
Speak_{2nd person sing.} not!
'Do not speak!'

In Italian, in order to negate a true imperative verb, a suppletive infinitive verb is used instead, as shown below:

(13)

- a. Non mangiare_{inf} la torta!

Do not eat the cake!

After disentangling this phenomenon in different languages, Zanuttini (1996) concludes that true imperatives are underspecified with respect to some features. True imperative verbs are composed of a verbal root, a thematic vowel and in some cases an agreement morpheme, but they crucially lack marking for tense, aspect and mood.³⁷ This is the reason that true imperatives cannot be negated by a pre-verbal negative marker. This proposal is further developed by Zanuttini in the light of the syntactic derivation of imperative sentences, which will be outlined in the next paragraph.

6.2 Imperative sentences and their relation to pronominal clitics

Imperative sentences express an illocutionary imperative force which needs to be checked in syntax. According to Zanuttini (1997), the illocutionary force of an imperative sentence is checked in C°, i.e. the feature [+ imperative] needs to be checked by some elements in the sentence in order to have the correct imperative force. Appropriate elements to move to C° are: verbs, verbal features and pre-verbal negative markers. Zanuttini assumes that in the derivation of affirmative imperative sentences, the verb (both true and suppletive imperative verbs) moves to C° filling the necessary position for an imperative sentence to have a correct illocutionary imperative force. Whether it is the verb itself which moves to C°, or verbal features which do so, is still unclear. Nevertheless, support for the view that it is the verb itself which moves to C° comes from the relative position of the verb with respect to pronominal clitics. Indeed, in imperative sentences, when a verb is combined with a pronominal clitic, the order of the constituents is verb-clitic (as shown in examples (14a) and (15a), which is the reversed order to the one displayed in declarative sentences with finite verbs, i.e. clitic-verb, as shown in examples (14b) and (15b). The verb-clitic order is valid both for true and suppletive imperatives.

³⁷ We will not now specifically deal with the explanations given by Zanuttini of why true imperatives are underspecified for tense and aspect (mainly morpho-phonological reasons), but we will focus on the lack of mood features.

(14)

- a. Mangiala!
Eat it!

- b. Daniele la mangia
Daniele it eats
'Daniele eats it'

(15)

- a. Mangiamola!
Let us eat it!

- b. Noi la mangiamo
We it eat
'We eat it'

In declarative sentences, the verb is assumed to left-adjoin to the clitic to its further movement to AgrSP, which is still a lower position than CP. Again, the fact that in imperative sentences the verb is linearly placed before the clitic assumes an extra movement of the verb to C°. As far as negative imperatives are concerned, in example (11b) it was already shown that a true imperative in Italian cannot be negated by a pre-verbal negative marker, but instead a suppletive infinitival verb has to be used, as in example (13a). The two examples are repeated here for the sake of clarity.

(16)

- a. *Non mangia la torta!
Not eat the cake!
'Do not eat the cake!'

- b. Non mangiare la torta!
Not eat the cake
'Do not eat the cake!'

Zanuttini (1997) suggests that in Romance languages (Italian included), even if they show one type of negative marker, it is possible to assume that two different types of negative markers are present depending on the context. A negative marker is used in sentences with an illocutionary imperative force, and a negative marker is used in sentences which do not have an imperative illocutionary force.³⁸ As a consequence, Zanuttini assumes that Italian displays two types of negative markers (which are homophonous and homograph to each other). One is used in negative imperative sentences and, importantly, it requires marking for mood, and the other is used in non-imperative sentences, and it does not require mood marking. Given these characteristics of the pre-verbal negative marker used in imperative sentences, Zanuttini describes as follows the syntactic derivation of negative imperative sentences. For all imperative sentences, the imperative force of the sentence has to be checked in C° . In this case the pre-verbal negative marker, which is suitable and the closest element to C° , will move to it. If an imperative sentence is a negative one, there is the requirement that the MoodP projection should be filled as well. At this point of the derivation, a true imperative verb, which is underspecified for mood, cannot be the element which fills the MoodP projection. This is the reason why a true imperative verb cannot be negated by a pre-verbal negative marker. An element which is suitable to fill MoodP is needed for a negative imperative to be grammatical. To explain which could be the element which can fill MoodP it is necessary to introduce two new examples:

(17)

a. Non mangiarla!

Not eat_{inf} it!

'Do not eat it!'

b. Non la mangiare!

Not it eat_{inf}!

'Do not eat it!'

As shown in examples (17a) and (17b), Italian displays two possible positions for a pronominal clitic particle in negative imperatives. The first one is post-verbal, i.e. the enclisis position,

³⁸ The argument given by Zanuttini for this duality in the nature of negative markers, finds its roots in the difference found in Latin between the negative marker used in the so called 'prohibitive sentences', i.e. jussive sentences, and another type of negative marker used in non-jussive sentences.

whereas the second one is pre-verbal, i.e. the proclisis position. The first case perfectly patterns with the order seen in declarative sentences (where in case the verb is non-finite the clitic always follows the verb); intuitively, the second case should be considered ungrammatical. Whenever an Italian declarative sentence displays a non-finite verb, the pronominal clitic has to be placed after the verb. Zanuttini (1997), following Kayne (1992), and taking as an example some variants of Italian, assumes that non-finite verbs in negative imperative sentences are different from regular non-finite verbs. Specifically, non-finite verbs seen in negative imperatives are licensed by an abstract auxiliary. Indeed, some Italian dialects obligatorily show an overt auxiliary when expressing a negative imperative. Two examples are presented here, one from Padovano, the dialect spoken in Padua (Veneto region), and the other from Casalasco, a dialect spoken in the Po region.

(18)

Padovano

- a. Non *stá* magnar!
Not + aux + eat_{inf}!
'Do not eat!'
- b. *Non magnar!
Not + eat_{inf}!
'Do not eat!'

(19)

Casalasco

- a. *Stá* mia sbraia!
Aux + negative marker + shout_{inf}!
'Do not shout!'
- b. *Mia sbraia!
Negative marker + shout_{inf}!
'Do not shout!'

Examples (19a) and (19b) show that in Padovano and Casalasco the use of an overt auxiliary (in this case 'stare') to form a negative imperative is obligatory. Not producing the auxiliary leads to

an ungrammatical sentence, as (18b) and (19b) show. At this point it is fundamental to infer that examples (17a) and (17b) can be reinterpreted as having the non-finite verb licensed by an abstract auxiliary. Thus they can be paraphrased as follows:

(20)

- a. Non (\emptyset auxiliary) mangiar*la*!
Not eat_{inf} it!
'Do not eat it!'

- b. Non *la* (\emptyset auxiliary) mangiare!
Not it eat_{inf}!
'Do not eat it!'

Negative imperative sentences could be reinterpreted as an instance of restructuring, in terms of Rizzi (1982), i.e. where two single verbs can be reinterpreted as one single verbal complex. Importantly, the apparent inversion of the order (otherwise obligatory), non-finite verb-clitic to clitic-non-finite verb, is nothing other than the reflection of what can be seen in restructuring sentences in which clitics have climbed before the verbal complex. Going back to the derivation of negative imperatives, the negative pre-verbal marker is the one (being the closest element) that fills C° . The active projection MoodP will then be filled by an abstract (in case of standard Italian) or an overt (in case of some variants of Italian) auxiliary, which is a suitable element to fill MoodP.

6.3 Experimental goals and hypotheses

By studying the production of pronominal clitics in the context of imperative sentences, three goals are aimed at. The first is to investigate the production of imperative clauses in agrammatic speakers. Specifically, the aim here is to see whether there will be a difference in producing affirmative and negative imperative sentences, given the assumed different derivation for these two structures. It is hypothesized that affirmative imperative sentences will be more difficult to produce than negative imperative ones. Affirmative imperative sentences require that the verb moves with a long movement to C° to check the imperative illocutionary force of the sentence, whereas in negative imperative sentences, this is not the case, given that it is the preverbal negative marker which moves with a short movement to C° .

Chapter VI

The second goal is to proceed with the investigation on the production of pronominal clitics in various conditions (imperative sentences constitute an interesting syntactic context). The production of both direct and indirect object clitics in affirmative and negative imperative sentences will be tested, and the error pattern related to it will be analysed. Moreover, the analysis of the position in which pronominal clitics will be produced in affirmative and negative imperative clauses will be examined. As seen in the introductory part of this chapter, affirmative imperative sentences require an obligatory verb-clitic order, whereas negative imperative sentences imply that pronominal clitics can be placed either before or after the infinitival verb, giving rise to clitic-verb or verb-clitic order, respectively. The aim is to study the production of pronominal clitics in imperative sentences to further test the two hypotheses tested in the previous chapter, which assume an underlying disorder at the syntactic level. The first is that addressed as the Clitic-Placement Deficit Hypothesis (CI-PI-DH), which assumes that clitic production is difficult for agrammatic speakers as a consequence of the fact that the syntactic operation of Clitic Placement is difficult. The second hypothesis to be tested is the Derived Order Problem Hypothesis (DOP-H) which predicts that pronominal clitics are difficult to produce for agrammatic speakers because they have to be produced in a different position respect to the base order of constituents in the sentence. Taking into consideration these two hypotheses, it is possible to make clear predictions on the clitic production pattern, and the eventual error pattern related to it. Also, predictions can be formulated on the position in which clitics will be produced in affirmative and negative imperative sentences.

If the CI-PI-DH is correct, the prediction here is that clitics should be equally impaired when produced in affirmative or negative imperative sentences, irrespective of whether their position is pre-verbal or post-verbal. Clitic Placement (CI-PI) assumes that clitics have to undergo overt movement in order to be phonologically realized, irrespective of their position in respect of the hosting verb. As far as the error pattern is concerned, if the CI-PI-DH is correct, omissions can be expected of clitics and substitutions with the relevant NP. If CI-PI does not apply, clitics cannot be interpreted at the phonological level, and they will therefore be omitted or substituted with a relevant full NP. Moreover, regarding the position of clitics once they are produced, the CI-PI-DH predicts that in affirmative imperative sentences, where the clitic has to be produced in the post-verbal position, they will always appear in the correct position, as CI-PI is correctly applied. Regarding the position in negative imperative sentences, where clitics can be optionally placed either before or after the verb, CI-PI-DH predicts that agrammatic speakers will produce the same number of clitics before and after the verbal complex, in that for both positions CI-PI has to apply. Also, the CI-PI-DH expects a difference in the number of correct productions

between direct and indirect object clitics because indirect object clitics bear an extra feature (person) to be checked in syntax compared to direct object clitics.

If, instead, DOP-H is correct, it is expected that agrammatical speakers produce a similar number of correct clitics affirmative imperative sentences and in negative imperative sentences. Even producing a clitic in an affirmative imperative sentence implies deriving the order of the constituents. When producing a negative imperative sentence participants are virtually free to choose in which position they would produce clitics, it is not possible to make a clear prediction to compare these two conditions. However, DOP-H predicts that when clitics are produced in affirmative imperative sentences, they will be produced in a correct position. Regarding clitic production in negative imperative sentences, the DOP-H predicts that agrammatical speakers should produce the same number of clitics before or after the non-finite verb, because in both cases the order of the constituents in the sentence is derived. Moreover, the DOP-H predicts that there should not be a difference between direct and indirect object clitics, being the position in which they are produced the same.

6.4 Methods

6.4.1 Experiment design

This test was designed to prompt the production of direct and indirect object clitics in affirmative and negative imperative sentences. The test parallels that used for the production of pronominal clitics in declarative sentences described in the previous chapter. The present test is therefore a sentence completion task, where the participants have to complete verbally the sentences of the experimenter.

It includes a total of sixty prompting sentences, thirty of which prompt the production of direct object clitics, and thirty which prompt the production of indirect object clitics. Within the thirty prompting sentences for every clitic type, fifteen sentences prompt the production of affirmative imperative sentences, and fifteen sentences prompt the production of negative imperative sentences. Consequently, when an affirmative imperative sentence is prompted, the expected position of the clitic to be produced is obligatorily post-verbal (therefore, this condition will be termed the OBLIGATORY CONDITION), as shown in the following two examples (respectively for direct and indirect object clitics)

Direct object clitics:

Experimenter:

‘Marco dice a Maria: Non berlo!, invece Gianni dice a Maria?’ ...

Marco tells to Maria: Do not drink it!, instead Gianni tells to Maria...

Participant:

'Bevilo!'

'Drink it!'

Indirect object clitics:

Experimenter:

'Marco dice a Maria: Non *mi* scrivere la lettera!, invece Gianni dice a Maria:' ...

Marco tells to Maria: Do not write me the letter!, instead Gianni tells to Maria...

Participant:

'Scrivimi la lettera!'

'Write me the letter!'

In the thirty cases where a negative imperative sentence is prompted, there is no expected position for the clitic that will be produced, i.e. the clitic can be produced either before or after the verb (OPTIONAL CONDITION). Nevertheless, given that the position of the clitic in the prompting sentences creates a bias for the position in which the clitic will be produced, in half of the prompting sentences (fifteen) clitics are presented after the verb, whereas in the other fifteen, clitics are presented before the verb.³⁹

Experimenter:

'Marco dice a Maria: Non mangiarlo! (or 'Non *lo* mangiare!') Anche Gianni dice a Maria:' ...

'Marco tells to Maria: Do not eat it! Also Gianni tells to Maria:'

Participant:

³⁹ We are aware of the fact that a simpler way to prompt negative imperative sentences, allowing a freedom regarding the position of the clitic would have been to prompt the production of a negative imperative sentence by means of an affirmative imperative one. For example:

Experimenter: 'Marco dice a Maria: Bevilo!, invece Gianni dice a Maria:' ...

Marco tells to Maria: Drink it!, instead Gianni tells to Maria...

Participant:

'Non berlo!' or 'Non *lo* bere!'

'Not drink *it!*' or 'Not it drink!'

Nevertheless, we decided to use a negative imperative as a prompting sentence (varying the position of the clitic proposed) for sake of equality with the design of the experiments discussed in the previous chapter, and because we were interested in 'forcing' the production of the clitic in both positions. Given the optional nature for the position of the clitic in such contexts, allowing a freedom regarding the position of the clitic would not have been very informative.

‘...Non mangiarlo!’ or ‘..... Non lo mangiare!’

‘...:Not eat it!’ or ‘... Not it eat!’

Overall, eighteen verbs were used which were equally subdivided among the three declinations, i.e. six verbs from the first one (ending in –are), six verbs from the second (ending in –ere), and six verbs from the third (ending in –ire). Within the direct object clitic sentences, fourteen sentences contained a clitic in the singular form and feminine gender (‘la’), ten in the singular form and masculine gender, and six in the plural form and masculine gender. Within the indirect object clitics, the thirty items were equally subdivided among the three relevant persons in the singular form: ten presented a clitic in the first singular person (‘mi’), ten in the third person and masculine gender (‘gli’), and ten in the third person and feminine gender (‘le’).

6.4.2 Participants and procedure

Seven agrammatic speakers and ten non-brain-damaged speakers participated in the experiments. The participants are the same as those who participated in the previous experiments.⁴⁰

The experiment was run in a quiet room. Participants sat in front of a computer screen and the experimenter sat next to her/him. The experimental procedure was explained to the participants. There were four trial sentences for every test. In case the task was not clear, additional trial sentences were added until it was evident that the task was understood by the participants. All the experiments were recorded with a digital voice recorder, and all the responses were eventually transcribed for analysis.

6.4.3 Scoring and data analysis

All the answers produced were transcribed and scored. Three main variables were taken into consideration: SENTENCE STRUCTURE, CLITIC PRODUCTION (correct production and error analysis) and CLITIC POSITION. The resulting data sets were compared across the two groups of participants, i.e. non-brain-damaged speakers and agrammatic speakers, and between conditions, i.e. the obligatory condition (affirmative imperative sentences) and the optional condition (negative imperative sentences). Given the nominal nature of the data, the chi-square test was used as a statistical test throughout all analyses.

⁴⁰ We refer the reader to chapter 4, paragraph 3.1

6.5 Results

6.5.1 Sentence structure

The first parameter of interest was the structure of the sentence, i.e. verifying whether there is a difference in the production of imperative sentence structures between non-brain-damaged speakers and agrammatic speakers. Additionally, the test was intended to discern possible differences between the production of affirmative and negative imperative sentences. Results show that there is a significant difference in the production of correct sentence structure between agrammatic speakers and non-brain-damaged speakers. Non-brain-damaged speakers produce 96% of sentences with a correct imperative structure, whereas agrammatic speakers produce 69% of imperative sentences with a correct structure. The error analysis shows that the most frequent change in sentence structure made by non-brain-damaged speakers is to change the structure from a direct imperative sentence into an indirect imperative sentence (4%), which does not have the status of an imperative structure any longer but it is still a legal change, in that it is possible to complete the test sentences with such a structure.⁴¹ Agrammatic speakers, on the other hand, produce a significantly higher number of structure changes, for example from an imperative to a non-imperative indicative sentence structure (21%). Moreover, agrammatic speakers transform an affirmative imperative sentence into a negative one in 5% of the cases, and in 1% of the cases they do the opposite transformation, i.e. they produce an affirmative imperative sentence instead of a negative one. Table 31 illustrates the difference in sentence production between the two groups, and Table 32 illustrates the data for sentence production for each participant.

Table 31: Sentence structure. Row percentages. Chi-square and p-values are presented.

Group	Sentence structure		
	n	Correct	Incorrect
Non-brain-damaged speakers	600	96	4
Agrammatic speakers	420	69	31
χ^2 value; (df=1)		135.12	
p-value		<0.01	

⁴¹ For example the sentence was changed from:

.... Mario dice a Maria: mangiala! (Mario says to Maria: eat it!)

to:

.... Mario dice a Maria di mangiarla (Mario tells to Maria to eat it)

Table 32: Sentence production for every participant of both groups. Row percentages.

Group	Participants	n	Correct	Imp→Ind	Aff→Neg	Neg→Aff	Other
Non-brain-damaged speakers	C1	60	100	-	-	-	-
	C2	60	100	-	-	-	-
	C3	60	100	-	-	-	-
	C4	60	82	17	-	2	-
	C5	60	100	-	-	-	-
	C6	60	100	-	-	-	-
	C7	60	100	-	-	-	-
	C8	60	100	-	-	-	-
	C9	60	75	20	2	3	-
	C10	60	100	-	-	-	-
	Tot	600	96%	4%	0%	0%	0%
Agrammatic speakers	A1	60	65	27	5	-	3
	A2	60	93	-	-	7	-
	A3	60	72	2	23	3	-
	A4	60	95	-	5	-	-
	A5	60	50	48	-	-	2
	A6	60	47	53	-	-	-
	A7	60	62	18	2	-	18
		Tot	420	69%	21%	5%	1%

Legend:

Imp→Ind: Sentences are transformed from sentences with an imperative mood into sentences in the indicative mood.

Aff→Neg: An affirmative sentence is transformed into a negative one.

Neg→Aff: A negative sentence is transformed into an affirmative one.

6.5.2 Production of direct and indirect pronominal clitics

To perform the analyses with respect to clitic production, it was necessary to take into consideration only the sentences produced with a correct structure. Only in this way would the comparison between the two groups regarding clitic position be reliable.

Results show that agrammatic speakers produce significantly fewer correct clitics than non-brain-damaged speakers, both for direct object and indirect object clitics. Non-brain-damaged speakers produce 96% of correct direct object clitics and 98% correct indirect object clitics. Agrammatic speakers, on the other hand, produce 55% correct direct object clitics and 22% correct indirect object clitics. For non-brain-damaged speakers there is therefore no difference between the number of correct direct object clitics and indirect object clitics as shown in Table 33. On the contrary, for agrammatic speakers this difference is significant ($\chi^2=33.71$; $df=1$; $p<0.01$).

Table 33: Clitic production of direct and indirect object clitics for both groups. Row percentages. Chi-square and p-values are presented.

Direct object clitics			
Group	Clitic production		
	n	Correct	Incorrect
Non-brain-damaged speakers	288	96	4
Agrammatic speakers	146	55	45
χ^2 value; (df=1)		105.18	
p-value		<0.01	
Indirect object clitics			
Group	Clitic production		
	n	Correct	Incorrect
Non-brain-damaged speakers	286	98	2
Agrammatic speakers	144	22	78
χ^2 value; (df=1)		279.53	
p-value		<0.01	

The error analysis reveals that instead of producing direct object clitics, non-brain-damaged speakers substitute the clitic with the relevant full NP in 5% of cases, and that two participants, C7 and C9, are the ones who produce these substitutions. Specifically, participant C9 produces the largest number of substitutions (in 35% of cases), thus classifying as an outlier among non-brain-damaged speakers. Participant C9 will not, therefore, be taken into consideration in further analyses. While producing indirect object clitics, non-brain-damaged speakers omit the clitic in 1% of cases and perform person errors in 1% of cases. Agrammatic speakers substitute direct object clitics with a full NP in 19% of cases, and they omit clitics in 23% of cases. In 3% of cases they produce gender errors. When producing indirect object clitics, agrammatic speakers omit clitics in 62% of the cases and they perform person errors in 15% of cases. Gender errors count for 1% of the errors. Table 34 presents all the results for every participant of both groups.

Clitic Production in Imperative Sentences

Table 34: Clitic production of direct object and indirect object clitics. Data for both groups are presented. Row percentages.

Non-brain-damaged speakers						
Direct object clitics						
Participants	n	Correct	Omissions	Full NP	Gender errors	Person errors
C1	30	100	-	-	-	-
C2	30	100	-	-	-	-
C3	30	100	-	-	-	-
C4	25	100	-	-	-	-
C5	30	100	-	-	-	-
C6	30	100	-	-	-	-
C7	30	83	-	17	-	-
C8	30	100	-	-	-	-
C9	23	65	-	35	-	-
C10	30	100	-	-	-	-
Tot	275	96%	0%	4%	0%	0%
Indirect object clitics						
C1	30	100	-	-	-	-
C2	30	100	-	-	-	-
C3	30	100	-	-	-	-
C4	23	96	-	-	-	4
C5	30	100	-	-	-	-
C6	30	100	-	-	-	-
C7	28	93	7	-	-	-
C8	30	100	-	-	-	-
C9	20	91	-	-	-	9
C10	30	100	-	-	-	-
Tot	286	98%	1%	0%	0%	1%
Agrammatic speakers						
Direct object clitics						
Participants	n	Correct	Omissions	Full NP	Gender errors	Person errors
A1	19	79	16	5	-	-
A2	28	4	75	21	-	-
A3	20	50	-	50	-	-
A4	28	77	11	11	-	-
A5	16	44	-	50	6	-
A6	11	91	9	-	-	-
A7	24	67	21	-	12	-
Tot	146	55%	23%	19%	3%	0%
Indirect object clitics						
A1	20	35	65	-	-	-
A2	28	4	79	-	-	18
A3	23	39	17	-	-	44
A4	29	41	45	-	-	14
A5	14	0	100	-	-	-
A6	17	18	71	-	-	12
A7	13	0	85	-	15	--
Tot	144	22%	62%	0%	1%	15%

Furthermore, this work intended to analyse whether the production of clitics differs in the two conditions, i.e. when producing an affirmative or a negative imperative sentence. Results show that for non-brain-damaged speakers there is no difference between the two conditions, both for direct and for indirect object clitics ($\chi^2= 5.05$; $df=1$; Fisher's Exact test: $p=0.6$). The result holds for every non-brain-damaged speaker participant (for each participant: Fisher's Exact test: $p>0.05$). Running the subject-by-subject analysis for agrammatic speakers, results show that only two participants (A1 and A4) show a significant difference, i.e. they produce more correct direct object clitics while producing negative imperative sentences than when producing affirmative imperative sentences (A1: $\chi^2= 14.18$; $df=1$; Fisher's Exact test: $p<0.01$; A4: $\chi^2= 8.8$; $df=1$; Fisher's Exact test: $p<0.01$). For the other five agrammatic speakers, no difference was found. (For all participants: Fisher's Exact test: $p>0.5$) When producing indirect object clitics, all agrammatic speakers perform similarly, in that there is no difference in the number of correct clitics produced between affirmative and negative imperatives. (For all participants: Fisher's Exact test: $p>0.05$)

6.5.3 Position of produced clitics

To answer the last research question, i.e. the position in which clitics are produced, the parameter 'clitic position' was analyzed in both affirmative imperative sentences (which require an obligatory position of the clitic with respect to the verb) and negative imperative sentences, where the position of the clitic is optional. In affirmative imperative sentences, when correct clitics were produced, both non-brain-damaged speakers and agrammatic speakers produced clitics in a correct position, i.e. after the verb. There is therefore no difference between the two groups, as shown in Table 35. Even though always produced in a correct post-verbal position, a further analysis reveals that in affirmative imperative sentences, agrammatic speakers produce significantly more correct direct object clitics than indirect object clitics ($\chi^2= 4.12$; $df=1$; $p=0.04$). For non-brain-damaged speakers this difference is not significant ($\chi^2= 2.8$; $df=1$; $p=0.1$).

Table 35: Position of produced clitics in affirmative imperative sentences for both groups. Row percentages.

Clitic type	n	Clitic position	
		Pre-verbal	Post-verbal
Non-brain-damaged speakers	260	-	100
Agrammatic speakers	35	-	100

For negative imperative sentences, results show that non-brain-damaged speakers produced overall 40% of clitics in a post-verbal position and 60% of clitics in a pre-verbal position, and

that there was no difference in clitic placement between direct and indirect object clitics. (Direct object clitics (n=132): post-verbal position: 36%; pre-verbal position: 64%. Indirect object clitics (n=129): post-verbal position: 43%; pre-verbal position: 57%; $\chi^2=1.00$; df=1; p=0.10) Agrammatic speakers produced overall 62% of clitics in a post-verbal position and 38% of clitics in a pre-verbal position. The analysis shows that there is no difference between direct and indirect object clitics in clitic position (direct object clitics (n=58): post-verbal position: 64%; pre-verbal position: 36%; indirect object clitics (n=20): post-verbal position: 55%; pre-verbal position: 45%; $\chi^2= 0.48$; df=1; p=0.50).

Overall, for non-brain-damaged speakers the position in which clitics are produced is significantly related to the position in which clitics are presented in the prompting sentences ($\chi^2= 123$; df=1; p<0.01). A subject-by-subject analysis reveals that three non-brain-damaged speaker participants (C3, C6 and C8) show a preference for producing the clitics in a pre-verbal position independently from the position of the clitic in the prompting sentence, while for the other six non-brain-damaged speaker participants, the position in which clitics are produced is equally distributed between the pre-verbal and post-verbal position. In other words, the position of the clitic produced by C3, C6 and C8 is independent from the position of the clitic in the prompting sentences, while for the other participants the position in which they produce the clitic is significantly related to the one in the prompting sentences. These data sets are summarized in Table 36.

Table 36: Position of produced clitics for every non-brain-damaged speaker participant per prompting position. Row percentages. Association values are presented.

Participants	Prompting position	n	Position Produced Clitic		Association Fisher's Exact test
			Post-verbal	Pre-verbal	
C1	Pre-verbal	15	100	-	p<0.01
	Post-verbal	15	-	100	
C2	Pre-verbal	15	100	-	p<0.01
	Post-verbal	15	-	100	
C3	Pre-verbal	15	93	7	p=0.10
	Post-verbal	15	73	27	
C4	Pre-verbal	14	79	21	p<0.01
	Post-verbal	8	-	100	
C5	Pre-verbal	15	87	13	p<0.01
	Post-verbal	15	-	100	
C6	Pre-verbal	15	93	7	p=0.10
	Post-verbal	15	73	27	
C7	Pre-verbal	15	93	7	p<0.01
	Post-verbal	14	-	100	
C8	Pre-verbal	15	93	7	p=0.10
	Post-verbal	15	73	27	
C10	Pre-verbal	15	-	100	p<0.01
	Post-verbal	15	-	100	

For agrammatic speakers, the position in which clitics are produced, and the position in which clitics are presented in the prompting sentences, is significant as well, as shown in Table 37.

Table 37: Correlation between position of the prompted clitic and position of the produced clitic for the group of agrammatic speakers. Row percentages. Chi-square value and p-value are presented.

Position of the prompted clitic	n	Position of produced clitics	
		Pre-verbal	Post-verbal
Post-verbal	39	3	97
Pre-verbal	39	74	26
χ^2 value; (df=1)		42.4	
p-value		<0.01	

Because of the low number of clitics produced (for example, participant A2 produces only one clitic, and A6 seven clitics), it was not possible to run statistical tests to analyse the relation between position of clitics produced and position of clitics in the prompting sentences. The best way to look at the data was to use a descriptive table for the single agrammatic speaker participant, as shown in Table 38.

Table 38: Position of produced clitics per prompting position for every agrammatic speaker participant. Row percentages. Association values are presented.

Participant s	Prompting position	n	Position Produced Clitic	
			Pre-verbal	Post-verbal
A1	Pre-verbal	9	100	-
	Post-verbal	10	10	90
A2	Pre-verbal	1	100	-
	Post-verbal	-	-	-
A3	Pre-verbal	5	-	100
	Post-verbal	9	-	100
A4	Pre-verbal	12	66	33
	Post-verbal	9	-	100
A5	Pre-verbal	2	100	-
	Post-verbal	4	-	100
A6	Pre-verbal	4	75	25
	Post-verbal	3	-	100
A7	Pre-verbal	6	100	-
	Post-verbal	4	-	100

Table 38 shows that for one participant (A3) the position of the clitic was constantly post-verbal, regardless the position in which the clitic was presented in the task sentences. For all the other participants (except participant A2, who only produces one clitic in the post-verbal position) the position of the produced clitics is balanced, in that clitics in both the pre-verbal and post-verbal positions are produced.

The difference in clitic placement between the two groups is significant, i.e. agrammatic speakers produce significantly more clitics in the post-verbal position and fewer clitics in the pre-verbal position than non-brain-damaged speakers. When clitics were prompted in the post-verbal position, agrammatic speakers produced more clitics in the post-verbal position than non-brain-damaged speakers (97% for agrammatic speakers and 74% for non-brain-damaged speakers), and when clitics were prompted in the pre-verbal position, non-brain-damaged speakers produced more clitics in the pre-verbal position than agrammatic speakers. All the differences mentioned are significant. Data sets are shown in Table 39.

Table 39: Comparisons of clitic position in negative imperative sentences between non-brain-damaged speakers and agrammatic speakers. The first table presents the overall data, the second table when clitics are prompted post-verbally, and the last table when clitics are presented pre-verbally. Row percentages. Chi-square and p-values are presented.

Overall			
Group	Position of produced clitics		
	n	Pre-verbal	Post-verbal
Non-brain-damaged speakers	261	60	40
Agrammatic speakers	78	38	62
χ^2 value; (df=1)		11.8	
p-value		<0.01	
Post-verbal prompted clitic			
	n	Pre-verbal	Post-verbal
Non-brain-damaged speakers	127	26	74
Agrammatic speakers	39	3	97
χ^2 value; (df=1)		10	
p-value		<0.01	
Pre-verbal prompted clitic			
	n	Pre-verbal	Post-verbal
Non-brain-damaged speakers	134	93	7
Agrammatic speakers	39	74	26
χ^2 value; (df=1)		11	
p-value		<0.01	

6.6 Discussion and conclusions

The first point of interest which emerges from the data is that agrammatic speakers change the structure of imperative sentences more frequently than non-brain-damaged speakers. Specifically, non-brain-damaged speakers transform an imperative sentence into an indirect imperative sentence in 4% of cases, whereas agrammatic speakers transform an imperative sentence into a non-imperative declarative one in 21% of cases. These results suggest that

imperative sentences are difficult to produce for agrammatic speakers and that, specifically, affirmative imperative sentences are difficult. It can be suggested that the cause of this difference is a reflection of the different derivation that the two types of sentences have to undergo. On the one hand (for affirmative imperative clauses), the verb has to move to C° with a long movement to check imperative features (the movement is visible because of the verb-clitic order) whereas in negative imperative clauses it is the negative marker which moves with a short movement to C° . Indeed, the pre-verbal negative marker was always correctly produced. This explanation is, nevertheless, left as a speculative proposal which will need more data and experiments to be more fully explored.⁴²

The second topic of interest towards which this analysis was directed was the actual clitic production. The results show that agrammatic speakers produce significantly fewer clitics than non-brain-damaged speakers, and that agrammatic speakers produce overall significantly fewer indirect object clitics than direct object clitics (even within the conditions specified). The error analysis reveals that when a direct object clitic is required, agrammatic speakers omit them in 23% of cases or substitute them with a full NP in 19% of cases. When an indirect object clitic is required agrammatic speakers omit clitics in 62% of cases, and no instances of substitutions with a full noun or strong pronoun were observed. Gender and person errors are present as well, though not as predominant error types. Our data sets show that for non-brain-damaged speakers there is no difference in the production of correct clitics between the two conditions, i.e. affirmative and negative imperative sentences, and that among agrammatic speakers only two participants (A1 and A4) show a higher number of correct clitics produced in the context of negative imperative sentences and fewer correct clitics produced in affirmative imperative sentences, while for the other five participants there was no difference. This clitic production pattern, and this error pattern, fits both the predictions made by the CI-PI-DH and the DOP-H. The only difference is the predictions made regarding a possible difference between direct and indirect object clitics. On the one hand, the CI-PI-DH predicts a difference between these two clitic types, whereas the DOP-H does not. In this respect, the observed data sets do not support the predictions made by the DOP-H.

Regarding the variable ‘clitic position’, the two hypotheses make similar predictions for affirmative imperative sentences, and different predictions for negative imperative sentences. Specifically, they both predict that once clitics are correctly produced in affirmative imperative

⁴² An explanation on the observed selective impairment in producing imperative verbs in agrammatic speakers in terms of impaired dependency marking is in preparation (Rossi, E. & Zwart, J.W.).

sentences, where the clitic obligatorily appears after the verb, they will always be produced in a correct position. The data sets show, indeed, that when clitics are produced in the context of correct affirmative imperative sentences, they are always produced in a correct position, i.e. the order verb-clitic is displayed. The CI-PI-DH and the DOP-H make similar predictions regarding the position in which clitics will be produced in negative imperative sentences; participants can choose the position in which to produce the clitic. Specifically, the CI-PI-DH predicts that agrammatic speakers should produce an equal number of clitics in pre-verbal and in post-verbal positions, in that both cases imply clitic placement (i.e. syntactic movement). DOP-H, predicts that agrammatic speakers should produce the same number of clitics in a post-verbal position and in a pre-verbal position⁴³. Data sets show that when agrammatic speakers produce negative imperative sentences they produce overall 62% of clitics in a post-verbal position and 38% in a pre-verbal position. Moreover, the results also show that the position in which clitics are produced is related to the position in which clitics are presented in the prompting sentences. When prompted with a clitic in the post-verbal position, agrammatic speakers produce a clitic in the post-verbal position in 97% of cases and a clitic in the pre-verbal position in 3% of cases. When prompted with a clitic in the pre-verbal position agrammatic speakers produce 74% of clitics in a pre-verbal position and 26% of them in a post-verbal position. This positive correlation between position of the produced clitic and position of the prompted clitic is true for all agrammatic speaker participants except one (A3), who only produces clitics in a post-verbal position. The observed pattern of clitic placement relative to the verb for negative imperative sentences fits the predictions made by the DOP-H, in that agrammatic speakers produce significantly more clitics in the post-verbal position than in the pre-verbal position, and significantly more clitics in a post-verbal position than non-brain-damaged speakers.

In conclusion, it can be said that the pattern of clitic production and the error pattern observed in the context of imperative sentences is similar to the pattern observed in the previous experiments. Agrammatic speakers are clearly impaired in clitic production, and this is mainly expressed by means of their omissions and substitutions. Again, a difference in production between direct and indirect object clitics was observed. This difference is explainable by

⁴³ We are aware that in our test design there there was no additional element (for example an adverb) which could clearly show that even in affirmative imperative sentences clitics are in a derived order, like for example:

‘Mangia subito la mela!’

‘Eat immediately the apple!’

‘Mangiala subito!’

‘Eat *it* immediately!’

postulating that this is due to the fact that indirect object clitics bear an inherent extra case feature which is the specification for person, which renders their production more difficult for agrammatic speakers, given that it is related to case checking. Checking an extra feature in syntax could be the reason why indirect object clitics are more impaired than direct object clitics. Again, a broader explanation for this difference in terms of argument structure complexity (Thompson 2003) is possible. On the one hand, the observed results about the number of correct clitics produced, and about the error pattern, could be explained by both the CI-PI-DH and the DOP-H. The results about the position in which clitics are produced in negative imperative sentences do not fit the prediction made neither by the DOP-H nor the ones made by the CI-PI-DH. The general preference observed in agrammatic speakers to produce clitics in the post-verbal position seems, in any case, to be diminished with respect to the one seen in the previous experiments with restructuring context sentences.

A cross-comparison between the data described for the experiments on clitic production in declarative sentences and in imperative sentences will therefore be important to further understand the underlying mechanisms of what is impaired in clitic production. The next chapter will address this topic in depth.

Apostil 2

Similarly to the data presented in the previous experiment healthy speakers showed a preference for producing clitics before the verbal context in restructuring context sentences, The data sets presented in this chapter show a similar tendency. Healthy speakers show a general preference for producing clitics in a pre-verbal position even in the context of negative imperative sentences. They produce overall 40% of clitics after the verb and 60% of clitics before the verb. Specifically, three participants (C3, C6 and C8) produce clitics in a pre-verbal position independently from the position of the clitic in the prompting sentences. For the other six participants the distribution in the position of clitics is balanced between the pre-verbal and post-verbal positions. Again, it is proposed here that the observed production pattern can be explained in terms of regional variation preferences, at least for the participants who showed no correlation between the position in which the clitic was produced and the position in which the clitic was proposed in the prompting sentence.

CHAPTER 7

CLITIC PRODUCTION IN DECLARATIVE AND IN IMPERATIVE SENTENCES: A COMPARISON

In the previous chapters the production was analysed of pronominal clitics in a group of seven agrammatic speakers and ten non-brain-damaged speakers. In chapters 5 and 6 the production of pronominal clitics was analysed in experiments eliciting declarative and imperative sentences respectively. In chapter 5, the production of clitics in two types of obligatory conditions (i.e. in sentences in the present and perfect tense in which clitics had to be produced before the finite verb or before the finite auxiliary) and in an optional condition (i.e. restructuring context sentences with a modal verb governing an infinitival verb in which clitics could optionally be placed either before or after the verbal complex) were tested. In chapter 6, the production was examined of clitics in affirmative and negative imperative sentences. The required clitic position in affirmative and negative imperative sentences parallels the one required in declarative sentences and restructuring sentences. In affirmative imperative sentences clitics have an obligatory position with respect to the hosting verb (i.e. in the post-verbal position). Similarly, in declarative sentences with a finite verb clitics have an obligatory position in which they have to be produced with respect to the verb. Affirmative imperative sentences and declarative (non-restructuring) sentences commonly require an obligatory position for clitics with respect to the hosting verb. Importantly, the given order between verb and clitic is different between these two sentence types, declarative sentences showing a clitic-verb order and affirmative imperative sentences showing a verb-clitic order. In negative imperative sentences clitics can optionally be placed before or after the verb, and the same applies for restructuring sentences where clitics can be placed in the climbed position (i.e. before the verbal complex) or in the enclisis position (i.e. after the verbal complex).

The aim of this chapter is to give an overview of the data sets collected in chapter 5 and 6 and to directly compare them, in order to clarify which could be the possible cause underlying the impaired production of pronominal clitics in agrammatism. The similarity in the obligatoriness for clitic position between declarative sentences and affirmative imperative sentences on the one hand, and the similarity in the optionality for clitic position between negative imperative sentences and restructuring sentences, on the other hand, renders these structures interesting for comparison.

7.1 Previous results

7.1.1 Clitic production in declarative sentences

Summarizing the data collected in chapter 5 on the production of direct and indirect object clitics in the group of agrammatic speakers, the following results arose. Agrammatic speakers were impaired in the production of both direct and indirect object clitics, with indirect object clitics being significantly more impaired than direct object clitics, even in the same clitic position. The majority of errors were represented by omissions of clitics and with their substitutions by a relevant full NP (at least for direct object clitics). When producing declarative sentences (including both present tense sentences in which clitics appear before a finite verb and perfect tense sentences, where clitics appear before a finite auxiliary), agrammatic speakers produced overall 36% correct clitics. When clitics were produced they were always placed in a correct position, i.e. before the finite verb or before the finite auxiliary.

With regard to clitics in restructuring sentences, results show that agrammatic speakers produced significantly more clitics in the enclisis position (85% of correct clitics produced) compared to clitics in the climbed position (15%) and that this was true even when clitics were prompted in the climbed position.⁴⁴ When clitics were prompted in an enclisis position, agrammatic speakers produced 97% of clitics in the enclisis position and only 3% of clitics in the climbed position. When clitics were prompted in the climbed position, agrammatic speakers still produced 67% of clitics in the enclisis position and only 33% of them in the climbed position.

In the light of these results, the preliminary conclusion drawn was that the observed deficit in clitic production seen in agrammatic speakers can be explained both assuming the predictions made by the CI-PI-DH, and the ones made by the DOP-H. In fact, whereas a pure explanation in terms of CI-PI-DH could have accounted for the diminished number of clitics produced in sentences requiring an obligatory position of clitics, it could not explain the observed difference in restructuring sentences where the position of clitics was optional. Assuming that CI-PI is impaired, within the optional condition a similar number of clitics should have been produced in the enclisis and in the climbed position (given that both possibilities require clitic placement to apply). Instead, the observed preference to produce clitics in the enclisis position (which significantly differs from the performance of non-brain-damaged speakers) supported the prediction formulated by the DOP-H. DOP-H predicts that in order to produce a sentence in

⁴⁴ Except for participant A4, who was the only one to produce clitics in the climbed position when so prompted.

which the order of the constituents is the same with respect to the one in the base order is easier than producing a sentence in which the order of the constituents is derived. Nevertheless, the observed difference between direct and indirect object clitics does not support the predictions made by DOP-H. In chapter 5 it was therefore preliminarily concluded that both the proposed hypotheses could partially explain the observed clitic production pattern seen in agrammatic speakers.

7.1.2 Clitic production in imperative sentences

The results described in chapter 6 showed that the general clitic production pattern, in terms of correctness and error types, mirrored the one seen for declarative sentences. As far as clitic position is concerned, when producing affirmative imperative sentences agrammatic speakers produced 30% correct clitics (with a significant difference between direct and indirect object clitics). Whenever clitics were correctly produced, agrammatic speakers produced them in the correct position, i.e. in the post-verbal position. When producing negative imperative sentences, results show that agrammatic speakers produced overall 62% of clitics in the post-verbal position, and 38% of clitics in the pre-verbal position, therefore showing a preference in producing clitics in the post-verbal position. Nevertheless, when in the prompting sentences clitics were presented in the pre-verbal position, agrammatic speakers produced 74% of clitics in the pre-verbal position, and only 26% of clitics in the post-verbal position. These data sets show again that agrammatic speakers have a preference for producing clitics in the post-verbal position (which differs from the performance of non-brain-damaged speakers), but that this preference seems to be decreased compared to what is observed in restructuring contexts, where almost all clitics were produced in the enclisis position, irrespective of the position in which clitics were prompted. Once again, following the same reasoning for the patterns observed in clitic production in declarative sentences, it was concluded that the data on clitic production and on clitic position in imperative sentences could verify some predictions made both by CI-PI-DH and by the DOP-H and, at the same time, it did not support some predictions made by both hypotheses.

7.2 Comparing the data

7.2.1 Clitic production in declarative sentences and affirmative imperative sentences

In declarative sentences clitics have to be placed before the finite verb or the finite auxiliary, whereas in affirmative imperative sentences clitics have to be placed after the verb, as in the following examples:

(1) Declarative sentences

- a. *Renata lo mangia*

Renata it eats

'Renata eats it'

- b. *Mario lo ha visto*

Mario it has seen

'Mario saw it'

(2) Affirmative imperative sentences

- a. *Mangiala!*

Eat it!

Both sentence structures imply the use of finite verbs and require clitics to be placed in one specific position, i.e. in the pre-verbal position in declarative sentences and in the post-verbal position in affirmative imperative sentences. The fact that they both require an obligatory position for clitics renders their comparison interesting for making predictions on clitic production in the light of the DOP-H and the CI-PI-DH. It could be claimed that this is an illegal comparison, because a declarative sentence is different from an imperative one, and producing an imperative sentence is more difficult than producing a declarative one. Indeed, it is assumed (Zanuttini, 1997) that in imperative sentences the verb is realized in a higher position with respect to declarative finite verbs, and this is visible from the relative verb-clitic order of imperative sentences in place of the order clitic-verb of declarative sentences, and this could cause an additional difficulty for the production of imperative sentences. But the fact that in imperative sentences the verb is realized higher than in declarative sentences does not change the fact that clitics have to overtly move to check their case features. Therefore, in both declarative and imperative sentences clitics undergo CI-PI, despite the fact that in imperative sentences they are in the post-verbal position. In order to avoid a bias due to a difference in production as a result of a probable difference between producing declarative and imperative sentences, only correctly produced sentences (taking into account a correct verbal production) were taken into consideration during the analyses. Taking into account only correct sentences implies that the factor 'difference in difficulty between declarative and imperative sentences' is ruled out, and makes the comparison on clitic production legal.

Going back to the two hypotheses being tested, the CI-PI-DH predicts no difference in the number of correct clitics produced in declarative sentences and in affirmative imperative sentences, given that in both cases clitics have to undergo CI-PI. DOP-H, instead, predicts that clitic production in declarative sentences should be more difficult than in imperative sentences, given that in declarative sentences the order of constituents differs from the base order of constituents, whereas in affirmative imperative sentences this is not the case, i.e. the order of constituents is the same as in the base order.

Comparing data on clitic production between simple declarative present tense sentences and affirmative imperative sentences in the agrammatic speakers group,⁴⁵ the analysis shows that there is no significant difference in the number of correct clitics produced between the two structures. Agrammatic speakers produce 40% of correct clitics in simple declarative sentences and 30% correct clitics in affirmative imperative sentences ($\chi^2=2.6$; $df=1$; $p=0.10$). Moreover, the number of substitutions with a full NP in the two structures does not differ either ($\chi^2=1.00$; $df=1$; $p=0.19$). Agrammatic speakers substitute clitics with full NPs in 35% of cases and in affirmative imperative sentences they do so in 42% of cases. Comparing the data of clitic production between declarative sentences in the past tense and affirmative imperative sentences, results show that there is a significant difference between the number of correct clitics produced in the two sentence types. Agrammatic speakers produce more correct clitics when producing a declarative sentence (47% correct clitics before the finite auxiliary) than when producing affirmative imperative sentences (30% correct clitics). The difference is significant ($\chi^2=5.18$; $df=1$; $p=0.02$).

7.2.2 Clitic production in restructuring sentences and negative imperative sentences

Following the reasoning of the previous paragraph, clitic production is compared in restructuring sentences and negative imperative sentences and this allows the possibility of making predictions following the two main hypotheses being tested. Restructuring sentences and negative imperative sentences are directly comparable in terms of clitic production in that they permit two surfacing positions for clitics. Moreover, the design of the test used was equal for both sentence types, i.e. in both cases participants were virtually free to choose where to produce the clitic, even if half of the prompting sentences presented the clitic before the verbal complex in restructuring sentences (or before the verb in negative imperative sentences), and the other half presented the clitic after the verbal complex (or after the verb). Given that the two structures are comparable

⁴⁵ For this cross-analysis we will insert a priori all agrammatic speaker participants.

with respect to clitic position and test design, some hypotheses can be made consequently, always taking into account only correctly produced sentences. If the CI-PI-DH is valid, there should not be a difference in the number of clitics produced between the two positions in either construction. If, on the other hand, the DOP-H is valid, for both type of sentences a preference would be expected in producing clitics in the enclisis position (i.e. either after the verb or after the verbal complex). Comparing the positions in which clitics are produced in the two types of contexts (i.e. restructuring sentences and negative imperative sentences) agrammatic speakers produced overall significantly more clitics in the pre-verbal position in negative imperative sentences than before the verbal complex in restructuring sentences ($\chi^2=12.56$; $df=1$; $p<0.01$). In negative imperative sentences, agrammatic speakers produce clitics in the pre-verbal position in 38% of cases, whereas in restructuring contexts they produce clitics before the verbal complex in 15% of cases. Data sets are shown in Table 40.

Table 40: Agrammatic speakers. Position of produced clitics in restructuring and in negative imperative sentences. Row percentages. Chi-square and p-values are presented.

Type of context	Position of the produced clitic		
	N	Enclisis	Climbed or Pre-verbal
Restructuring	104	85	15
Negative imperative	78	62	38
χ^2 value;(df=1)	12.56		
p-value	<0.01		

Moreover, comparing the data regarding the relation of the position of produced clitics with the position in which clitics were presented in the prompting sentences, in both sentence types two additional comparisons arise. On the one hand, when clitics were prompted in the enclisis position (i.e. after the verbal complex) in restructuring sentences or in the post-verbal position in the case of negative imperative sentences, agrammatic speakers produced clitics in the same position as in the prompting sentences in both sentence types ($\chi^2=0.03$; $df=1$; $p=0.67$). On the other hand, when clitics were prompted before the verbal complex (in restructuring contexts) or before the verb (in negative imperative sentences), the position in which clitics were produced significantly differed between the two conditions ($\chi^2=13.66$; $df=1$; $p<0.01$). In restructuring contexts, agrammatic speakers produced 33% of clitics before the verbal complex, whereas in negative imperative sentences they produced clitics in the pre-verbal position in 74% of cases. Data sets are shown in Table 41.

Table 41: Agrammatic speakers: Position of produced clitics respect to the position of prompted clitics. Row percentages.

Clitics prompted in enclisis position or in post-verbal position			
Type of sentences	n	Position of the produced clitic	
		Enclisis or post-verbal	Climbed Or pre-verbal
Restructuring	62	97	3
Negative imperative	39	97	3
Clitics prompted in climbed position or in pre-verbal position			
Type of sentences	n	Position of the produced clitic	
		Enclisis or post-verbal	Climbed Or pre-verbal
Restructuring	42	67	33
Negative imperative	39	26	74

7.3 Testing the two hypotheses

The data sets presented in this chapter arise from the comparison of the data described in chapters 5 and 6. The aim was to compare data on clitic production in structures which are comparable regarding the requirements in terms of obligatoriness of clitic position, and in terms of the similarity in the availability of clitic positions. The first comparison was run between declarative (non-restructuring) sentences and affirmative imperative sentences, in that both sentence constructions allow only one possible clitic position (pre-verbal in declarative sentences and post-verbal in affirmative imperative sentences). The data collected on clitic production in the two sentence types were compared, and new predictions were made following the CI-PI-DH and the DOP-H. It was predicted here that if the CI-PI-DH were valid, there should not be a difference in the number of correct clitics produced between the two sentence typologies, in that both require clitics to undergo CI-PI. Instead, if the DOP-H were valid agrammatic speakers should not have produced more correct clitics in affirmative imperative sentences respect to declarative sentences, given that in both constructions clitics are in a derived order respect to the base order of the constituents. Results from the comparison show that agrammatic speakers do not produce more correct clitics in affirmative imperative sentences than in declarative sentences. Instead, there was no difference between the number of correct clitics produced in declarative sentences in the present tense and in affirmative imperative sentences. Moreover, the analysis revealed that agrammatic speakers produced significantly more correct clitics in

sentences with an auxiliary than in affirmative imperative sentences. From the direct comparison between declarative sentences and affirmative imperative sentences it can therefore be concluded that the both the predictions made by the DOP-H and by the Cl-PI-DH are supported in the specific case of simple declarative sentences, in that no difference was found in the number of correct clitics produced between these sentences and affirmative imperative sentences. Regarding the results which show a majority of correct clitics produced between declarative sentences with an auxiliary, and affirmative imperative sentences, no explanation can be given yet.

The second comparison was made between restructuring sentences and negative imperative sentences, in that both of them permit two surfacing positions for clitics, i.e. a climbed position, and an enclisis position in restructuring sentences, and a pre-verbal and a post-verbal in negative imperative sentences. Given the comparability of these two structures, new ad-hoc predictions were formulated. The Cl-PI-DH predicted that there should not be a difference in the number of clitics produced between the two available clitics positions in either structures, and that there should not be a difference in the position in which clitics are produced between the two structures. The DOP-H predicted, however, that for both structures the post-verbal or climbed clitic positions should be the preferred ones, and that this should not differ when comparing the two sentence types. Results show that, overall, agrammatic speakers prefer producing clitics in the post-verbal (or post-verbal complex) position, but that there is a significant difference in clitic position between the two sentence types. Agrammatic speakers produce significantly more clitics in the pre-verbal position in negative imperative sentences than in the climbed position in restructuring sentences. This phenomenon is particularly clear when observing the relationship between the position of clitics in the prompting sentences and the position of produced clitics. When clitics are prompted in the enclisis position or in the post-verbal position, the position of produced clitics is almost univocally enclitic in both conditions. When clitics are prompted in the pre-verbal position or in the climbed position the performance changes between the two sentence types. In restructuring contexts, despite the fact that the clitic is prompted in the climbed position, agrammatic speakers still produce 67% of clitics in the enclisis position, whereas in negative imperative sentences, they produce 74% of clitics in the pre-verbal position and 26% in the post-verbal position. Therefore, these results show that agrammatic speakers have less difficulty in producing clitics in the pre-verbal position in negative imperative sentences, than in the climbed position in restructuring contexts. The comparison between negative imperative sentences and restructuring sentences does not, therefore, entirely support the predictions made

by either hypothesis. Neither the Cl-PI-DH nor the DOP-H can satisfactorily account for the observed results.

7.4 Interpreting the dissociation

The data sets presented in this chapter partially disconfirm the hypothesis that clitics are difficult for agrammatic speakers to produce because a derived constituents order has to be produced (DOP-H). If the underlying problem is the derived order of constituents, agrammatic speakers should have produced a comparable proportion of clitics both in the climbed position in restructuring sentences, and in the pre-verbal position in negative imperative sentences. Similarly, this result cannot be explained assuming a deficit in Clitic Placement (Cl-PI-DH) either. If Clitic Placement is difficult agrammatic speakers should have produced a similar number of clitics in the climbed position and in the enclisis position (in restructuring sentences) and the same number of clitics in the pre-verbal or in the post-verbal position in negative imperative sentences. This work must now question why this dissociation has occurred and how to interpret it.

In restructuring sentences, clitics can surface in two positions, i.e. after the verbal complex (enclisis) or before the verbal complex (i.e. climbing), as in (3a) and (3b).

(3)

a. Mario vuole mangiar*la*

Mario wants to eat it

b. Mario *la* vuole mangiare

Mario it wants to eat

‘Mario wants to eat it’

Recalling the definition given by Rizzi (1982), Restructuring analyses the two verbs as a single verbal complex.⁴⁶ According to Rizzi, the clitic can climb before the verbal complex only if Restructuring applies, whereas if Restructuring does not apply, clitics cannot climb over the verbal complex, and the only possible position is an instance of enclisis, in that if the two verbs

⁴⁶ Rizzi assumes that restructuring can be optionally applied.

are not reinterpreted as a single verbal complex but stay separated, the clitic can just enter into an enclisis relation with the infinitival verb, as the grammatical rule requires.

The other sentence type in which this work is interested is that of negative imperative sentences. In Italian, negative imperative sentences allow two surfacing positions for the clitic as well, i.e. before or after the verb, as in (4a) and (4b).

(4)

a. Non mangiar*la*!

Not eat it!

'Do not eat it!'

b. Non *la* mangiare!

Not it eat!

'Do not eat it!'

In the previous chapter the analysis by Kayne (1992) and Zanuttini (1997) was reported which interprets negative imperative sentences as containing an auxiliary (phonologically realized in some variants of Italian) which licences the infinitival verb in the sentence. This auxiliary is not overtly realized in Italian. In the light of this analysis (4a) and (4b) can be rewritten as follows:

(5)

a. Non (\emptyset aux) mangiar*la*!

Not eat it!

b. Non *la* (\emptyset aux) mangiare!

Similarly, as for sentences with a restructuring context, the pre-verbal position of the clitic in (5b) can only exist by assuming that an auxiliary (overt or non-overt) licences the infinitival verb. If this is not the case, the order of the clitic with respect to the verb in (5b) will be ungrammatical, as clitics normally enter into an enclisis relationship with infinitival verbs. This difference is signalled by the grey area in the following schematisation.

Clitic Production in Declarative and in Imperative Sentences: A Comparison

	1 st	2 nd	3 rd	4 th	5 th
Restructuring sentences	Negative marker	Pre-verbal complex clitic position	Modal verb	Infinitival verb	Post-verbal complex clitic position
	Non Not	[lo] [it]	vuole wants	mangiare to eat	[lo] [it]
Negative imperative sentences	Negative marker	Pre-verbal clitic position	∅ aux	Infinitival verb	Post-verbal clitic position
	Non Not	[lo] [it]	∅	mangiare to eat	[lo] [it]

In summary, the two analysed structures differ along one axis, i.e. the presence (or absence) of a modal (or auxiliary) verb which licences the infinitival verb, but they both show two available positions for clitics, i.e. before or after the verb (or verbal complex). This can be transferred to the idea that in restructuring sentences two phonologically realized verbs are present, whereas in negative imperative sentences this is not the case, in that, only the infinitival verb is phonologically expressed. It is proposed here that the observed difference for the position in which agrammatic speakers place clitics between restructuring sentences and negative imperative sentences can be explained as follows. In restructuring sentences, in case restructuring is applied (letting clitics be placed before the verbal complex) this has to be an *active* operation, whereas in negative imperative sentences, where the auxiliary is not phonologically expressed, restructuring assumes either the characteristics of a *passive* operation, or it is simply no longer a necessary operation of negative imperative sentences. In other words, the pre-verbal clitic position in negative imperative sentences ('Non *la* mangiare!' Do not eat it!) could be viewed as an instance of lexicalised sentence structure. Another possibility is that the empty auxiliary and the non-finite verb enter the derivation already restructured. Unfortunately, it has not been possible to discern an answer to this specific question, as yet. Nevertheless, whichever possibility is true, it is proposed here that the difficulty seen for agrammatic speakers in placing a clitic in the climbed position reflects a difficulty in operating Restructuring. If this is the case, the sharp preference (almost an impossibility) for agrammatic speakers to place clitics in the climbed position in restructuring sentences, could be reinterpreted in terms of an inability to restructure the two phonologically realised verbs in one single verbal complex. Indeed, if restructuring does not apply, clitics cannot be placed in the climbed position. On the contrary, in negative imperative sentences, where an active restructuring does not have to be applied, clitic placement in the pre-verbal position is significantly easier.

7.5 Revisiting the results

If the major problem which agrammatic speakers face is a difficulty in applying Restructuring, preventing them from producing pronominal clitics in the climbed position results from clitic production in declarative sentences can be reinterpreted as follows. The observed error pattern (clitic omissions and substitutions with full NPs), and the fact that there was no difference in the number of correct clitics produced before a finite verb or a finite auxiliary, can be seen as the reflection of a difficulty in CI-PI. Different to the conclusions of chapter 5, the impossibility of producing clitics in the climbed position can now be seen as the inability to apply Restructuring, and not as a problem of the derived order of constituents.

Similarly, the pattern of clitic production and the error pattern observed in the context of imperative sentences, together with the observed difference between direct and indirect object clitics are explainable in terms CI-PI-DH. Moreover, the general preference observed in agrammatic speakers to produce clitics in the post-verbal position cannot be fully explained in terms of DOP-H, but have to be analysed in terms of passive Restructuring. Another possible explanation is to interpret the general preference to produce clitics in the post-verbal position in terms of DOP-H, but DOP-H should then contain some language-specific assumptions, or some sort of language-related syntactic rule hierarchy. In the specific case of Italian restructuring sentences, DOP-H should take into account that Restructuring is a syntactic operation that it must be applied when clitics are produced before the verbal complex.

CHAPTER 8

CONCLUSIONS

8.1 Clitic production in agrammatic speech is impaired

The results presented in this thesis show that agrammatic speakers are impaired in the production of pronominal clitics. This was observed both in spontaneous speech and in the several experiments performed.

Our data sets are in line with the results on Italian found in Lonzi & Luzzatti (1993), Miceli, Silveri, Romani & Caramazza (1989), Miceli & Mazzucchi (1990), and Chinellato (2004) in that the main outcome reflects the fact that agrammatic speakers produce fewer pronominal clitics than normal. Moreover, in our spontaneous speech data, the major error type produced by agrammatic speakers is represented by clitic omissions when the context requires a clitic. Departing from Italian, our results are in line with the few other studies in the literature which analyse clitic production in agrammatic spontaneous speech in Spanish (Rezink, Dubrovsky & Maldonado, 1995) and in Greek (Stavrakaki & Kouvava, 2003), in that these studies also found that agrammatic speakers are impaired in clitic production and, moreover, that the major error type is constituted by omissions. What is new in our results is that we show that there is a difference in frequency of production among clitic categories in both groups (agrammatic speakers and non-brain-damaged speakers), where reflexive, direct object and indirect object clitics are more frequently produced than partitive, locative and impersonal clitics. Importantly, agrammatic speakers produced significantly fewer reflexive, direct object and indirect object clitics than healthy controls, whereas no difference was found for partitive, locative and impersonal clitics. We interpreted these results by saying that reflexive, direct object and indirect object clitics are more difficult to produce because they bear more case-related features (such as person and number) than locative, partitive or impersonal clitics. Interestingly, from the aforementioned studies on language acquisition (Antelmi, 1997; Guasti, 1994; Bottari, Cipriani, Chilosi & Pfanner, 2001), pronominal clitics are generally reported to be acquired at a later stage and omitted or substituted with a relevant full NP.

The fact that agrammatic speakers are impaired in clitic production is confirmed by the results of all the experiments we performed to elicit clitic production. The general outcome of the experiments is that agrammatic speakers are heavily impaired in clitic production. This is true for every experiment which tested clitic production in different sentential contexts. In the context of

declarative sentences, while producing direct object clitics, agrammatic speakers produce 57% of correct clitics, and while producing indirect object clitics, agrammatic speakers only produce 37% of correct clitics. In the context of imperative sentences, agrammatic speakers produce 55% of correct direct object clitics and 22% of correct indirect object clitics. The error analysis from both experiments reveals that the most frequent types of error are represented by clitic omissions, and clitic substitutions with a relevant full NP. This observed error pattern is in line with that observed in the afore-mentioned studies on spontaneous speech, even if none of them specifically deals with an ad-hoc experimental design to study clitic production in agrammatism.

8.2 On the difference between direct and indirect object clitics

One of the interesting outcomes of this thesis is the sharp contrast in production between direct and indirect object clitics. As outlined in the previous paragraph, agrammatic speakers are significantly more impaired in the production of indirect object clitics than in the production of direct object ones. Our results show, moreover, that direct object clitics are omitted or substituted with a relevant full NP, whereas indirect object clitics are never substituted with the relevant full NP, but they are only omitted. The first question is why indirect object clitics are more difficult to produce than direct object clitics. The second question is why an indirect object clitic is never substituted with a relevant full NP. In the course of the thesis we proposed several possible explanations for this observed pattern (which, as far as we have been able to ascertain, has not been described before). An initial possible answer to the first question is reflected in the characteristics of the clitic self. According to the theoretical background on clitics (Belletti, 1999), clitics overtly move in syntax because they have to check their case features. If case-related features are not properly checked, clitics cannot be spelled-out. Crucially, indirect object clitics bear an additional case feature, i.e. the specification for person (on top of the specification for gender and number). A possible explanation of the difference in performance between direct and indirect object clitics can be given by formulating a ‘load of features’ account. The higher the number of case-related features a clitic bears, the more difficult it will be to produce the clitic. This idea is supported by the observed data on clitic production in our analysis of spontaneous speech. We observed that the type of clitics with more case-related features, i.e. reflexive clitics, direct and indirect object clitics, were produced significantly less frequently by agrammatic speakers than by healthy speakers, whereas there was no difference in frequency of production for clitics with fewer case-related features (impersonal, locative and partitive clitics). A second possible explanation we proposed to account for the difference in production between direct and indirect object clitics was related to Thompson’s (2003) *Argument Structure*

Complexity Hypothesis (ASCH), which states that the more complex the argument structure of a verb, the more difficult it is for agrammatic speakers to produce the verb, and this is due to a disorder of retrieval or processing of the verb lemmas. Therefore, producing a verbal structure with two internal complements, i.e. typically a direct object and an indirect object, is more difficult than producing a verbal structure with only one internal complement, i.e. typically a direct object. The observed difference between direct and indirect object clitics could therefore reflect a difficulty in retrieving a more complex verbal structure, and this could result in a diminished number of indirect clitics produced. Nevertheless, because in our experiments the analyses were run considering only the sentences in which a correct verbal structure was produced, we think that a pure explanation in terms of ASCH is not sufficient to explain the dichotomy between direct and indirect object clitics. Once the verb lemma is retrieved, and the verb is correctly produced, the discrepancy between direct and indirect object clitics is still large. To answer the second question, of why indirect object clitics were only omitted by agrammatic speakers and never substituted with the relevant full NP, we propose the explanation that in Italian a full indirect complement is expressed with a preposition and a noun ('Dai la mela *a* Maria'; 'Give the apple to Mary'), whereas a full direct complement needs just a full NP. We claim that this explains why agrammatic speakers never substitute an indirect object clitic with the relevant indirect full NP. Producing a preposition and a full NP is a syntactically more complex than producing a single noun.

In conclusion, we think that the observed discrepancy between the production of direct and indirect object clitics can be explained taking into consideration the fact that clitic production depends on the retrieval of the verb lemma. Once the verb is correctly retrieved the difference in the number of produced direct and indirect object clitics can be explained in terms of *LOAD OF FEATURE ACCOUNT*: the higher the number of case-related features a clitic bears, the more difficult it is to produce it. As a consequence, indirect object clitics, bearing more case-related features that have to be checked in syntax are more difficult to produce.

8.3 Clitic impairment as a syntactic impairment

The data sets shown in the course of this thesis lead us to conclude that clitic impairment cannot be explained in terms of a deficit at the phonological level, in that the difference in clitic production seen among the different conditions, and the observed difference between direct and indirect object clitics, cannot be explained in phonological terms.

Moreover, the observed data cannot be explained in terms of a morphological impairment. The very small number of morphological errors observed throughout the experiments is not a solid

proof for the observed complex pattern of impaired clitic production in terms of a morphological impairment.

Instead, the results described in this thesis give a solid basis to the claim that what makes pronominal clitics difficult to produce for agrammatic speakers finds its roots in a deficit at the syntactic level. Specifically, clitics are syntactically difficult because they inherently bear case features, and case (with its related features) has to be checked in syntax; in order to do that clitics have to overtly move, first to check case and consequently, given that clitics bear strong case features, they cliticize together with their host in order to be spelled-out. Furthermore, the observed difference between direct and indirect object clitics is a reflection of this difficulty. Indirect object clitics bear more case-related features that have to be checked, and this renders them more difficult to produce.

8.4 Impaired clitic production in agrammatism is explained assuming a deficit in CI-PI

One of the main goals of this thesis was to answer the question on the underlying impairment in agrammatism which causes impaired clitic production. In the course of the thesis two possible hypotheses were confronted: the Clitic Placement Deficit Hypothesis (CI-PI-DH) and the Derived Order Problem Hypothesis (DOP-H) (Bastiaanse & Van Zonneveld, 2005). Both hypotheses generally predict that agrammatic speakers will be impaired in clitic production, but they have different assumptions which lead to different sub-predictions. On the one hand, the CI-PI-DH assumes that what renders clitics difficult is the fact that they have to undergo CI-PI. Therefore, the CI-PI-DH predicts that clitic production will be equally impaired wherever their surfacing position might be. For example, in obligatory contexts where clitics have to surface pre-verbally (in declarative sentences with finite verbs) or post-verbally (in affirmative imperative sentences) clitics will be equally impaired, in that in both cases they have to undergo CI-PI. In optional contexts, i.e. in restructuring sentences or in negative imperative sentences, where clitics can be optionally placed before or after the verbal complex, the CI-PI-DH predicts that there will not be any difference in the number of produced clitics between the two positions. On the other hand, the DOP-H assumes that producing clitics which appear in a derived position will be more difficult than producing clitics that surface in a non-derived position. Therefore, DOP-H predicts that clitics in affirmative imperative sentences, where the order of the constituents is like the base one (verb-clitic order), will be less impaired than clitics that have to be produced in the pre-verbal position, i.e. in declarative sentences. In optional contexts, the DOP-H predicts that in restructuring contexts agrammatic speakers will prefer to produce clitics

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after the verbal complex instead of before the verbal complex, in that in the first case the order of the constituents is not derived. The same goes for negative imperative sentences (where clitics can be placed before or after the non-finite verb). DOP-H predicts that agrammatic speakers will prefer to place clitics in the post-verbal position.

In order to test these two hypotheses, we analysed clitic production in several sentence structures. Results confirmed that agrammatic speakers are impaired overall in clitic production, irrespective of their surfacing position. However, a cross-analysis revealed that agrammatic speakers produce the same number of clitics in the two obligatory contexts (i.e. declarative sentences and affirmative imperative sentences) even if the surfacing position of the clitic is different for the two conditions (pre-verbal in the first case and post-verbal in the second). In the optional contexts (restructuring contexts and negative imperative sentences), results show that agrammatic speakers have a general preference to produce clitics after the verbal complex (in the case of restructuring sentences) or in the post-verbal position (in negative imperative sentences). Importantly, our data sets show that in restructuring contexts agrammatic speakers did not produce any clitic before the verbal complex, whereas in negative imperative sentences, they still showed a preference for producing clitics in the post-verbal position, but they could produce significantly more clitics in the pre-verbal position.

From these results the predictions made by the CL-PI-DH are supported in that clitic production is similarly impaired irrespective of the position of the clitic. We propose that this mirrors an impairment at the syntactic operation Clitic Placement (Cl-Pl), which is triggered by the necessity of clitics to check their case features in order to be interpreted and spelled-out. Such a deficit explains why clitics are impaired both when they are expressed in proclisis and in the enclisis position, in that irrespective of the place where clitics surface they have to check their case features, and therefore they have to undergo Cl-Pl. Moreover, explaining the deficit in clitic production in terms of an impairment in Cl-Pl naturally fits the proposed load of feature account. If clitics are difficult to produce because they have to undergo Cl-Pl to check their case-related features, the more case-related features they bear, the more difficult it will be to produce them. However, the general preference of agrammatic speakers to produce clitics after the verbal complex (or in the post-verbal position), cannot be solely explained in terms of Cl-Pl-DH. Even the predictions made by the DOP-H are partially supported and partially not supported by our results. Crucially, the preference agrammatic speakers show to produce clitics after the verbal complex (or in the post-verbal position) fits its predictions. Moreover, the general fact that clitic production is impaired when the clitic has to be produced in the pre-verbal position in obligatory contexts, is explainable in terms of DOP-H, as well. But, the fact that agrammatic speakers

produce the same number of clitics in the pre-verbal position (in declarative sentences) and in the post-verbal position (in affirmative imperative sentences) cannot be supported by DOP-H. Moreover, DOP-H cannot explain the observed difference between direct and indirect object clitics.

To summarise, the observed data sets partially fit both hypotheses, even though none of them can explain the given results entirely. Therefore, we propose two external arguments that can supply the missing links between our data and the two hypotheses.

8.5 Revisiting the DOP-H

Our data sets show that agrammatic speakers are generally impaired in clitic production. This result can be explained in terms of DOP-H because in certain contexts clitic placement involves a different constituent order than the base one. Nevertheless, the fact that agrammatic speakers produce the same number of correct clitics in the pre-verbal position (in declarative sentences) and in the post-verbal position (in affirmative imperative sentences) does not support DOP-H. Moreover, DOP-H cannot explain the observed difference between direct and indirect object clitics. We propose that DOP-H could be a valid explanation for the observed deficit in clitic production, but DOP-H should be reformulated considering some language-specific assumptions. In the specific case of Italian, DOP-H should, for example, take into account the difference between direct and indirect object clitics, as far as case-related features go, and the syntactic operation of Restructuring (passive or active), which seems to affect the ability to produce clitics in a certain position.

8.6 Restructuring as an impaired operation in agrammatism

One of the results that the CI-PI-DH cannot explain is the general preference that agrammatic speakers show for producing clitics either after a verbal complex in restructuring sentences or in the post-verbal position in negative imperative sentences. Our data sets showed that agrammatic speakers could produce significantly more clitics in the pre-verbal position in negative imperative sentences than in restructuring sentences. To explain this dichotomy we propose that in restructuring sentences, the impossibility of producing clitics before the verbal complex is a reflection of an impairment in operating Restructuring, as postulated in Rizzi's terms (1982). This deficit prevents agrammatic speakers from allowing the climbing of the clitic over the verbal complex, consequently leaving them in the enclisis position. To explain why in negative imperative sentences agrammatic speakers could place clitics significantly more in the pre-verbal position than in restructuring sentences, we propose the following. Negative imperative

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sentences are different from fully-fledged restructuring sentences because they lack an overt auxiliary, and restructuring assumes the characteristics of a passive operation, or it is simply no longer a necessary operation of negative imperative sentences. We propose another possibility, that the empty auxiliary and the non-finite verb enter the derivation already restructured. To conclude, the difficulty seen for agrammatic speakers in producing clitics in the climbed position reflects a difficulty in operating Restructuring. In negative imperative sentences, where an active restructuring does not have to be applied, clitic placement in the pre-verbal position is significantly easier. Moreover, restructuring being a syntactic operation, an explanation in terms of impaired Restructuring fits the general claim that the underlying problem in agrammatism is syntactic in nature. Recalling the view proposed on Restructuring by Cardinaletti and Shlonsky (2004) and Cinque (2004) an alternative explanation to account for the fact that agrammatic speakers prefer placing clitics in enclisis position rather than in climbing position would be to assume that the lexical version of verbs is better preserved than the functional version of verbs. As a consequence there will be a lack of clitic climbing⁴⁷.

To summarise, we believe that our data can be fully explained by assuming a main deficit in CI-PI which leads to an impaired clitic production. Furthermore, assuming a load of feature account (which is directly linked to the operation of CI-PI), we can explain the observed difference between direct and indirect object clitics. Finally, we propose that agrammatic speakers face a deficit in (active or passive) Restructuring, which impeaches them to produce clitics before a verbal complex (or in a pre-verbal position).

⁴⁷ We thank Anna Cardinaletti for the important suggestion.

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SAMENVATTING

Binnen de theoretische taalkunde wordt taal op verschillende niveaus bestudeerd. De fonologie houdt zich bezig met de regels die aan de combinatie van klanken in een taal ten grondslag liggen, de morfologie bestudeert de interne structuur van woorden, de semantiek richt zich op de betekenis van woorden en binnen de pragmatiek houdt men zich bezig met de betekenis en interpretatie van zinnen. De syntaxis, tenslotte, bestudeert de grammaticale regels van een bepaalde taal. In dit proefschrift staat de syntaxis centraal.

Taalverwerking vindt plaats in verschillende gebieden van de hersenen, over het algemeen in de linker hersenhelft. Ten gevolge van hersenletsel in deze gebieden kunnen een of meer taalfuncties of linguïstische vaardigheden verstoord raken. Een dergelijke taalstoornis als gevolg van hersenletsel wordt afasie genoemd. Afasie kent verschillende verschijningsvormen, die afhankelijk zijn van de plaats en grootte van het hersenletsel.

Agrammatische afasie is een van deze soorten. Agrammatische sprekers hebben een stoornis op grammaticaal niveau. Zij spreken vertraagd en moeizaam, ze laten werkwoorden weg of ze gebruiken deze alleen in de infinitiefvorm en daarnaast worden ook vaak functiewoorden, zoals voorzetsels en lidwoorden, weggelaten. In de literatuur wordt de zinsproductie van agrammatische sprekers ook wel aangeduid als telegramstijl. Agrammatische sprekers laten echter niet alleen een vereenvoudigde grammatica zien in de zinsproductie, ze hebben ook moeite met het toepassen van bepaalde syntactische regels of operaties. Voor het Nederlands is bijvoorbeeld aangetoond dat agrammatische sprekers niet alleen moeite hebben met vervoegde werkwoorden, maar dat werkwoorden moeilijker worden als ze verplaatst zijn uit hun basisposities (in het Nederlands is dat de zinsfinale positie). Er is dan ook wel gezegd dat Nederlandse agrammatische sprekers een probleem hebben met het toepassen van de syntactische operatie waarbij het werkwoord verplaatst wordt vanuit zijn basispositie naar de tweede positie in de zin, zoals het volgende voorbeeld laat zien (1):

- a. Ik zie dat [de jongen een boek leest]
- b. De jongen leest een boek

In dit proefschrift bestuderen we de grammaticale vermogens van zeven Italiaanse taalgebruikers

Samenvatting

die zijn gediagnosticeerd met agrammatische afasie. In het bijzonder doen we onderzoek naar de eventuele problemen die deze personen hebben om bepaalde grammaticale morfemen, die worden aangeduid als clitics, te produceren. Deze clitics vormen een speciale klasse binnen de groep van voornaamwoorden.

Neta Is bij persoonsvormen in het Nederlands wordt het gebruik van clitics ook gereguleerd door specifieke syntactische regels en dat maakt het interessant om dit gebruik te bestuderen in een groep agrammatische sprekers die een syntactische stoornis hebben. Het doel van het onderzoek is om de productie van clitics te bestuderen, de gevonden foutenpatronen te bediscussiëren en er vervolgens over te speculeren wat de onderliggende taalstoornis kan zijn die tot een eventueel probleem bij het produceren van clitics leidt. We hebben een aantal studies verricht om dit te bereiken. Allereerst hebben we het gebruik van clitics in de spontane taal geanalyseerd. Verder is een aantal experimenten ontwikkeld om de productie van clitics in specifieke zinsconstructies, zoals declaratieve zinnen, zogenaamde restructuring zinnen en imperatiefzinnen, te onderzoeken. Het bestuderen van clitics in verschillende zinscontexten kan informatief zijn, omdat in het Italiaans (zoals hieronder wordt toegelicht), clitics op verschillende posities in de zin kunnen voorkomen.

WAT IS EEN CLITIC?

Een voornaamwoord is een grammaticaal morfeem dat op de plaats van een zelfstandig-naamwoordsconstituent staat. In de literatuur worden twee typen voornaamwoorden beschreven: sterke voornaamwoorden en clitics. Zowel sterke voornaamwoorden als clitics vervangen een zelfstandig-naamwoordcomplement, zoals blijkt uit de voorbeelden (2) en (3). In (2b) wordt het complement 'Maria' uit (2a) vervangen door het sterke voornaamwoord 'lei'. Op dezelfde manier wordt in (3b) het complement 'Maria' uit (3a) vervangen door de clitic 'la'.

(2)

- a. Gianni vede Maria
Jan ziet Marie
- b. Gianni vede lei
Jan ziet haar

(3)

- a. Gianni vede Maria
Jan ziet Marie
- b. Gianni la vede

Samenvatting

Jan haar ziet
'Jan ziet haar'

Wat is het verschil tussen sterke voornaamwoorden en clitics? Clitics worden niet beklemtoond en ze worden gemarkeerd voor naamval. Verder verschijnen het sterke voornaamwoord en de clitic op verschillende posities in de zin: het sterke voornaamwoord staat achter de prsoonsvorm (2b), de clitic staat ervoor (3b).

Volgens de taalkundige theorie nemen clitics niet de positie in van een zelfstandig naamwoord omdat ze verplaatsen. In dit proefschrift volgen we de syntactische benadering van clitics zoals die beschreven is door Kayne (1975; 1991) en Rizzi (1982). Binnen deze benadering wordt aangenomen dat clitics op dezelfde plaats in de zin worden gegenereerd als de volledig gespecificeerde complementen, maar dat ze uiteindelijk verplaatst worden naar een positie voor het werkwoord. Deze regel wordt aangeduid als de Clitic Placement Rule en wordt in het volgende voorbeeld weergegeven:

(4)

- a. Gianni vede Maria
 Jan ziet Marie
- b. Gianni la vede
 Jan haar ziet
 'Jan ziet haar'

Verder gaan we uit van Belletti's (1999) aanname over cliticverplaatsing in termen van 'feature checking'. Hierbij wordt ervan uitgegaan dat clitics verplaatsen omdat ze hun naamval moeten controleren, of in linguïstische termen, hun naamvalskenmerken moeten checken in de syntaxis.

HET ITALIAANSE CLITIC SYSTEEM

Het Italiaans heeft een rijk cliticsysteem dat bestaat uit vijf verschillende soorten clitics. Het gaat hierbij om direct-objectclitics, indirect-objectclitics, reflexieve clitics, partitieve clitics en locatieve clitics. In het Italiaans verschijnen clitics bovendien op verschillende posities in de zin, afhankelijk van het zinstype waarin ze voorkomen. In declaratieve zinnen met een finiet werkwoord verschijnen clitics voor het werkwoord (i.e. in de proclisispositie), zoals in (5a). Bij een infiniet werkwoord verschijnen clitics na het werkwoord (i.e. in de enclisispositie), zoals in voorbeeld (5b).

(5)

- a. Cristiano la vede
Christiaan het eet
'Christiaan eet het'
- b. Vederlo sarebbe bello'
Zien hem [zou zijn] mooi
'Hem te zien zou mooi zijn

In zinnen met een modaal werkwoord, een aspectueel hulpwerkwoord of een bewegingswerkwoord plus een lexicaal werkwoord (de zogenaamde restructuring zinnen), verschijnen clitics óf na het lexicale infinitieve werkwoord (zoals in 6b; vergelijkbaar met 5b) óf voor het modale werkwoord (zoals in voorbeeld 6c). Dit type zinnen wordt aangeduid als restructuring zinnen op basis van de definitie van Rizzi (1978), die aanneemt dat er een syntactische operatie is die de twee werkwoorden samenneemt tot één werkwoordscluster. Volgens Rizzi is dat de reden waarom in restructuring zinnen clitics voorkomen op een positie voor het eerste werkwoord, dat wil zeggen voor het werkwoordscluster.

(6)

- a. Marco vuole mangiare il gelato
Marco wil eten het ijsje
'Marco wil het ijsje eten'
- b. Marco vuole mangiarlo
Marco wil eten het
'Marco wil het eten'
- c. Marco lo vuole mangiare
Marco het wil eten
'Marco wil het eten'
- d. Marco vuole mangiarlo
Marco wil eten het'
'Marco wil het eten'

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In affirmatieve imperatieve zinnen komen clitics na het finiete werkwoord, zoals in (7b), terwijl in negatieve imperatieve zinnen clitics zowel aan het infiniete werkwoord kunnen voorafgaan of erop kunnen volgen, zoals blijkt uit de voorbeelden (8a) en (8b).

(7)

- a. Mangia la torta!
Eet de cake!

- b. Mangiala!
Eet het!

(8)

- a. Non mangiare la torta
Niet eten de cake
'Eet de cake niet!'

- b. Non mangiarla!
Niet eten het!
'Eet het niet!'

- c. Non la mangiare!
Niet het eten!
'Eet het niet'

DE PRODUCTIE VAN CLITICS IN SPONTANE TAAL

In hoofdstuk vier van dit proefschrift wordt de productie van clitics in de spontane taal van zeven agrammatische en tien niet-taalgestoorde Italiaanse sprekers geanalyseerd. Het corpus spontane taal werd op basis van drie taken verzameld: een semi-gestructureerd interview waarbij de vragen van de Italiaanse versie van de Akense Afasie Test (AAT; Luzzatti, Willmes, & De Bleser 1994) gesteld werden, een beschrijving van de 'cookie theft picture', uit de Boston Diagnostic Aphasia Examination (BDAE; Goodglass & Kaplan, 1972), en het laten vertellen van het sprookje Roodkapje. De analyse richtte zich op het gebruik van de vijf soorten clitics: er

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werd geteld hoeveel correcte clitics erdoor elke spreker gebruikt werd en hoeveel er werden weggelaten of vervangen. Ook werd gekeken of de clitics in de juiste positie werden gerealiseerd. De analyse laat zien dat agrammatische sprekers problemen hebben met de productie van clitics: (1) Zij produceren significant minder clitics dan niet-taalgestoorde sprekers; (2) Zij laten regelmatig clitics weg in een verplichte context; (3) De productie van directe, indirecte en reflexieve clitics levert problemen op. Opvallend is dat partitieve en locatieve clitics net zo vaak (maar heel weinig) geproduceerd worden door agrammatische als door niet-taalgestoorde sprekers.. Het feit dat agrammatische sprekers clitics vaak weglaten en dat er geen morfologische fouten gemaakt worden, leidt, tot de voorlopige conclusie dat de onderliggende stoornis in de productie van clitics bij agrammatische sprekers niet een morfologisch maar syntactisch van aard is. De gevonden verschillen tussen de categorieën clitics kunnen verklaard worden door een ‘load of features’. Dit houdt in dat hoe meer syntactische kenmerken een clitic met zich mee draagt, des te moeilijker het zal het zijn voor agrammatische sprekers om deze te produceren. Direct- en indirect-objectclitics and reflexieve clitics hebben naamvalskenners; dat hebben de andere clitics niet. Daardoor hebben de eerste drie een zwaardere ‘load of features’ en zijn ze moeilijker te produceren voor agrammatische sprekers.

DE PRODUCTIE VAN CLITICS IN DECLARATIEVE ZINNEN

Hoofdstuk vijf gaat over de productie van direct- en indirect-objectclitics in declaratieve zinnen, waarin clitics verplicht voorafgaand aan het finiete werkwoord staan, en restructuring zinnen, waarin clitics optioneel in enclisis- of proclisispositie kunnen worden geproduceerd. Het doel van deze studie is na te gaan wat de onderliggende syntactische stoornis is die leidt tot een stoornis in de productie van clitics. In dit hoofdstuk worden twee hypothesen getest. De eerste hypothese is de Clitic-Placement Deficit Hypothesis (CI-PI-DH), die aanneemt dat clitics problemen opleveren voor agrammatische sprekers vanwege het feit dat de syntactische operatie, die aan cliticverplaatsing ten grondslag ligt, moeilijk is. De tweede hypothese die we testen is de Derived Order Problem Hypothesis (DOP-H; Bastiaanse and Van Zonneveld, 2005) die voorspelt dat clitics die verplaatst moeten worden moeilijker te produceren zijn dan clitics in basispositie..

Om deze twee hypothesen te testen, zijn twee zinsaanvultaken ontwikkeld, waarmee de productie van direct object clitics (accusatieve clitics) en indirect object clitics (datieve clitics) in declaratieve en restructuring zinnen kan worden uitgelokt. Een zinsaanvultest is een test waarbij de proefpersoon mondeling een zin moet aanvullen, die is begonnen door de onderzoeker, zoals in het volgende voorbeeld:

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Onderzoeker:	Ieri Maria non l'ha aperto, ma oggi Maria... Gisteren Marie niet het heeft geopend, maar vandaag Marie... Gisteren heeft Marie het niet geopend, maar vandaag gaat Marie...
Proefpersoon:	... lo apre ... het openen

Zeven agrammatische en tien niet-taalgestoorde Italiaans sprekers deden mee aan het onderzoek. De resultaten laten zien dat agrammatische sprekers significant minder clitics produceren dan niet-taalgestoorde proefpersonen en dat indirect-objectclitics meer problemen opleveren dan direct-objectclitics. Een foutenanalyse laat zien dat agrammatische sprekers clitics weglaten of vervangen door een zelfstandig naamwoord. Net als in de spontane taal werden ook bij deze test geen morfologische fouten gemaakt. In declaratieve zinnen, waar clitics voor het werkwoord moeten staan, produceerden agrammatische sprekers die keren dat ze een clitic gebruikten, deze altijd in de juiste positie. In restructuring zinnen, waarin clitics zowel voorafgaand aan het finiete werkwoord als na het infinitieve werkwoord kunnen worden geproduceerd, waren agrammatische sprekers niet in staat om clitics te produceren voorafgaand aan het finiete werkwoord. Na het infinitieve werkwoord, dat wil zeggen in enclisispositie, konden ze de clitics in de meeste gevallen wel correct produceren.

Deze resultaten sluiten aan bij de conclusies over de spontane-taaldata. Agrammatische sprekers hebben problemen met het produceren van clitics en wij nemen aan dat dit wordt veroorzaakt door een stoornis in de syntactische verwerking. Of dit problemen worden veroorzaakt door een stoornis op het niveau van de syntactische operatie die aan de cliticplaatsing (CI-PI) ten grondslag ligt of dat de problemen optreden als gevolg van een probleem met een afgeleide woordvolgorde, kan nog niet worden vastgesteld op basis van deze data. Het probleem dat agrammatische sprekers hebben met het produceren van clitics voorafgaand aan het werkwoordscluster in restructuring zinnen verklaren we door aan te nemen dat agrammatische sprekers niet in staat zijn om de syntactische herstructureringsoperatie, waarbij twee werkwoorden tot een werkwoordscluster worden gevormd, toe te passen.

DE PRODUCTIE VAN CLITICS IN IMPERATIEVE ZINNEN

In Italiaanse affirmatieve imperatieve zinnen moeten clitics na het werkwoord worden geproduceerd (zie voorbeeld 7b), terwijl in negatieve imperatieve zinnen de clitics voor of na het infinitieve werkwoord mogen voorkomen (zie voorbeelden 8a-b). Het doel van het experiment in

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hoofdstuk zes is de productie van clitics in imperatieve zinnen bij agrammatische sprekers te analyseren, om zodoende te achterhalen welke onderliggende stoornis leidt tot het probleem bij cliticproductie. Opnieuw zijn zeven agrammatische en tien niet-taalgestoorde Italiaanse sprekers getest met een zinsaanvultaak. Deze taak bestond uit zestig zinnen. Dertig hiervan lokten de productie van een direct-objectclitic (accusatief) uit en dertig van een indirect-objectclitic (datief) in affirmatieve en negatieve imperatieve zinnen. De resultaten laten opnieuw zien dat agrammatische sprekers significant minder clitics produceren dan niet-taalgestoorde proefpersonen. Daarnaast blijken ze significant meer problemen te hebben met het produceren van indirect-objectclitics dan van direct-objectclitics. Net als in de vorige experimenten laat de foutenanalyse ook nu zien dat agrammatische sprekers clitics weglaten of vervangen door een zelfstandig naamwoord. Ook blijkt dat in negatieve imperatieve zinnen, waarin de positie van clitics optioneel is, agrammatische sprekers significant meer clitics produceren na het infinitieve werkwoord dan ervoor. Dit patroon sluit aan bij de voorspellingen die worden gedaan door de DOP-H.

CONCLUSIES

De resultaten die in dit proefschrift worden gepresenteerd laten zien dat agrammatische sprekers problemen hebben met de productie van clitics. Zij laten clitics weg of vervangen ze door een zelfstandig naamwoord. Dit werd gevonden zowel in spontane taal als in een aantal experimenten. Deze resultaten vormen een solide basis voor de claim dat een syntactische stoornis de problemen met clitics bij agrammatische sprekers veroorzaakt. Clitics zijn moeilijk omdat ze inherent naamvalskenmerken in zich dragen die gecontroleerd moeten worden in de syntaxis. Als gevolg hiervan moeten clitics verplaatst worden. Cliticverplaatsing zou op zich een moeilijk syntactisch proces kunnen zijn. Een alternatieve verklaring voor de gevonden uitkomsten is dat clitics moeten worden geproduceerd op een positie die is afgeleid van hun basispositie. De DOP-H voorspelt dat dit probleem ten grondslag ligt aan de problemen met de productie van clitics.

Verder laten de spontane-taaldata zien dat agrammatische sprekers meer moeite hebben met de productie van reflexieve clitics, direct object clitics en indirect object clitics dan niet-taalgestoorde sprekers, terwijl een dergelijk verschil niet werd gevonden voor partitieve en locatieve clitics. Deze uitkomsten hebben we verklaard door aan te nemen dat clitics die meer naamvalskenmerken hebben moeilijker zijn te produceren dan clitics die minder van deze

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kenmerken hebben (load-of-feature-verklaring).

Een andere belangrijke uitkomst van dit onderzoek is dat is aangetoond dat agrammatische sprekers moeite hebben met het produceren van clitics in proclisispositie (d.w.z. voor het werkwoordscluster) in restructuring zinnen en met clitics voorafgaand aan infinitieve werkwoorden in negatieve imperatieve zinnen. We nemen aan dat deze problemen worden veroorzaakt door een stoornis in de syntactische herstructureringsoperatie. De duidelijke voorkeur bij agrammatische sprekers om clitics na het werkwoordscluster te produceren verklaren we door aan te nemen dat ze niet in staat zijn om twee fonologisch gerealiseerde werkwoorden te herstructureren tot één werkwoordscluster. Als twee werkwoorden niet tot één werkwoordscluster kunnen worden samengenomen, dan kunnen clitics niet verplaatst worden naar een positie voor het cluster.

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