Child Language and Agrammatism:

A Comparison

The Use of Pronouns – Focused on the English Language

Sabina Kasum
3106829
BA Thesis English Language and Culture, Utrecht University
Linguistics
6732 words
July, 2012

Supervisors:
1. W.C.H. Philip
2. M.E.H. Schouten

Table of Contents

1. Introduction

The aim of this thesis is to give a clear comparison between child language and the language use of aphasics and to find an explanation why both make errors in the production of pronouns and why the errors are so similar. In order to do so, pronouns will be used as an example to represent the comparison, because both groups, children and aphasics, seem to produce the latter incorrectly. Pronouns are a special phenomenon in the case of children and aphasics, because both groups experience difficulties when the pronoun has to be linked to an anaphora. The hypothesis which will be discussed is the following: misinterpretation and incorrect use of pronouns is due to processing errors in the brain which both groups, children and aphasics, suffer from. A child is able to learn more and more as years go by, it eventually masters the use of language. However, people suffering from agrammatism will not be able to do so because of trauma to the left hemisphere of their brain.

For this research, the work of Nada Vasic (2006) will be used as a main leading hypothesis to prove that the abovementioned hypothesis is correct. Other research will be used to contradict this hypothesis, but in the end the main goal is to prove that Nada Vasic is correct.

According to Vasic (2006), it is reasonable to conduct research with the two groups, children and aphasics, because both struggle with the same problems when using pronouns. However, the factors which cause the problems can differ, whereas the outcome is similar. Vasic (2006) performed experiments which clarified the similarities between the two populations, but also showed some differences, yet the conclusion is the same: children and aphasics display processing errors when using pronouns, but not the same factors cause the errors.

Yet, many researchers such as Grodzinsky seem to think otherwise. According to him children and aphasics are not able to implement Rule I properly. O'Grady states that the faculty of language is underpowered. Both these studies will be used to contradict Vasic's research.

This BA thesis will consist of several chapters, the first one focusing on Broca's aphasia. For the

aim of this thesis, it is necessary to explain what Broca's aphasia is and how the brain functions after having suffered from lesions. The other chapters will consist of short summaries of child language acquisition and data gathered from different research and a conclusion.

2. Aphasia

2.1 Broca's Aphasia

Agrammatism is also referred to as Broca's aphasia[1]. Sergey Avrutin (2001) claims: "[it] is a case of a more general linguistic impairment." It consists of a lesion to the left hemisphere of the brain such as a trauma or stroke (cerebral vascular accident, also referred to as CVA). Broca's aphasia is manifested by the presence of ungrammatical utterances in the speech of patients with particular brain damage, i.e. different types of aphasia, as well as abnormal comprehension of certain constructions (Avrutin, 2001).

The study of aphasia has attracted many linguists' attention. Firstly, the modularity of language thesis was confirmed. The Modularity Hypothesis is widely assumed: linguistic knowledge emerges from an encapsulated cognitive system, and the language module itself has a modular structure (Evans & Green, 2006). Aphasic patients preserve normal cognitive abilities; the impairment is only linked to language (Avrutin, 2001). The presence of this evidence supports the claim that language is modular, that it is in fact an independent system of cognitive structures which is governed by its own rules and principles (Avrutin, 2001).

2.1.1. Broca's Aphasia: A Historical Overview

Research on language representation in the brain started during the late nineteenth century, but the phenomenon of language impairment due to brain injury is as old as recorded medicine. Paul Broca and Carl Wernicke were the first persons to group certain language impairments together under the

---

[1] Broca's aphasia is just one of many characterizations of brain damage. With the goal of this thesis in mind, Broca's aphasia is the most relevant one to focus on. Another form of aphasia, which is in contrast to Broca's is referred to as Wernicke's aphasia. The difference between Broca's and Wernicke's is the fact that Wernicke's aphasia consists of effortless production, correctly used functional categories and correct intonation patterns, however, the comprehension is poor. Of course, there are many more forms of aphasia which all represent a syndrome with a number of related symptoms. What is also important to note is the fact that it is quite difficult to classify patients as having a certain form of aphasia, because the syndromes are not often 'pure', that is, they represent a combination of symptoms which in turn can represent other syndromes.

name of aphasia.

The first useful observations on this topic were based on clinical observations and pathological correlates discovered in the brain during autopsy. Paul Broca was the first to locate the inferior part of the third frontal convolution in the left hemisphere as the motor center for spoken words. Broca based his findings on the fact that his patient was unable to speak. The patient could only utter one syllable, namely 'tan'. The autopsy of this patient's brain showed that the left part of the brain was damaged.

Later on, Carl Wernicke did extended research on the same subject and discovered other factors that play a role in aphasia. Wernicke studied a patient, who suffered a stroke, but in this case, the patient was able to speak and his hearing was impaired. The patient was not able to understand written words. After this patient's death, Wernicke performed autopsy on the brain and found a lesion in the rear parietal/temporal region of the patient's left brain hemisphere. Wernicke's conclusion was that this region was responsible for language comprehension. Wernicke named this syndrome sensory aphasia, which is now referred to as Wernicke's aphasia.

2.2 Characteristics of Broca's Aphasia

Broca's aphasia is characterized as a language disorder resulting in effortful and telegraphic speech. The length of the utterances is reduced to a minimum and patients also experience difficulties in describing pictures.

Patients display severe problems with finding the correct word for an object or person, which can at least partially account for their elliptical utterances and poor naming. Moreover, this type of aphasia is also characterized by frequent omission of functional categories, such as determiners, tense and complementizers.

It is believed that patients comprehend what they hear, but only have difficulties reproducing it. However, Avrutin (2001) claims that recent psycholinguistic research has shown that comprehension in

agrammatism is also impaired.

2.3 Aphasics: Speech Data

The following data is taken from Avrutin's (2001) article "*Linguistics and Agrammatism*". It is an example of a patient suffering from Broca's aphasia. The patient was tested as to see what he would produce as an outcome of looking at the picture (see below). This picture/test is also known as the "*Cookie Theft Picture*", patients are inclined to say. The outcome of the test should resemble the following description:

"a woman is drying dishes not noticing what is going around her; the water flows out of the sink, a boy and a girl are taking cookies out of a jar, and the boy, standing on a kitchen stool, is about to fall down."
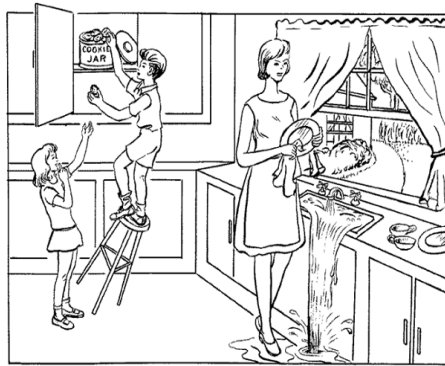
The patient was only able to produce the following:

> *B.L.: Wife is dry dishes. Water down! Oh boy! okay. Awright. Okay . . . Cookie is down . . . fall, and girl, okay, girl . . . boy . . . um . . .*
>
> *Examiner: What is the boy doing?*
>
> *B.L.: Cookie is . . . um . . . catch*
>
> *Examiner: Who is getting the cookies?*

B.L.: Girl, girl!

Examiner: Who is about to fall down?

B.L.: Boy . . . fall down![2]

Evidently, the patient is unable to produce a fluent sentence structure and the speech is telegraphic, that is: the utterances are very short and do not consist of entire grammatically correct sentences. The patient takes a long time to express a thought, which is expressed in halting speech; this is indicated by the dots (Vasic, 2006). Moreover, some of the words used for description do not correlate exactly with what is in the picture. The boy is grabbing the cookie, whereas the patient refers to it as 'catch'.

3. Child Language

3.1 Child Language: The Acquisition

The Generative Theory of Universal Grammar is often used to account for language acquisition. According to this framework, human beings are endowed with a system of richly structured linguistic knowledge which guides infants in analyzing incoming linguistic stimuli (Guasti, 2002).

At the age of three, children already know a lot about the linguistic data they receive from the input. Although their speech is not entirely fluent, they still manage to put words together in the correct order. Take for instance Adam, a three-year-old boy:

Adult: I don't think you write with pencil on that, Adam.

Adam: What you write with?

Adult: You write with some crayons.

---

[2] This example was taken from Sergey Avrutin's article "Linguistics and Agrammatism"; Moreover, Nada Vasic also uses this example in her dissertation.

Adam: Why d(o) you carry it by de handle?[3]

This example shows that Adam, as any other child, is able to produce adult-like sentences. However, a certain feature, which is common to almost all English learning children, is that they tend to not use auxiliary verbs. In the example Adam does not use an auxiliary verb.

Children can learn language without explicit teaching. Acquiring a first language does not require systematic instruction. Language develops spontaneously because of the linguistic input a child is exposed to. They interpret what they hear. Parents also rarely correct children when they make errors. According to Guasti (2002), children do not respond to corrections.

The corrections children receive from parents should inform them that something is not possible in the language they are exposed to. Such information is also called negative evidence. As noted, corrections are rare and do not seem to work or influence the linguistic behavior. The general conclusion about negative evidence, according to linguists, is that it is not a sufficient and reliable source for children, because of several factors. Mostly, it is noisy and children do not respond to it. A better and reliable source for children is positive evidence, all the input they hear around them, this source is also abundantly available (Guasti, 2002).

The linguistic input and circumstances children are exposed to vary from child to child, yet children acquire language in a limited amount of time and the process they go through is the same. Children attain the same competence in language use. By the age of 5 they have mastered most of the constructions of their language, yet their vocabulary is still growing (Guasti, 2002).

Furthermore, children achieve linguistic milestones in parallel fashion, regardless of the specific language they are exposed to (Guasti, 2002). For instance, at about 6-8 months, all children start to babble, that is, to produce repetitive syllables. About 10-12 months they start to speak their first

---

[3] This example was taken from Maria Teresa Guasti's book: "Language Acquisition: The Growth of Grammar" in which she explains the process of language acquisition. Guasti shows as a great deal of evidence in supporting Chomsky's framework. However, only the relevant chapters from her book will be discussed in this section.

words, and between 20 and 24 months they start to put words together (Guasti, 2002).

4. Child Language and Agrammatism: Why Are the Two Comparable?

4.1. Observations: Child Language and Agrammatism

First of all, a very general observation can be made, namely, children have a long process ahead when learning a language. At the age of, say, three they still have a lot to learn about linguistic input by analyzing it. However, an adult agrammatic already has a fully developed language and functional computational system. After a lesion the faculty of language is impaired. This causes aphasics to produce childlike speech.

The question arises how it is possible that an adult who is suffering from aphasia can be at the same linguistic level as that of a child that is just learning how to speak English. The aim of this thesis is to prove that this is a matter of processing errors in the brain of both groups, children and agrammatics.

A child is at a developing stage and their language area of the brain will still need growth which will eventually lead to adult-like speech.

In comparing the two groups, it is best to use pronouns, because both groups, children and agrammatics, have difficulties with pronoun production. Aphasic and children's computational systems do not allow for pronouns to refer back to antecedents.

Vasic (2006) did extended research on the behavior of pre-school children and Broca's aphasics. She supports her research by stating that:

it is well-known that the processing capacity of agrammatic aphasic patients is compromised. If their errors are analyzed as a consequence of such a limitation, it is reasonable to look for independent support in the form of data from a population with similar problems in relation to language processing.

This other population is children.

She continues by claiming that according to her the two language systems, that of a child and an agrammatic aphasic, share the same insufficient ability to implement grammatical knowledge as a consequence of a lack of processing resources. Moreover, she also acknowledges the general observation which was made in the first paragraph; namely, the two language systems differ in that the developing language system in children is a dynamic, constantly changing system while the impaired system in agrammatism is more static.

4.2 Theoretical Background

Pronouns are a very useful phenomenon when comparing child language to that of agrammatics. Pronouns rely on anaphora; what this means is that the words on their own do not carry enough linguistic information in order to be interpreted correctly. However, by using them together in a sentence, a child with a developed computational system or an adult can still understand the linguistic information that is transferred.

It should be noted that the interpretation of pronouns and anaphora depends on syntactic and discourse factors and also on the interaction of the different levels of grammatical representation (Vasic, 2006).

The main purpose of this section is to discuss all the theories that are relevant within the field of this research in order to make the reader familiar with the terms used and the thought behind the reasoning of this thesis. Firstly, the Reflexivity framework by Reinhart and Reuland (1993) will be explained and secondly Rule I by Grodzinsky and Reinhart (1993).

4.2.1. Reflexivity Framework

According to the reflexivity model of Reinhart and Reuland (1993) two modules govern the distribution of pronominal elements. The first one (1A) is related to the function of reflexivization, which is relevant for the binding conditions. This is illustrated in (1). The modules are defined in terms of conditions on predicates.

(1) *A: A reflexive-marked predicate must be interpreted reflexively.*

   B: A reflexively interpreted predicate must be reflexive-marked.

The other part (1B) relates to the referential property [R] of the pronominal element in the sentence, and it is also referred to as the A-chain condition. Condition B of this theory is defined as a condition on reflexive predicates. The following explanation illustrates how the model accounts for the differences in grammatical correctness of sentences:

(2) *a. John hit him.*

   b. John hit himself.

A predicate can only be interpreted reflexively if the two arguments are co-indexed. (2) would then grammatically look like the following:

(3) *a. John$_i$ hit him$_i$.*

   b. John$_i$ hit himself$_i$.

(3) consists of two sentences in which the arguments are co-indexed, hence they are both

reflexive. However, condition b in (1) requires that sentences can only be interpreted reflexively if they are reflexive-marked. In (3a), the verb *hit* is not inherently reflexive, in other words the verb does not carry aspects which cause it to be reflexive. Moreover, the pronoun is not a reflexive-marker, because only SELF anaphors can function as reflexive-markers. In conclusion, this would mean that this sentence violates the B principle of the Reflexivity model by R&R. However, (3b) consists of the reflexive-marker *himself*, which causes the predicate to be grammatically correct, and only one interpretation is possible, namely that Peter hit himself. Children and aphasics are able to comprehend the SELF anaphor and hardly make mistakes in using reflexives, because reflexives refer back to the subject in the sentence.

The Reflexivity Model can account for sentences which other theories could not. Sentences such as (4) can be understood by the reflexivity model. In the sentence the reflexive functions as a logophor, which is not a real reflexive anaphor. According to Vasic (2006), a logophor and anaphor differ in terms of co-argumenthood with their potential antecedents; in other words, a logophor is a reflexive in an argument which again is inside a complement or an adjunct of a main predicate. This would mean that a reflexive anaphor is a reflexive that is an argument of the same predicate as its antecedent (Vasic, 2006). The reason the Reflexivity Model can account for sentences such as (4) is because according to Reuland (1993) the distribution of logophors is governed by discourse factors.

(4) *Mary put the purse near her/herself.*

In sentence (4), the reflexive fails to mark the predicate *put* as reflexive, because it is not an argument of this predicate. The argument in this case is the entire prepositional phrase *near herself*. According to the model, condition A sets a requirement that only reflexive-marked predicates may be reflexive and do not apply when predicates are not reflexive-marked. For this reason, (4) is not ruled

out.

However, not everything is accounted for in the Reflexivity Model; for instance, it does not explain how the interpretation of pronouns is regulated in sentences such as (2a). Over the years, linguists have illustrated that there are two types of pronouns: bound variable pronouns and co-referential pronouns. According to Fromkin (2000), pronouns are said to be bound when the reference is determined by a c-commanding antecedent. The second type of pronouns is distinguished by Rule I and operates at the level of discourse, which was introduced by Grodzinsky and Reinhart (1993). For a complete explanation of Rule I, see (5):

(5) *Rule I: Intrasentential co-reference*

NP A cannot co-refer with NP B if replacing A with C, C A-bound by B yields an indistinguishable interpretation.

Vasic's research (2006) makes it clear that children and aphasics have little trouble interpreting reflexives in simple transitive sentences. One of the experiments she conducted consisted of a picture selection task. The results of the experiment were that children and aphasics were able to interpret reflexives better than pronouns. Both groups interpreted pronouns as reflexives, because they were unable to link the pronoun to a subject that was not directly present in the clause. The research consisted of 45 sentences. The relevant conditions consisted of reflexives and pronouns in transitive sentences and reflexives and pronouns in Exceptional Case Marking (ECM) constructions such as:

… and then has the woman herself touched – Reflexive in a transitive sentence
… and then the woman touched herself. – Pronoun in a transitive sentence
… and then saw the man himself playing soccer. – Reflexive in an ECM construction
… and then the man saw him playing soccer. – Pronoun in an ECM construction

Vasic illustrates that the transitive sentences with a pronoun or a reflexive were identical apart from the pronominal element and that the sentences with a reflexive were included as control items.

She expected no problems with the comprehension of these sentences because similar research conducted with the same constructions by Grodzinsky (Grodzinsky et al. 1993) and no major inconsistencies were found then.

Vasic used a picture selection task to test the interpretation or pronouns and reflexives in transitive sentences and in ECM constructions which were mentioned above. The sentences were presented orally to the subjects and repeated as often as necessary. Each item had a picture belonging to it. The interpretation of the first conjunct was depicted on the left side of the page. Three other pictures were on the right side of the page, please check the Appendix A for the pictures that were used. Two of the sentences given in the test functioned as distractors and only one was entirely correct. Vasic used one distractor in every example which was represented by local binding. All the sentences can be found in Appendix A. The subject received instructions to listen as carefully as possible to both parts of the sentences and to look at which picture depicted the experimental sentence best.

The results of the experiment are the following: the test revealed that the aphasic speakers performed significantly worse than the non-brain damaged speakers on the ECM condition with pronouns (Vasic, 2006). Moreover, the test also showed that the aphasics scored worse on the pronouns in transitive sentences. The test on the reflexives in transitive sentences had an overall passing score which was aligned with the results Grodzinsky had presented in his research. For all results, please check Appendix B. Vasic backs up her research by also stating that she examined whether the aphasic speakers performed differently from chance-level on the two conditions previously mentioned. The aphasics pointed at the direct distractor most of the time. Moreover, they only seemed to choose between either the entirely correct picture or the distractor. The participants paid no attention to the third picture. Therefore, Vasic explains that she recalculated chance level performance to be 50% instead of 33% (because of the 3 options). Vasic also points out that her experiment differs from Grodzinsky's et al. (1933) that her subjects scored better than the ones participating in Grodzinsky's

research. Vasic blames the difference in testing as the main reason of this difference. Grodzinsky used a truth-value judgment task in which the target sentence was presented in the form of a question and could be answered with a yes or a no.

As for Rule-I, that will be explained and illustrated in the next paragraph.

4.2.2. Rule I

The notion of Rule I essentially means that establishing a dependency through variable binding is more economical than that of co-referencing (a discourse operation), unless co-referencing leads to an interpretation that is distinguishable from the interpretation derived through variable binding (Vasic, 2006).

According to the authors, Grodzinsky and Reinhart (1993) Rule-I is:

The idea behind Rule I is that in the standard cases the easiest way to express co-reference is by means of binding. When this option is avoided without the relevant motivation, lack of co-reference intention is inferred. We leave open whether Rule I is an independent principle of the co-reference module of Universal Grammar or whether it may be reducible to other general principles. If it can be shown that computing a reference twice, as in the co-reference interpretation, is more costly than computing it once, as in the binding interpretation, Rule I could be related to the Least Effort Principle.

In their study, Grodzinsky and Reinhart (1993) hypothesize that aphasics lack processing resources of the 'Rule I', which governs intrasential co-reference. The working memory in patients is limited and this results in a failure to apply Rule-I. Grodzinsky and Reinhart (1993) put forth a proposal in which children's data could correspond to aphasics' data. According to Grodzinsky and Reinhart (1993), the computation of reference in structures containing pronouns and non-quantified local antecedents also exceeds the working memory capacity in children. They argue that the processing of Rule-I causes problems for both groups.

The following sentence shows how Rule-I works in a simple transitive sentence with a pronoun object in object position:

(*6) Peter is kicking him. (him = Peter)

In (*6) it becomes clear that it is in principle possible because the antecedent DP *Peter* c-commands the pronoun *him.*

In order to assign reference to the pronoun in sentences such as (*6), a reference set needs to be computed. This reference set must include two possible representations during processing: one that involves a binding option (semantic operation) and another with the alternative co-reference interpretation, involving discourse-level information (Vasic, 2006). These two representations must be held in short-term memory and compared, relative to their context, in order to decide whether they are distinguishable, that is, whether they yield different interpretations. The co-reference interpretation is allowed only in the instances where the two representations yield different interpretations. In instances where there is no difference, the pronoun is interpreted as a bound variable (Vasic, 2006).

Regardless of the outcome of whether co-reference is allowed or not, Grodzinsky & Reinhart (1993) hypothesize that this kind of decision-making requires a complex computation that surpasses the processing ability of agrammatic patients. According to the authors, 'the need to hold and compare two representations surpasses the processing ability of the language-deficient hearer, whether an aphasic or a child' (Grodzinsky & Reinhart, 1993), and this leads to comprehension errors with sentences such as the one in (*6). Crucially, the claim is that both patients with agrammatic Broca's aphasia and children have the appropriate knowledge of Rule-I but fail in the execution of all the steps that are required by the rule and resort to guessing (Grodzinsky & Reinhart, 1993).

4.3 Agrammatism and Child Language: A Discussion

According to linguists, Broca's aphasics and children are not able to interpret pronominal linguistic information correctly. Broca's aphasics suffer from a limited language processing capacity. Due to this problem, Broca's aphasics, and children, tend to rely on extra-syntactic strategies in order to structure the linguistic information, i.e. they use discourse and pragmatic strategies. However, children do not suffer from lesions, therefore another factor is at play, yet the outcome is the same of both groups. This is in contrast to adults without language impairments and/or brain damage, because their syntactic representations are still intact.

William O'Grady (2001) wrote on the topic of agrammatism (Broca's aphasia) and child language in his article '*Language Acquisition and Language Loss*'. His key point was to indicate that language loss, as seen in aphasics, and language acquisition both confirm his thesis that the computational system for language is intact, but 'underpowered' in particular ways. He tried to illustrate this by the following phenomena: pronominal co-reference, the interpretation of relative clauses and the comprehension of two types of dative constructions. However, only the part of pronominal co-reference will be discussed.

It is worth noting that Vasic does not take the findings of O'Grady into consideration. She only mentions that there are errors in correct pronoun processing because aphasics and children have insufficient ability to implement grammatical knowledge and she links these problems to a lack of processing resources, whereas O'Grady claims the problem is a matter of 'underpowered' computational systems. Vasic's thesis is close to that of O'Grady's, but O'Grady assigns the problem to another issue explained below.

O'Grady (2001) states that the consequences of an underpowered computational system become clear when pronoun interpretation is the topic. According to him the interpretation of reflexive pronouns is a prototypical case of computational efficiency – the referential dependency is resolved not

just at the first opportunity, but immediately by an index present in the grid of the verb which the reflexive pronoun combines (O'Grady, 2001). O'Grady (2001) also refers to the Universal Grammar (UG) theory Chomsky presented. He says that the c-command and locality constraints that are traditionally stipulated as part of UG follow automatically. However, O'Grady (2001) raises the question what would happen when pronouns such as '*him*' and '*her*' are used, because it is possible that these pronouns also take a non-local antecedent, as is illustrated in (7):

(7) *John believes [that David$_j$ admires him$_i$/*himself$_i$]*.

Furthermore, pronouns always have antecedents that are external to the sentence and may even be used deictically (i.e. pointing at someone/something) to refer to a previously unnamed individual or entity. According to O'Grady (2001) these facts prove that the interpretation of pronouns must place extra strain on the computational system. Vasic completely leaves this option out in her research.

 He continues by saying that if his theory is correct, that of an underpowered computational system, there should be a tendency to misinterpret definite pronouns by resolving the referential dependency they introduce at the earliest opportunity, which would then give them the interpretation of reflexive pronouns. According to O'Grady (2001), this is also the case.

O'Grady (2001) states that there is reason to believe that the interpretation of definite pronouns is difficult for first language learners, children, who mistakenly take the pronoun in patterns such as (7) to refer to the nearer antecedent, which occurs about 50% of the time[4]. However, a reflexive pronoun in the same position is correctly interpreted in more than 90% of the cases. To prove this matter, the Truth Value Judgment task was performed (TVJ). Children had to respond to questions with regard to pictures such as that in (8). The sentences used for this experiment were the following: "Is Mama Bear

---

[4] The statistics of this research were taken from Jakubowicz 1984, Solan 1987, Read & Hare 1979, Otsu 1981, Kaufman 1994, Chien & Wexler 1990.

touching her or herself? More information on O'Grady's experiment will be explained below.
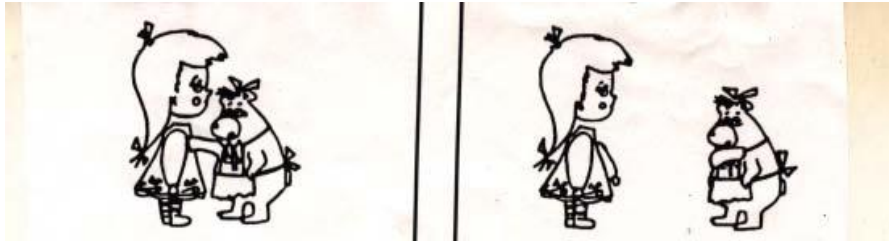
(8)

Children had to respond to questions such as those in (9):

(9)   *This is Mama Bear; this is Goldilocks.*

        Is Mama Bear touching her?

The research showed that children below the age of six performed poorly on this task, responding 'yes' to the question. They interpreted the pronoun *'her'* as a reflexive pronoun *'herself'*. This is what would be expected if the computational system favors the immediate resolution of referential dependencies and is too weak to consistently pursue less efficient interpretive options (O'Grady, 2001). Children younger than six years did poorly on this task, responding '*yes*' to the query '*Is Mama Bear touching her?*'. They pointed more than half of time on average to the picture on the left. They interpreted the plain pronoun her as if it were the reflexive pronoun herself. This is just what we would expect if the computational system favors the immediate resolution of referential dependencies and is too underpowered to consistently pursue less efficient interpretive options.

However, there is one possible inconsistency with this research. The pictures were rather unclear. If the results were to be accepted as true from this research, it could be debated whether they were obtained correctly. This could be a possible reason for Vasic not to have implemented the results

in her own research as a possible source for her experiments

In the case of aphasics; eight of the tested subjects by Grodzinsky et al. (1993) had no difficulties interpreting the reflexive pronoun such as that in (10). The participants were shown both pictures at the same time. Other evidence comes from other studies, such as that of Caplan and Hildebrandt (1988), who report a similar result on an act-out task that they conducted with three seriously impaired agrammatics.

(10)   *Is Mama Bear touching herself? – referring to picture (8) on the **right***

However, the study of Caplain and Hildebrandt (1988) also showed that the question shown in (11) was answered at a chance level on the definite pronoun, which was often interpreted as co-referential with the subject.

(11)   *Is Mama Bear touching her? – referring to the picture (8) on the **right***

Studies so far have shown that abovementioned results often show the same pattern, or at least similar, when it comes to these types of sentences for children learning English as a first language and Broca's aphasics. O'Grady (2001) supposes that all this has the same explanation: in both cases the subjects are tempted to resolve the referential dependency introduced by the pronoun via the shortest and quickest computation, which, incorrectly, links it to the subject of the same clause.

O'Grady (2001) showed that there is syntactic evidence for the preference of incorrect pronoun interpretation children and agrammatics show. Nada Vasic (2006) also did experiments on the abovementioned phenomenon which proved that this is indeed the case. In her article she continues to assume that both in children and agrammatics the linguistic knowledge requires processing sources.

According to Vasic (2006) an adult language processing system will use the least intensive operation to reach an interpretation in language comprehension. She claims that the error pattern in pronominal reference assignments which agrammatics show is a consequence of a reduced capacity for syntactic processing. Aphasics like 'to take the easy road', i.e. they allow alternative dependencies, causing to have different interpretations. However, in healthy adults these processes are blocked, because they are more intense. Aphasics may use this kind of processing. Vasic bases her conclusion on the research she did with aphasics and children in several experiments, one of the experiments was already explained in Chapter 4.2.1. in this BA thesis.

Vasic (2006) compared the data she got from her experiments with aphasics with the data she got after performing experiments with children. She tested the hypothesis that children's errors are a consequence of a reduced capacity to use narrow syntax as a way of encoding pronominal dependencies. She also claims that similar error patterns were found when the data was compared to that of agrammatics.

Vasic (2006) refers to the Maturity Hypothesis to substantiate her research. According to this hypothesis, particular linguistic data and principles of Universal Grammar (UG) may become available to children at certain stages of the process of language acquisition. Avrutin (2001) claims that language learning is a process of maturation of the brain. In children the syntactic organ needs to mature in order to become fully functional (Vasic, 2006). Avrutin (2001) states that children fail to perform certain computations at a young age, because they disobey some linguistic principles. It should be noted that they do not lack the linguistic constraints. Children lack the power to carry out computation, that is, they are not able to implement certain principles because their language system is not able to process it. Vasic (2006) says that therefore language learning itself should be examined as a process that encompasses representation as well as processing. In contrast to children's computational systems, adults choose the most efficient one for transferring information.

Moreover, Grodzinsky & Reinhart (1993) argued that both agrammatics and children have problems computing Rule I, due to a lack of processing resources.

Vasic (2006) continues by saying that her own research made it clear that aphasics and children exhibit the same error patterns. Research has shown that children aged four to six show adult-like performances in interpreting reflexives. The real problem is the pronouns. Linguists detected a particular pattern: children often allow pronouns to refer to local c-commanding antecedents.[5]

According to Vasic (2006) children and aphasics have problems with co-reference and not with binding. She also refers to a study conducted by Chien and Wexler (1990). The results of this study showed that children's performances on pronouns in simple transitive sentences, such as sentence (12), where the local c-commanding antecedent is a referential expression is at chance level.

(12) *Peter pointed at him.*

Although, in other structures, where the local antecedent is quantified as seen in sentence (13), children show an adult-like performance, the majority of the children (85%) showed this result.

(13) *Every girl pointed at her.*

An explanation for the behavior regarding sentence (13) could be that children reject binding between the pronoun '*her*' and the local quantified DP '*every girl'*.

Local co-reference is in the interpretation of pronouns as free variables, and this is not entirely impossible in the English language. However, it is limited to special contexts (Vasic, 2006). Children and aphasics allow local co-reference in contexts while healthy adults reject this. Children and aphasics

---

5   This information is obtained from Vasic, however, the results can be found in these studies: for English: Jakubowicz 1984; Chien & Wexler, 1990; for Dutch: Koster 1993, Sigurjónsdóttir & Coopmans, 1996; Philip & Coopmans 1996; for Icelandic: Sigurjónsdóttir,1992 and for Russian: Avrutin & Wexler, 1992

do this as a result of a failure to implement Rule I.

Vasic (2006) also refers to the DPBE in Exceptional Case Marking (ECM) constructions. According to the studies conducted by Philip & Coopmans and Baauw with Dutch children, children tend to allow the pronoun in ECM sentences, such as sentence (14), to refer to the local antecedent in around 80% of the cases tested.

(14) *Daisy saw her move.*

This data is in contrast with the chance performance which was observed in simple transitive structures where Principle B of the Reflexivity model applies.

Philip & Coopmans (1996) state that the strong DPBE in ECM sentences is a result of the not yet complete acquisition of the [case] feature. As a result, children falsely make assumptions regarding the [+/- R] property of the pronoun.

Aphasics, in contrast to children, performed at chance level in tests with pronouns in ECM constructions. They were above chance when interpreting pronouns and reflexives in simple transitive sentences (Vasic, 2006). However, if the pattern of problems with pronouns is the same or similar in children and aphasics, the results would have to be the same and the problems aphasics come across would also be the same children come across. However, a difference in children's performance on pronouns in transitive and ECM constructions should be found. Children's performance on these construction should be more problematic (Vasic, 2006). In Vasic's research, the results differed from that of Grodzinsky, because she tested aphasics above chance levels. However, because aphasics al differ in symptoms individually, it could be the case that if she used the same subjects as Grodzinsky (1993), the results would be the same.

Furthermore, it can be stated that children still need time to develop their computational

system, whereas aphasics already have a developed language module (which is not functioning optimally anymore). However, it is not necessary that both groups experience the same problems due to the same factors. Several aspects can be at play, causing incorrect pronoun interpretation, but the outcome with both groups is the same.

5. Conclusion

The goal of this thesis was to prove that both aphasics and children come across problems when using pronouns, according to the theory of Vasic (2006). All the problems occur because of processing errors in the brain. However, it is not certain that the same factors play a role in causing processing errors, yet the outcome is similar. The difference between children and aphasics is that children still can develop a fully functioning faculty of language, whereas aphasics cannot because they suffered a trauma to the brain.

According to the different research and theoretical frameworks presented, pronouns are the main problem for aphasics and children when it comes to correct linguistic production that . The two groups have trouble interpreting them as well as reflexives. According to the Reflexivity framework, children and aphasics cannot process the rules which are used. Rule I regulates the use of pronouns. It is a part of linguistic competence, and innate. In short, it would mean that 'if there is a better way of saying something, it should be used'. Children and aphasics fail on this part, because they cannot implement the rules and regulations of Rule I, it surpasses their competence.

Vasic (2006) states that the incorrect interpretation is due to processing errors children and adult aphasic patients come across, the problem is not so much with reflexives, but with pronouns. Moreover, O'Grady (2001) suggests that it is because the language of faculty is underpowered to perform tasks such as interpreting pronouns correctly. Grodzinsky et al. (1993) claim it is due to the fact that children and aphasia patients fail to implement the Rule I correctly. Avrutin (2001) states that children fail to

perform certain computations at a young age, which manifests in incorrect input because they disobey some linguistic principles.

In conclusion, research conducted by a number of linguists has shown that children and aphasics indeed suffer from a processing error. Vasic explains that the processing error is due to a lack of grammatical knowledge. Vasic does not take O'Grady's hypothesis into consideration, which is that that the processing error could be caused by an underpowered faculty of language. Vasic sticks to the conclusions made by Grodzinsky et al. (1933) and uses similar tests, whereas O'Grady used other methods of testing. Using different methods of testing can also be the reason for having different results.

It can even be stated that the results may depend on the method of testing. One problem is clear and certain: children and aphasics have problems with processing, but the hypotheses discussed in this thesis assign this to another issue. If Vasic tested other methods, other results would be available; her research can also be seen as debatable.

Works Cited

Avrutin, S. "Linguistics and Agrammatism". 2001. GLOT International.

Caplan, D. & N. Hildebrandt. "Disorders of Syntactic Comprehension". Cambridge, MA: MIT Press. 1988.

Chien, Y.C., and Wexler, K. "Children's Knowledge of Locality Conditions in Binding as Evidence for the Modularity of Syntax and Pragmatics". *Language Acquisition,* 1 (3), 225-295. 1990.

Evans, V. and M. Green. "Cognitive linguistics: an introduction". Edinburgh University Press, p. 456. 2006.

Fromkin, V. "Linguistics: an Introduction to Linguistic Theory". Massachusetts. 2000.

Guasti, M. "Language Acquisition: The Growth of Grammar". 2002. Massachusetss.

Grodzinsky, Y., and T. Reinhart. "The innateness of binding and coreference". *Linguistic Inquiry*, 24, 69-102. 1993.

O'Grady, W. "Language Acquisition and Language Loss". 2001. 2011. <http://www.ling.hawaii.edu/faculty/ogradyOld/langacqlangloss.pdf

Philip, W., and Coopmans, P. "The Role of lexical feature acquisition in the development of pronominal anaphora". In W. Philip and F. Wijnen (Eds.), *Amsterdam Series on Child Language Development Vol.5,* Amsterdam: Instituut Algemene Taalwetenschap, 73–106. 1996.

Reinhart, T., and E. Reuland. "Reflexivity". *Linguistic Inquiry*, 24 (4), p. 657-720. 1993.

Vasić, N. "Pronoun Comprehension in Agrammatic Aphasia: The Structure and Use of Linguistic

    Knowledge". 2006. Doctoral dissertation, Utrecht: LOT.

Appendix A

The sentences and pictures used by Vasic (2006) in her research:

Reflexive in a transitive sentence:
… en daarna heeft de vrouw zichzelf aangeraakt.
… and then has the woman herself touched.
… and then the woman touched herself.

Pronoun in a transitive sentence:
… en daarna heeft de vrouw haar aangeraakt.
… and then has the woman her touched.
… and then the woman touched her.

Reflexive in an ECM construction:
… en daarna zag de man zichzelf voetballen.
… and then saw the man himself playing soccer.
… and then the man saw himself playing soccer.

Pronoun in an ECM construction:
… en daarna zag de man hem voetballen.
… and then saw the man him playing soccer.
… and then the man saw him playing soccer.

First conjuncts, preceding the above conjuncts:

Reflexive/pronoun in a transitive sentence:
Eerst hebben de vrouw en het meisje gelachen, …
First have the woman and the girl laughed, …
First the woman and the girl laughed, …

Reflexive/pronoun in an ECM construction:
Eerst hebben de man en de jongen gegeten, …
First have the man and the boy eaten, …
First the boy and the man ate, …
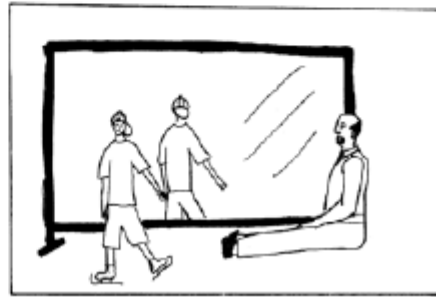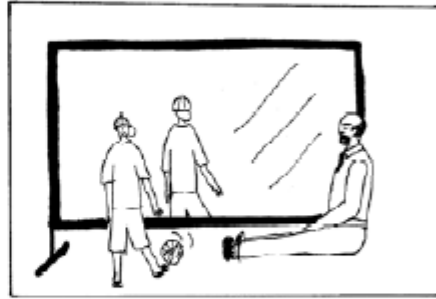
Appendix B

The number of correct tokens during the experiment mentioned in Chapter 4

Table 2.1

Total number of correct responses per aphasic subject and percentages correct for the whole group on four experimental conditions (N.A. = not available).

	Transitive sentence		ECM construction	
	Reflexive	*Pronoun*	*Reflexive**	*Pronoun*
AD	15/15	14/15	14/15	8/15
AN	15/15	14/15	15/15	10/15
MJG	15/15	15/15	N.A.	8/15
GK	15/15	15/15	N.A.	11/15
AK	11/15	12/15	N.A.	10/15
JW	14/15	15/15	15/15	8/15
AL	14/15	13/15	N.A.	7/15
IH	13/15	13/15	14/15	9/15
Tot. % correct	93.3	91.7	96.7	56.7
Controls	98.7	98.2	100	97.8

* In the additional testing of this condition, 10 non-brain-damaged speakers (mean age 38) were tested. They were not the same individuals as in the first experiment including the other three conditions reported here. The four agrammatic speakers (AD, AN, JW & IH), on the other hand, all participated in the first experiment reported here. Unfortunately, not all former participants could be traced. Nevertheless, these four can in principle be taken as reflecting the same behavior as the complete sample from the first experiment including the other three conditions.