



Hacettepe University Graduate School of Social Sciences
Department of English Linguistics

**AGRAMMATISM IN TURKISH BROCA'S APHASIC PATIENTS:
A DESCRIPTIVE CASE STUDY**

Asli Aan Budak

Ph.D. Dissertation

Ankara, 2008

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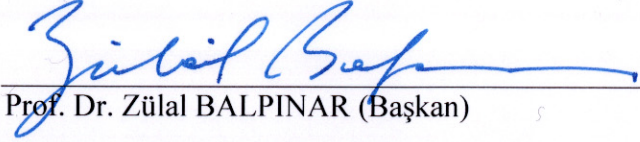
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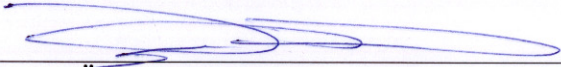
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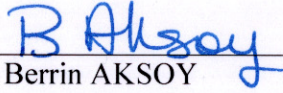
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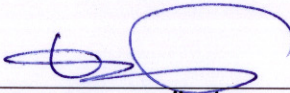
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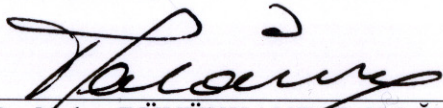
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Yukarıdaki imzaların adı geçen öğretim üyelerine ait olduğunu onaylarım.

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BİLDİRİM

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15. 12. 2008

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ÖZET

AÇAN-BUDAK, Asli. Türk Broka Afazili Hastalarda Agramatizm: Betimleyici bir Vaka Çalışması.

Dilbilgisi kuramlarının açıklanabilmesinde nöropsikolojik anlamda önemli bir kanıt sağlamakta olan afazyoloji, son zamanlarda giderek artan bir önem kazanmaktadır. Ne var ki, öncelikle cevaplanması gereken soru, beynin sol yarım küresindeki Broca alanının hasarı ile oluşan Broca afazisi ile özdeşleşmiş agramatizmin ne derece evrensel bir dil bozukluğu olduğudur. Agramatizmin en belirgin özelliklerinden biri, Broca afazili hastaların sergilediği telegrafik dil kullanımıdır. Literatüre bakıldığında, agramatizmi tanımlayan en belirgin özelliklerin, taban üretimli olmayan, tasima yoluyla türemiş cümle yapılarında, çekimsel biçimbilimde ve işlevsel sözcüklerde görülen bozukluklar olduğu gözlenmektedir. Yine de, diller arasındaki tipolojik ve yapısal farklılıklar nedeniyle sendromun doğası tam anlamıyla betimlenememektedir.

Bu çalışma, eklemeli ve SOV türde bir dil olan Türkçe'de, agramatizmi, sözkonusu bozukluklar doğrultusunda, biçimbilim ve sözdizim açısından değerlendirerek betimlemeyi amaçlamaktadır. Sözdizimsel çözümleme, taban üretimli olmayan yapılar olarak nesne çalkalama, özne çalkalama, postposing yapılarını, aynı zamanda dönüşümsel tasima içeren edilgenlik ve ilgilendirme yapılarının üretimini incelerken, biçimbilimsel analiz, isim ve fiil çekimlerini ve de işlevsel sözcükler sınıfına ait olan ilgeç öbeklerini incelemektedir.

Söz konusu belirli yapılara ilişkin veri elde etmek amacıyla iki Broka afazili hasta, iki ayrı deney yoluyla test edilmiştir. Deneyler, i. mülakat, ii. resim anlatma ve iii. tümce tamamlama olmak üzere toplamda üç ayrı teknik içermektedir. Mülakat, on dakikalık serbest dil verisi sağlayan yaklaşık 20 soru içermekte; resim anlatımı ise Boston Tanısal Afazi Sorgulaması tarafından hazırlanmış olan “kurabiye hırsızlığı” (cookie-theft) resminin anlatılmasını içermektedir. Diğer yandan, taban üretimli olmayan, ve dönüşümsel tasima içeren yapılar, tümce tamamlama testleri yoluyla elde edilmiştir.

Çalışmada gözlenen biçimbilimsel bulgular, Türkçe'deki agramatizmin, Türkçe'nin farklı tipolojik yapısı nedeniyle literatürdeki temel tanımlarından ayrıldığını göstermektedir. Sözdizimsel bulgular ise, literatürdekilerle daha paralel bir durum sergilemektedir. Yine de bazı seçici bozukluklar, daha kuramsal temellere dayanan ileri bir çalışma dahilinde ele alınmalıdır.

Sonuç olarak, agramatizm evrensel bir olgu olmakla beraber, içinde bulunduğu dilin yapı ve tipolojisine göre değişiklik gösteren parametrik bir özelliğe sahiptir.

Anahtar Sözcükler: afazyoloji, Türkçe, Broka Afazisi, agramatizm, biçimbilim, sözdizim.

ABSTRACT

AÇAN-BUDAK, Asli. *Agrammatism in Turkish Broca's Aphasic Patients: A Descriptive Case Study.*

In recent years, there has been a remarkably growing interest in aphasiology, which is considered to be a rich source of neuropsychological evidence for theories of grammar. However, a more basic question needed to be answered is to what extent agrammatism, a condition associated with Broca's aphasia and damage to Broca's area in the left hemisphere of the patients, is a universal language impairment cross-linguistically.

Characterisations of agrammatism mainly focus on features of the telegraphic speech production of Broca's aphasic patients. Concerning the literature, it is observed that these characteristic features include a disruption in the production of un-canonical, movement derived sentence structures, a lack of inflectional morphology and the omission or misuse of 'closed-class' (function words) such as articles, auxiliaries, prepositions or complementizers. Yet, the exact nature of the deficits is still an open question due to the typological differences among languages. Therefore, this study aims at describing agrammatism in Turkish which is a highly inflectional, SOV type language, concerning the acknowledged deficits with respect to 1. syntactic and 2. morphological criteria.

Syntactic analysis includes the investigation of the production of object scrambling, subject scrambling, postposing as the representatives of un-canonical word order variations, and also relativization and passivization as movement operations. On the other hand, morphological analysis concerns with the production of noun and verb paradigm inflections as well as the production of postpositions as the representatives of Turkish closed-class words.

In order to elicit the corpus of Turkish data concerning the production of certain particular linguistic structures, two Turkish Broca's aphasic patients are tested by means of mainly two experiments including three types of experimental techniques of *i.*

interview, *ii.* picture narration *iii.* sentence completion. The two of the techniques, namely, the interview and the picture narration are designed to obtain the data concerning the inflectional morphology, providing with a free narrative sample of agrammatic speech production in Turkish. The interview section includes approximately 20 personal questions providing with the data of approximately 10 minutes of free conversation whereas the picture narration requires the description of the “cookie theft” picture of the Boston Diagnostic Aphasia Examination (BDAE).

On the other hand, un-canonical word order constructions are elicited by sentence completion tests including 36 sentences of basically four different types of syntactic conditions, namely, canonical sentences in their base SOV order, object scrambling, postposing and finally, subject scrambling sentences. Also, transformational constructions are elicited including two conditions of movement operations, namely, relativization and passivization. Therefore, the overall experiment involves totally 27 sentences.

The findings of this study suggest that, morphological findings of agrammatism in Turkish appear to differ from the basic definitions of agrammatism due to its typological characterization. Considering the syntactic analysis of agrammatism, it is noticeable that Turkish Broca's aphasic patients represent a more parallel pattern to the existing definitions of agrammatism in the literature. However, some selectively impaired patterns require further investigation on more theoretical grounds. Consequently, agrammatism is a universal phenomenon, yet, it has a parametrical nature, varying according to the typology and the structure of the language that it appears in.

Key Words: Aphasiology, Broca's aphasia, Agrammatism, Morphology, Syntax

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CHAPTER I: INTRODUCTION

1.1. CLEARING THE GROUNDS

The modularity hypothesis of language considers language as an independent module separate from other cognitive systems such as problem solving, reasoning or memory. Therefore, aphasia which is an impairment that affects only the language faculty of the patient without any influence on other cognitive modules, provides an excellent source of information to analyze the processing of unimpaired adult language. That is why aphasiology which is the study of linguistic problems resulting from brain damage, has an important role in explaining the relationship between language and the brain.

Aphasia is a language disorder that results from damage to the left side of the brain that is dominant for language. Therefore, aphasia, which literally means 'without speech', refers to the disruption of language abilities, frequently as a result of a stroke or head injury. Though there are many types of aphasia, Broca's aphasia (non-fluent) and Wernicke's (fluent) aphasia are the two widely studied aphasic syndromes. Wernicke's aphasia results from damage to the back part of the left side of the brain, while Broca's aphasia from damage to the front part of the left side. Accordingly, the grammatical deficit experienced by Wernicke's type patients is considered to be paragrammatism, while agrammatism is associated with patients of Broca's aphasia.

Agrammatism can be defined as a symptom that usually appears as a result of a general aphasic impairment, mostly in Broca's aphasia, and manifested by the inability to produce syntactically well-formed sentences, absence or ungrammaticality of syntactic patterns such as functional heads (inflections), bound morphemes like tense, case and agreement. As Friedman (2001:71) mentions, though the deficit is very broad, empirical evidence suggests that the syntactic ability is not completely lost in these patients, rather, some syntactic abilities were found to be intact, while some other structures were found to be differently impaired in different languages following the same lesion. As he states, in the domain of agrammatic comprehension, the research of selective impairment is already very advanced and it lends itself to principled syntactic characterization. On the other hand, in language production, the empirical investigation

is still developing, but several studies have already shown that the impairment is selective, does not involve all grammatical structures and function words. Garcia (2005:3) distinguishes the two concepts 'aphasia' and 'agrammatism' stating that;

Aphasia is an impairment of language faculty in either the comprehension or the production, whereas agrammatism is a more restrictive impairment that seems to accompany some cases of aphasia, mainly Broca's aphasia. Agrammatism is a syndrome, that is, a collection of symptoms both in speech and in language comprehension, rather than a diagnostical category like Broca's or Wernicke's aphasia.

Further, he adds that (2005:8) there exist Broca's patients that do not show agrammatism either in production or in comprehension, as well as patients other than Broca's that show agrammatism. Therefore, it is not entirely clear to what extent agrammatism can be considered as a differential diagnostical category.

As Knight (<http://www.rachaelanne.co.uk/teaching/psych/aphasia>) mentions, patients diagnosed with agrammatism (usually) suffer with three separate components, namely, *i. sentence construction deficit* (difficulty in ordering words and putting them together in a sentence), *ii. Selective impairment of grammatical elements* (difficulty in producing function words and bound morphemes rather than producing content words), *iii. Syntactic comprehension deficit* (difficulty in comprehending a sentence, especially when there are no semantic cues)

As Dingwall (1998:92) explains, since 1980s, aphasiology has been developing as a quite recent approach under the name of cognitive neuropsychology which blends the fields of cognitive psychology and neuropsychology. The study of language within this approach has mainly two aims:

- i. to explain the patterns of impaired and intact cognitive performance seen in brain-injured patients in terms of damage to one or more of the components of a theory or model of normal cognitive functioning,
- ii. to draw conclusions about normal , intact cognitive processes from the patterns of impaired and intact capabilities seen in brain-injured patients.

One important and commonly occurring phenomenon in linguistic aphasiology is therefore the selective impairment of diverse aspects of the language faculty.

1.2. THE NEED FOR THE STUDY

As Garcia (2005:1-4) emphasizes, aphasiology needs a theoretical background regarding the structure of the language on which it can rely, and theoretical linguistics offers such a support. He continues that since language is one of the most accessible parts of cognition, it has attracted much attention in the last decades of scientific research.

Further, Garcia (2005:8) continues that, modern theories on agrammatic language production and comprehension are based on linguistic theory. In particular, some of the basic hypotheses, namely, 'Trace Deletion Hypothesis', 'The Default Strategy', 'Double Dependency Hypothesis', and 'Tree-pruning Hypothesis' on agrammatism strongly rely on the framework of Government and Binding, which is a particular view of the grammar of human languages that try to find out a unitary account for agrammatism considering the symptoms of both in language production and in language comprehension. However, the issue has been hold by different kinds of hypotheses, concerning different approaches. "Yet, the exact nature of the deficit in movement is still an open question." (Friedman, Gvion and Novogrodsky, 2006:197). Also, the definitions and characterizations identifying agrammatism as a syndrome are mostly based on evidence from mainly Indo-European languages and therefore it is difficult to separate universal mechanisms from language-specific content. (Bates, Wulfeck, MacWhinney, 1991:123)

Rachael-Anne Knight (<http://www.rachaelanne.co.uk/teaching/psych/aphasia>) underlines the problem by stating that "Although we know that agrammatism results from damage to Broca's area of the left hemisphere, this does not explain how exactly language is damaged. We must consider specifically what abilities or processes are affected in order to produce agrammatic symptoms." Knight mentions the ongoing debate whether agrammatism is a syndrome or not, and defines a syndrome as "a set of symptoms that co-occur often enough to suggest a single cause." According to Knight, the important question concerns whether patients actually have the same symptoms, and

if so, whether these symptoms always cluster together. This debate seems to have important consequences for both experimental methodology and theory (that comes from linguistics).

Agrammatic patients mainly have problems in comprehending and/or producing movement-derived non-canonical sentence structures. This view has been reported by Grodzinsky (2000:1) as follows;

This cerebral region, implicated in Broca's aphasia, does have a role in syntactic processing, but a highly specific one: It is the neural home to receptive mechanisms involved in the computation of the relation between transformationally moved phrasal constituents and their extraction sites (in line with the Trace-Deletion Hypothesis). It is also involved in the construction of higher parts of the syntactic tree in speech production.

Duman (2004: 88) also claims that agrammatic patients have specific problems with the production of movement-derived non-canonical sentence structures, therefore they tend to overuse the canonical word order and avoid using non-canonical or scrambled forms. According to the 'Tree-Pruning Hypothesis' (Friedman and Grodzinsky 1997, Friedman 2001) this deficit derives from the inaccessibility of the hierarchically higher nodes of the syntactic tree. Since movement-derived structures rely on higher nodes in the syntactic tree, agrammatics are unable to produce them correctly. Duman (2004:88) states that;

The tendency to avoid non-canonical forms has been verified for SVO languages such as English, Italian, French and Chinese (Bates, Friederici, Wulfeck & Juarez 1985), SOV languages such as Turkish (Slobin 1991) and Dutch (Bastiaanse, Rispens, Rugendijk...2002). Cross-linguistic data support that there is a strong relationship between the agrammatic production and syntactic dependency.

Another one of the typical manifestations of agrammatism is reported as the problem in the production and/or comprehension of close-class (function) words and grammatical inflections. As Bates, Friederici and Wulfeck (1987:545) state, "agrammatism is defined by omission of grammatical inflections and function words, usually accompanied by a marked reduction in phrase length and syntactic complexity, giving the patients' speech a telegraphic look." They continue that these symptoms are generally associated with

Broca's aphasia, however, (cited in Grodzinsky, 1982; Lapointe, 1985; Miceli and Mazzucchi, 1985; Menn and Obler, 1985, 1987) substitution errors seem to be more common than omission errors in richly-inflected languages like Hebrew or Italian.

Also, Grodzinsky (1984:100) mentions that the clinical literature on agrammatism describes the syndrome with the omission of function words and inflectional morphology in speech (Geschwind, 1970; Goldstein, 1948; Goodglass and Berko, 1960; Tissot et al., 1973). Considering agrammatism as a universal phenomenon, he (1984:100) claims that, “for structural reasons, there are languages where certain kinds of closed-class items cannot be omitted”, therefore, “agrammatism has different configurations, depending on the type of language in which it occurs.”

Similarly, Bates, Friederici and Wulfeck (1987:550) define Broca's aphasia as “non-fluent and dysprosodic speech with reduced utterance length and sentence complexity, together with more omission of function words and/or grammatical inflections.”

Menn and Obler (cited in Bates, Wulfeck, MacWhinney, 1991:123) put forward that “the same aphasic syndromes look very different from one language to another” and Mavis (2003:247) mentions that “the situation may be different in typologically different languages”. According to Bates, Devescovi and Wulfeck (2001:383), “the hegemony of English in aphasia research has led to some historical errors that can be corrected with cross-linguistic studies of grammatical and lexical symptoms”. To emphasize the importance of cross-linguistic studies in aphasiology, Bates, Wulfeck, MacWhinney (1991:11) also mention that it is not much possible to match patients for severity or type of aphasia across languages that differ so radically in their basic structure. One of the defining characteristics of agrammatism is known as ‘telegraphic speech’, however, Bates, Wulfeck, MacWhinney (1991:11) with reference to Slobin (1991) mention that Turkish is a case inflected language with an extremely rich and regular set of bound morphemes, in which an entire sentence may consist of no more than one or two richly inflected words including an ordered string of prefixes or suffixes around a root word and demonstrate that these inflections are remarkably well preserved in the speech of Broca's and Wernicke's aphasic patients, therefore, ‘telegraphic speech’

which is a typical characteristics of Broca's aphasia is not produced in Turkish. O'Connor, et.al. (2005: www.asha.org/about/publications/leader-online/archives) put forward that agrammatism manifests itself differently in different languages and/or dialects. Furthermore, as Bates, Devescovi, and Wulfeck (2001:383) state, since English has a relatively sparse grammatical morphology in which the errors of omission (of function words) are very evident, the equation of grammatical deficits with damage to Broca's area derives from a peculiarity of English. Therefore, the contribution of cross-linguistic studies in aphasiology is considerable in order to analyze what is difficult and what is easy for aphasic patients, since the hierarchy of difficulty that patient groups share can vary over languages. Also, as Bates, Devescovi, and Wulfeck (2001:384) note, "cross-linguistic studies reveal just how much detailed language-specific knowledge is retained by aphasic patients, despite their lexical and grammatical errors".

To conclude, Bates, Devescovi and Wulfeck (2001:390) emphasize that, "There is, however, an immense amount of work that needs to be done to verify whether English-based findings can be generalized and to explore the opportunities afforded by the dramatic structural contrasts that characterize human language". Therefore, analysing and describing the agrammatism in Turkish, a highly inflected agglutinative language is a cross-linguistic contribution in defining 'agrammatism' as a common syndrome. Also, discovering the selective patterns in agrammatism is valuable to understand the normal functioning of cognitive ability, and, thus, linguistic theory in general, which in return leads to better diagnosis and consequently, better treatment of the pathology.

When the studies conducted on agrammatism in Turkish are considered, it is obviously remarkable that the most extensively held researches belong to Slobin (1991), Mavis (2000) and (2003), Kükürt (2004), and Duman (2004) and (2005), each of which handling the issue within a specific framework of linguistic inquiry, concerning either morphological, syntactic, or hypothetical domains. Benefiting the above mentioned previous researches, this study tries to arrive at a description of agrammatism as a syndrome by making use of Turkish data.

1.3. AIM OF THE STUDY

Considering the acknowledged definitions of agrammatism which mention the problematic issues as the production of complex sentences involving non-canonical word order, closed-class (function) words and grammatical inflections, this study, by the investigation of two Turkish aphasic patients, aims at describing agrammatism in Turkish with respect to these impaired structural patterns. Accordingly, the study mainly aims at describing agrammatism with respect to 1. syntactic, and 2. morphological criteria; the former includes the analysis of the production of object scrambling, and word order variations as the representatives of non-canonical sentence structures, beside relative clauses and passive constructions which are chosen to be analyzed as the representative of movement operations. As for the latter, the production of postpositions as the representative of closed-class words, and finally, inflections of case, and number for the noun paradigm, tense, and agreement for the verb paradigm, are chosen to be analyzed. Since 'agrammatism' is a problematic and complex phenomenon, this study, describing the morpho-syntactic characterization of Turkish agrammatism and revealing the selectively impaired patterns, tries to represent a cross-linguistic contribution to the issue. Furthermore, this study will also question the typical existence of agrammatism in Turkish. In order to clarify the debate on agrammatism, the study tries to contribute to the research, questioning whether agrammatism has a typical property of a “syndrome”, in spite of linguistic diversities among languages.

1.4. RESEARCH QUESTIONS

The study is mainly designed to be conducted with the consideration of following research questions:

1. What are the linguistic characteristics of agrammatism in Turkish?
 - i. Are Turkish Broca's aphasic patients able to produce non-canonical, scrambled and movement- derived word order structures?
 - ii. Do Turkish Broca's aphasic patients omit closed-class words?
 - iii. Do Turkish Broca's aphasic patients have problems in grammatical inflections?

2. Does agrammatism in Turkish establish a selectively impaired pattern?
 - i. Are different types of movement operations selectively impaired?
 - ii. Are different types of inflections (noun vs. verb) selectively impaired?
3. Does agrammatism typically exist in Turkish?
 - i. Do the deficits observed in Turkish agrammatics correspond to cross-linguistic findings?
 - ii. In spite of the language specific characteristics, is it possible to consider agrammatism as a (common) syndrome?

CHAPTER II: LITERATURE REVIEW

2.1. PRELIMINARIES

2.1.1. Aphasiology

2.1.1.1. Linguistic Aphasiology

As Dingwall (1998: 92) explains, since 1980s, a quite recent approach has been developing under the name of cognitive neuropsychology which blends the fields of cognitive psychology and neuro psychology. This new subdiscipline of psychology has mainly two aims:

- iii. to explain the patterns of impaired and intact cognitive performance seen in brain-injured patients in terms of damage to one or more of the components of a theory or model of normal cognitive functioning,
- iv. to draw conclusions about normal, intact cognitive processes from the patterns of impaired and intact capabilities seen in brain-injured patients.

The study of language within this approach has recently been termed linguistic aphasiology. Grodzinsky (2000:1) explains the relation of syntax and Broca's aphasia as follows: "This cerebral region, implicated in Broca's aphasia, does have a role in syntactic processing, but a highly specific one: It is the neural home to receptive mechanisms involved in the computation of the relation between transformationally moved phrasal constituents and their extraction sites."

Also, it is obvious that there is a mutual relation between neurolinguistics (aphasiology) and theoretical linguistics, as van der Meulen (2004:1) also suggests:

Theoretical linguistics provides well-defined tools useful for describing the data of Broca patients. These data, in turn, lead to new research questions and analyses for the field of theoretical linguistics.

According to van der Meulen, such multidisciplinary studies are fruitful for the research in both fields.

2.1.1.2. Selective Impairment

One of the most important phenomena utilized in linguistic aphasiology is called “selective impairment.” Language impairment may arise from different causes and may take on a variety of forms. Yet, an interesting commonly occurring phenomenon in various cases of language impairment is the selective impairment of diverse aspects of the language faculty. Very briefly, selective impairment refers to the impairment of any two components of grammar in a dissociative manner. In the literature, these dissociations are taken to show differences of representation and/or processing between the relevant aspects of language.

As Friedman (2001:71) explains, many researches in aphasiology claim that the syntactic ability is completely lost in aphasic patients (Berndt and Caramazza, 1980; Caplan, 1985; Goodglass, 1976), or that all functional elements are impaired in their language production (Grodzinsky, 1984; Kean, 1977; Ouhalla, 1993). However, recent empirical studies suggest that this picture is incorrect. What is striking is the fact that;

Following brain damage to the left cerebral hemisphere, people suddenly lose their ability to correctly inflect verbs for tense, form wh-questions, use subject pronouns, use relative sentences, and to produce subordination conjunctions, at the same time, they retain their ability to inflect verbs for subject agreement, form Yes/No questions in some languages, use (post-verbal) object pronouns, use reduced relatives, and produce coordination conjunctions.

Friedman (2001:72) concludes that;

This selective pattern is what makes the exploration of the agrammatic impairment in production especially interesting and valuable for theories of normal syntax, as the selectivity imposes constraints on the theory of the normal functioning of the relevant cognitive ability: linguistic theory. Reciprocally, linguistic theory provides students of agrammatism with the descriptive toolkit that enables a more precise derivation of the behavioral pattern witnessed in this impairment, leading to better diagnosis and subsequently, to better treatment of the pathology.

What follows is a brief consideration of literature concerning selective impairment of linguistic phenomena. Based on a distinction made between regular and irregular word

forms, Jansen and Penke, et al., (1999: 225) carried out an investigation concerning the representation of inflectional morphology in which they emphasize, by evidence from Broca's aphasia, that irregular and regular participles apply distinct processes.

Another study conducted by Goodglass, et al., (1966: 74-89) shows that word category membership may also be a decisive factor in the form of the impairment. There are many reports of brain-damaged patients who have disproportionate problems with verbs while nouns are relatively spared.

Furthermore, impairment may also dissociate syntactic and morphological aspects of the language faculty that is, some brain-damaged patients may reveal severe syntactic problems whereas their morphological ability remain accurate or visa versa (Luzatti and De Blesser, 1996).

2.1.1.3. Broca's Aphasia vs. Wernicke's Aphasia

Aphasia is a language disorder that results from damage to the portion of the brain that is dominant for language. For most people, this is the left side of the brain. Aphasia usually occurs suddenly, frequently as the result of a stroke or head injury, but it may also develop slowly as in the case of a brain tumor. The disorder may involve aspects of language comprehension and/or expression.

Caplan (1987:17) explains that, Broca's aphasia is caused by damage to the area involving the frontal operculum and also the premotor and motor regions of the brain that lie behind and above Broca's area. Lesions deep in the white matter and the basal ganglia of the brain can also cause Broca's aphasia (Kükürt 2004:14).

There are many types of aphasia, however, Broca's aphasia and Wernicke's aphasia are two widely studied aphasic syndromes. Broca's aphasia results from damage to the front portion of the language dominant side of the brain. Wernicke's aphasia results from damage to the back portion of the language dominant side of the brain. (See, www.mossresourcenet.org/textapha.htm).

Purves, Fitzpatrick, Augustine, et.al (2001:2) compare the basic characteristics of Broca's and Wernicke's aphasia as follows:

Broca's Aphasia	Wernicke's Aphasia
Halting speech.....	Fluent speech
Repetitive (perseveration)	Little repetition
Disordered syntax	Syntax adequate
Disordered grammar.....	Grammar adequate
Disordered structure of individual words.....	Contrived or inappropriate words
motor, expressive, or production aphasia.....	Sensory or receptive aphasia

As also stated in www.csuchico.edu (unit 7. Specific Syndromes: The Nonfluent Aphasias), the lesion that causes Broca's aphasia affects the **third frontal convolution** (both the gyrus and the sulcus) of the left frontal lobe. Telegraphic speech is the basic characteristic of this type of aphasia which involves the omission of the articles, conjunctions, prepositions, auxiliary verbs and pronouns (function) words **and** morphological inflections (e.g. plurals, past tense). The output can be restricted to noun-verb combinations since the content words such as nouns, verbs, adjectives and adverbs are preserved.

Generally, sentence length is short. Syntax and morphology are affected; only the most basic and over-learned grammatical forms are produced (often limited to nouns and verbs). Speech is labored and slow.

2.1.1.4. Syntactic Agrammatism

As Avrutin (2001: 1) describes; agrammatism is a case of a more general linguistic impairment known as Broca's aphasia. "It is manifested by the presence of ungrammatical utterances in the speech of patients with a particular brain damage as well as in abnormal (ungrammatical) comprehension of certain constructions."

Avrutin (2001: 5) further explains that, frequent omission of functional categories, such as determiners, tense and complementizers, constitutes a characteristic feature of

agrammatic speech, and is often taken as the diagnosis of agrammatism. However, he continues that agrammatic errors are not ‘random’, rather they seem to follow certain patterns depending on the ambient language. He (2001: 5) cites Grodzinsky (1990, 1999) arguing that patients’ performance can be characterized either as omission or substitution, and this varies according to the typology of languages. In languages like English or Japanese, where bare stems can function as independent lexical items, agrammatics tend to omit bound morphemes. On the other hand, in languages like Russian or Italian where bare stems are not allowed, subjects do not produce bare stems, but may use an incorrect one. Hence, Avrutin (2001:6) mentions that, “the sensitivity to the properties of the surrounding language points once again to the importance of linguistic theory in a proper characterization of agrammatism.”

Throughout the literature, recent research on aphasia has been devoted to the characterization of the syndrome of agrammatism.

Furthermore, as Ulatowska and Sadowska (1988: 77) explain, the fact that agrammatism is most precisely described along grammatical lines rather than various linguistic activities such as comprehension, reading or writing provides an excellent opportunity to bridge the gap between theories of language structure and aphasiology, and therefore has important consequences. This field of study is, thus, also referred to as “linguistic aphasiology.”

Also, according to Obler and Menn (1988: 63), agrammatism is referred to as a kind of aphasic deficit concerning the omission of some or all grammatical factors in speech. They emphasize the importance of the phenomenon as providing a window on the organization and processing of syntax in and by the brain.

However, as Mavis (2003:247) also states, these definitions are based on evidence from mainly Indo-European languages and the situation may be different in typologically different languages.

Broca’s aphasia, also called as agrammatism, has been basically characterized by

nonfluent and effortful production of language, namely, telegraphic speech, exhibiting flat and monotonous intonation patterns, with a preserved or mildly impaired comprehension of basic structures.

Yi-ching Su and colleagues (2007:1) describe agrammatism as a selective disorder of speech production (i.e. sparse verbal output, disfluency, and omission of functional morphemes) but intact comprehension. They further explain that the comprehension of agrammatic patients are impaired especially when the crucial cues to interpret the sentences are syntactic.

Caramazza and Zurif (1976), suggested that Broca's aphasics lacks "syntactic-like algorithmic processes", hence, they fail in comprehending semantically reversible relative clause constructions. Semantic and pragmatic hints such as agent, patient, theme, goal, etc. help them to guess the thematic roles of the constituents. When agrammatics were left with syntactic cues only, they had difficulty in assigning these roles. (Kükürt, 2004: 59)

Furthermore, as Kükürt (2004: 59) mentions, Zurif and Pinango (1999) put forward that, agrammatics have comprehension problems in non-canonical forms such as passives, object relatives, object cleft, etc., while they present normal comprehension in canonical structures, such as active sentences, subject relative clauses and subject clefts.

Similarly, van der Meulen (2004: http://www.hum.au.dk/engelsk/engkrc/Handouts/krc-SCL22_2006-syntax_brain.pdf) also states that one of the central factors underlying the comprehension deficit of Broca patients is syntactic movement. In his study, he revealed that the comprehension deficit of Broca patients is related to the type of movement through which constructions are derived.

According to Ulatowska and Sadowska (1988: 77), "the interest in agrammatism has in turn led to expanding the studies to languages representing different structural types in order to explore the effect of the specific structure on the disruption of language in aphasia."

2.1.1.5. Agrammatism vs. Paragrammatism

Bates, Friederici and Wulfeck (1987: 546) review the concepts 'agrammatism' and 'paragrammatism' within a historical perspective, and state that the distinction between them is attributed to Arnold Pick, the first aphasiologist in modern times, who focused on the grammatical impairment in aphasia. Pick studied agrammatism in German and Czech which are highly inflected, case-marked languages indicating that the nature and the extent of the errors are likely to be quite different from the errors observed in English speaking aphasics.

Throughout his studies, Pick distinguished between two forms of expressive agrammatism as frontal and temporal. Bates, Friederici and Wulfeck (1987: 547) explain that frontal agrammatism corresponds most closely to the form of grammatical impairment that we commonly associate with Broca's aphasia, displaying a telegraphic character, involving reduced complexity and occasional omission of function words, and inflections. Temporal agrammatism on the other hand involves erroneous grammatical constructions (paragrammatism), in which the tempo of speech is not retarded.

According to Pick (cited in Bates, Friederici, Wulfeck 1987: 547), the difference is that; temporal agrammatism involves a disruption at the deepest level of linguistic formulation, while frontal agrammatism occurs at a later stage, when a great deal of structure has been assigned. He hypothesizes that there should also be a qualitative difference between frontal and temporal agrammatism in terms of grammatical errors produced, in particular, a relative difference in the distribution of omission vs. substitution. "However, the predicted difference still has little support" (Bates, Friederici, Wulfeck, 1987:547).

2.2. GRAMMATICAL THEORIES CONCERNING THE ISSUE

Considering the existing definitions of agrammatism, it is remarkable that one of the prominent issues of impairment in defining agrammatism as a syndrome appear to emphasize three main symptomatic aspects as 1) the tendency to avoid movement-derived non-canonical sentence structures and transformations, 2) omission of the

closed-class function words and 3) omission and/or substitution of noun and verb paradigm inflections. Since this study aims at describing the production of these constructions and categories, it will be useful to explain the operation of these tested structures briefly, in order to provide a better evaluation of the findings.

2.2.1. The Movement Operation

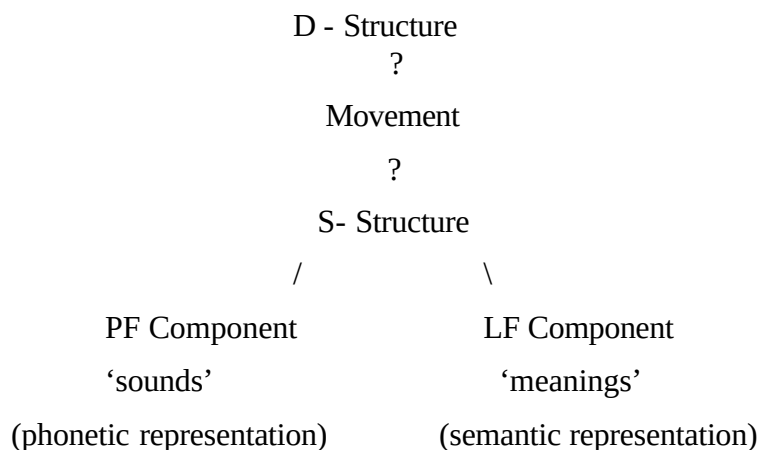
According to Trask (1999:194), movement can be defined as “any of various processes or structures in which an element of a sentence appears in a position other than its canonical position.”

He continues to add that, in the 1950s, with the formalism of Transformational Grammar (TG), linguists conventionally began to speak of the ‘movement’ of elements out of their ordinary position. Familiar examples involve Wh-movement, passivization, fronting, raising, etc.

In order to explain the movement operation, Cook (1996:45) mentions of two connected levels of syntactic representation required by the Government and Binding version of Principles and Parameters Theory, namely, the underlying D-Structure (deep structure) at which all the elements of the sentence are in their original location, before movement, and the S-Structure (surface structure) where the elements in the sentence have been moved leaving their traces (*t*) of the original positions. Thus, S-Structure is related by movement to the D-Structure:

- (1) a. You are seeing what at the cinema? ? D-Structure
 is connected to
 b. What are you seeing at the cinema? ? S-Structure

Cook, demonstrates the movement of ‘what’ and ‘are’ to the beginning of the sentence in this manner, and states that S-Structure is the bridging level between sound and meaning, leading on the one hand to Phonetic Form (PF), on the other to Logical Form (LF);



However, as Cook (1996:46) states, S- Structure still carries the original locations of the elements that are moved, and this is achieved by 'traces' (*t*) that mark the original positions in the sentence from which elements have moved.

Thus, the full S-Structure of the sentence:

(1) c. What *t*₁ are *t*₂ you *t*₃ seeing *t*₄ at the cinema?

illustrates that "S-Structure is not just the 'surface' structure of the sentence but is enriched by traces of movement marking the original locations of elements that have moved", (Cook, 1996:46) so that, both the phonetic and the logical form of the sentence can be determined.

Similarly, Uzun (2000:289) defines movement as a process of moving a constituent from one level of syntactic representation to an empty position in another one, in which, there is a structural relation between the extracting and landing site. The moved constituent leaves a *trace* behind, in its previous position, and there occurs a *coreferentiality* between the moved constituent and the trace that it has left. It is also considered that coreferential elements constitute a chain among them which provides the interpretation of the reconstructed proposition. Therefore, the moved objects, although presented at a different position, are interpreted with respect to their original positions.

2.2.1.1. Movement and Case Theory

According to most recent formulations of transformational grammar (TG), for example government and Binding (GB) and minimalist program (MP), movement operations are obligatory; there is no optional movement. This can be further explained with reference to Case Theory which is the module of grammar concerning with the distribution of NPs. (Haegeman, 1991:180) According to the theory, a filter is required to ‘filter out’ any construction containing an overt NP which is not assigned case, therefore; ‘Case Filter’ requires that every overt NP must be assigned abstract case, otherwise, the sentence is ungrammatical. The relevant question here may be, “what are the mechanisms of the Case Theory?” Basic tenets can be listed as follows;

1. Transitive Vs are accusative case assigners
2. Finite I is nominative case assigner
3. Non-finite I is not a case assigner
4. A head can assign case to an NP which it governs
5. A passivized V loses the ability to assign (accusative) case

Actually, the mechanism itself explains the nature of movement as one of the fundamental syntactic operations including for instance ‘passivization’ and ‘raising’, etc.

(2) a. The cat killed the rat

In the above sentence, there are two overt NPs to assign case according to our Case Theory.

‘The cat’ is assigned case by finite I (-ed)

‘the rat’ is assigned case by the V (killed)

Since all the overt NPs are assigned case and satisfy the case filter, the sentence is grammatical. The passive pendant of the sentence can be considered as follows;

(2) b. *Was killed the rat

c. The rat was killed

According to v., a passivized V loses the ability to assign case. Consequently, in the post-verbal position, as demonstrated in the sentence 2b ‘the rat’ is unable to receive case, in violation of the Case Filter. However, recall ii. that finite I is nominative case assigner, so in order to satisfy the Case Filter, ‘the rat’ moves to a position where it can receive Nominative case from finite I, namely ‘was’. This is the only option available due to the fact that there is no other case assigner in the sentence. In effect, the Case Filter forces NP-movement from a caseless position to a case-marked position.

As Cook (1996:229) continues, the Case Filter plays a role not only in the passive constructions, but also in all other constructions that involve NP-movement. For example, in ‘raising’ constructions with verbs like ‘seem’, the subject of a complement clause is moved to the subject position of the raising verb. So, the D-Structure:

(3).a. [*Seems [John to be ill]] is transformed into the S-Structure as follows;

b. John seems *t* to be ill

The moved NP (John) is the subject of an infinitival clause at D-Structure; obviously a non-case-marked position. Thus, the subject will be forced to move into the subject position of the finite clause, where it will be assigned Nominative case by finite I. Again, then, the Case Filter plays an important role in motivating the movement of NPs.

2.2.1.2. Movement and Theta Theory

As part of their lexical entry, verbs and other content lexical categories have an *argument structure* which can be viewed as a type of syntactically relevant semantic information. The argument structure is simply a list of the *?-roles* (i.e. agent, patient...etc.) realized by some argument (a full NP). Every predicate has its argument

structure. An argument is an NP or S, and there is a tight one-to-one correspondence between θ -roles and arguments that is clearly specified by the θ -criterion according to which;

- a. Each argument is assigned to one and only one θ -role
- b. Each θ -role is assigned to one and only one argument.

The verb θ -marks its arguments, for example, the transitive verb 'kill' requires two arguments, namely, two NPs to which it assigns a θ -role; it assigns the role agent to the subject argument of the sentence, and the role patient to the object argument.

Briefly, *theta theory* has three components:

- i. θ -role assigners (predicate)
- ii. θ -role receivers (arguments)
- iii. θ -role assignment (X assigns a θ -role to Y iff X governs Y)

A θ -role is assigned both to a syntactic position, and to the argument that occupies that position (object or subject position). A θ -position then, is simply a position to which a θ -role is assigned. There are also non θ -positions such as in raising and passive constructions. Movement of an NP argument is necessarily from a θ to a θ -position.

To conclude, θ -role assignment is a motivation for the NPs to move within a sentence. Movement takes place to satisfy the theta criterion as can be seen in raising and passive constructions. There is a local relation between arguments and their predicates to maintain adjacency between θ -assigner and assignee.

As Carnie (2002:226) also states, there is thus the restriction on theta role assignment that an argument getting a theta role from a predicate must be local to (near by) the

predicate, which is referred to as locality condition:

Locality Condition: ?-roles must be assigned within the same clause as the predicate that assigns them.

With the sentence [johni is likely [to leave]], he explains that *john* is the agent of *leaving*, but the NP John appears in the main clause, far away from its predicate. The sentence seems to present a clear violation of the locality condition on ?-role assignment in its surface form, however, there is a transformation that takes the noun John and moves it from the lower clause to the higher clause. The subject NP is generated in the subj. position of the embedded clause where it is assigned the agent role. Then, in order to derive the surface order, a transformation is needed which moves this NP to the specifier of the main clause. This transformation is called NP movement, frequently called *raising*.

Carnie further states that, transformations are very powerful tools used limitedly, applying only when required. For example, he mentions (2002:315) that in head movement, the head needs to appear as part of the same word as the place it moves to, in order to get a suffix, while in wh- movement, the wh phrase needs to be near the wh feature, just as NP movement occurs so the NP can check its case feature with V.

To conclude, transformations thus need motivations or triggers to apply, otherwise not required.

2.2.1.3. Movement and the ‘Last Resort’ Condition

Chomsky (cited by Radford, 1998:110) calls the above mentioned kind of an obligation as ‘last resort’ condition which is needed in order to satisfy some grammatical requirement that would not otherwise be satisfied. He continues that the ‘last resort’ condition follows from a more general ‘economy principle’ banning the use of

superfluous constituents and operations; from this principle it follows that an operation like inversion, (or movement) is used only when there is no other way of satisfying some grammatical requirement (such as Case Filter).

Therefore, it is obviously noted that according to most recent formulations of transformational grammar (TG), for example government and binding (GB) and minimalist program (MP), movement operations are obligatory; there is no optional movement.

2.2.1.4. Types of Movement Operations

Movement can be classified according to certain criteria:

- i. The types of items that are moved, either heads, or entire phrases.
 - ii. The properties of landing/extraction sites for movement, either A or A-bar movement.
- 1) a. Head Movement: involves Auxiliary movement in order to form yes-no questions, (this type of movement is irrelevant for our purpose) and Verb movement.
 - b. Maximal Projections: for example the movement of NPs in passive constructions or in Wh- questions.
 - 2) a. A Movement: This type of movement has the following properties:
 - i. It is obligatory
 - ii. It's extraction site is a position where a θ -role is assigned and a $\bar{a}$ -position where case cannot be assigned.
 - iii. It's landing site is a position where case can be assigned, but no θ -role can be assigned.

iv. The moving item is NP

Passive constructions and raising constructions are of this type.

b. A-bar Movement: The properties of this type of movement are as follows:

1. It is obligatory
2. The extraction site is ?-position and also case position
3. The landing site is no case and ?-position
4. The moving element is NP

Wh-questions are of this type.

As stated in Uzun (2000:323), another factor that plays a role in classifying movement according to the position of moved constituents asks whether the landing site is base-generated or not. If the landing site involves a position which is not generated in the deep structure but appears as a new position derived by movement, the movement in question is treated as being an 'adjunct' and should be distinguished from other types of movements.

Adjuncts share the same theoretical status with A'-positions, therefore, adjuncts are also considered to be A'-movements. Haegeman (1991:76) also clarifies the issue stating that

Among the NP positions in a syntactic representation, we distinguish those like the subject position or the object position which are occupied by arguments from those which are occupied by adjuncts. The former are called A-positions, the latter A'-positions.

According to Haegeman (1991:545), scrambling is an adjunction operation that moves a constituent to an A'-position.

2.2.1.5. Phrase Structure and Positions

As it is mentioned before, there is an interaction between the arguments and the deep structure. Uzun (2000:152) explains that, argument structure is represented in the lexicon as a part of lexical information of lexical items and determines the number of the phrases c-selected by the head. Head assigns theta roles to the arguments, while d-

structure designates syntactic positions for the heads and their arguments. In the Principles and Parameters theory, the interaction of d-structure and lexicon is involved in the grammar by the term ‘position’. According to the theory, the d-structure positions occupied by the arguments of a lexical head are referred to as ‘*Argument Position*’, that is to say *A-position*. On the contrary, the *empty* positions which are not occupied by the arguments of a head are called *A’-positions*. For example the Spec. position of the Sentence is of this type, and can be filled in the s-structure by movement.

Phrase structure positions are considerable not only for arguments but also for theta role assignment. A position is called *theta role* position if it allows theta role assignment. Consequently, beside being a position where arguments are seen, a-positions also indicate a position where these argument are assigned theta roles, however, not all a-positions are theta role positions. Whether or not an a-position is also a theta role position is related to whether the head in question assigns theta role to that position or not.

2.2.1.6. Scrambling Phenomenon

According to standard accounts of scrambling in TG, (eg. Uzun, 2000:324-338) scrambling also known as ‘free word order’ involves movement operations. Radford, (1998:527) defines scrambling as “a process that re-orders maximal projections internally within clauses moving them further to the front of the clauses.

Haegeman (1991:538) argues the issue considering ‘German’ and ‘Dutch’ which allow striking variation for the order of VP-constituents and adverbials. She puts forward that these languages contrast sharply with English where no such freedom is allowed.

(4) a. dat Jan waarschijnlijk met dit mes de taart snijdt.

that Jan probably with this knife the cake cuts.

b. dat Jan waarschijnlijk de taart mit dit mes snijdt.

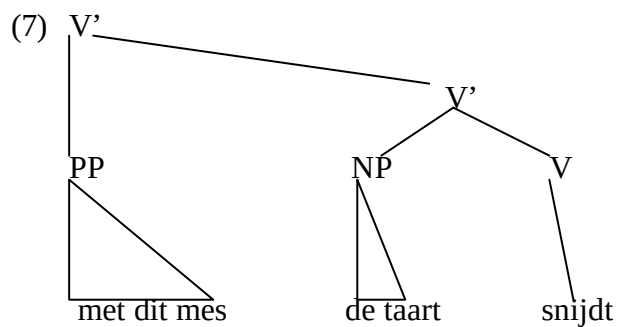
(5) a. John will probably cut the cake with this knife .

b. *John will probably cut with this knife the cake.

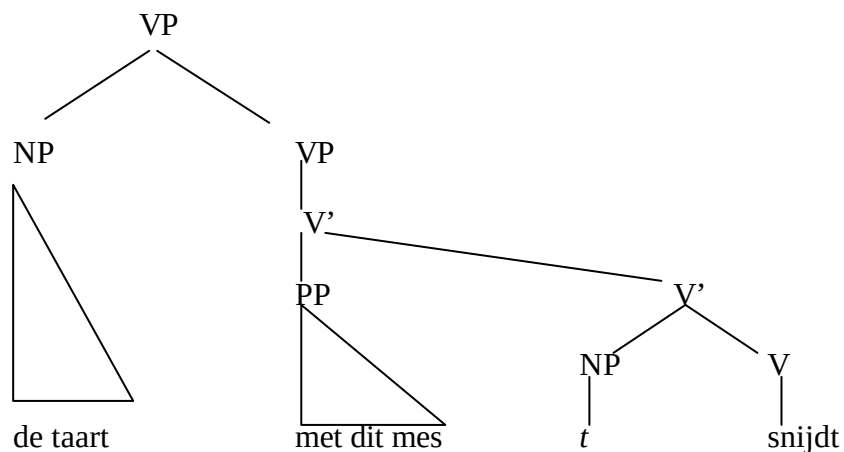
Haegeman (1991:539) puts forward that word orders can be derived on the basis of the types of movement. According to her, assuming that the structure of the Dutch VP is like in English, except that it is head-final, then both (6)a and (6)b would be expected to share the underlying structure (7):

(6) a. dat Jan met dit mes de taart snijdt.

b. dat Jan de taart met dit mes *t* snijdt.



Haegeman (1991:540) explains that the re-ordering of the NP and the PP involves a movement rule moving NP to the left of PP and adjoining it to VP:



Consequently, she defines scrambling as “the movement of VP-constituents to derive the various word-orders of VP.” (Haegeman,1991:542)

2.2.1.7. NP- Movement:

2.2.1.7.1. Passivization as an A-movement

Haegeman (1991:169) mentions that all overt NPs in a sentence must be assigned case. The reader can verify that the case-filter is satisfied in (45).

(45) Italy beat Belgium in the semi-finals.

If we consider (46), the passive pendant of (45);

(46) Belgium were beaten in the semi-finals.

The affects of passivization is obvious. First of all, Haegeman states that, passivization affects the morphology of the verb: the verb *beat* turns up in its participle form and is accompanied by the auxiliry *be*. Furthermore, in the passive sentence, the agent of the activity is not expressed by an NP in an Aposition. The AGENT of the action is presented by an adjunct PP, headed by the preposition *by*, which itself carries the notion of AGENTIVITY.

(47) Belgium were beaten by Italy in the semi-finals.

In (47), *by* assigns the theta role AGENT to the NP *Italy*. Obviously, (45) also satisfies the theta criterion since the NP *Italy* is assigned the external theta role AGENT, and the direct object NP *Belgium* is assigned the internal theta role PATIENT. The situation in (46) is less clear. In the sentence, we have the same predicate 'beat' which has the same meaning and there is only one argument to theta-mark the NP *Belgium* which is the subject of the sentence. However, it seems wrong to assign the external AGENT role to the NP *Belgium*, just as in (45), rather it is assigned the PATIENT role. Thus, we

conclude that the AGENT role is not assigned to an NP in an A-position. It is a property of passive verbs that they fail to assign the external theta role to an NP in an A-position. However, we feel that there is an implied AGENT. The agent role is not absent in passive sentences, rather it is absorbed by the passive morphology on the verb.

Similarly, Haegeman explains (1991:171) that, passivized verb loses the ability to assign structural ACCUSATIVE case to its complement, but we know that all NPs need case, so the sentence (50b) would be ungrammatical;

(50b) * There was beaten Belgium.

Since the object NP *Belgium* will not be able to receive ACCUSATIVE case from the verb *beaten*, the sentence will violate the case filter. (the object NP fails to be case-marked.) The only way to rescue the sentence is to provide case for the complement of the verb in another position. The obvious candidate is the [NP, IP] position to which NOMINATIVE case is assigned by the finite INFL. The object NP thus moved to the subject position OBLIGATORILY, because this is the only way that such NPs can pass the case filter.

To summarize the issue, Haegeman (1991:173) lists the major syntactic properties of passivization as follows:

1. The verb morphology is affected
2. The external theta role is absorbed
3. The structural case of the verb is absorbed
4. The NP which is assigned the internal theta role of the passive verb moves to a position where it can be assigned case
5. The movement of the NP is obligatory in view of the case filter.
6. The movement of the NP is allowed because the subject position is empty.

Now, let us examine the position emptied by the NP movement with respect to passive constructions. Consider the examples given by Haegeman (1991:282)

(14a) This story was believed by the villagers.

D-str? (15a) [IP e [I'was [VP believed [NP this story] by the villagers]]].

S-str.? (15b) [IP [NP This story_i] [I'was [VP believed e_i] by the villagers]]].

In (15a), the NP *this story* is theta-marked directly by the verb *believed*. The subject position is empty since passive verbs do not assign an external theta role. In (15b), *this story* is moved to the subject position and case-marked by the finite INFL. It is assumed that there is a null element in the position emptied by the NP. Co-indexation (*e*) is used to indicate that the null element and the NP in the matrix subject position are linked, which is referred to as a chain. An empty category which encodes the base-position of a moved constituent is referred to as a trace (*t*). The moved element is called the *antecedent* of the trace.

Haegeman (1991:290) lists the common properties of all the examples of NP movement as follows:

1. The moved element is an NP
2. Movement is obligatory
3. The landing site of the movement is an empty position
4. The landing site is an A-position
5. The landing site is an NP position
6. The landing site of movement is a position to which no theta role is assigned. (theta-bar position)
7. The landing site of the movement is a position to which case is assigned.
8. Movement leaves a trace

9. The trace is co-indexed with the moved element, the antecedent with which it forms a chain.
10. The chain is assigned one theta role
11. The theta role is assigned to the lowest position of the chain:the foot of the chain
12. The chain is case-marked once
13. Case is assigned to the highest position of the chain:the head of the chain.

2.2.1.7.2. Relativization as an A'-movement

Kükürt (2004:25) explains general properties of Relative Clauses (RCs), with reference to Haegeman (1994). She points out that “a RC construction is composed of a complex NP, in which the head noun is modified by a clause (CP).” Considering the example given by Hegeman,

(12) [I know [the man[whom Emsworth will invite.]]]

Kükürt (2004: 62) explains that the RC is considered to be an IP, (following a relative pronoun *whom*) since there occur an auxiliary and a subject NP, and the relative pronoun in the sentence is in [Spec, CP] position since it is a maximal projection and only heads are allowed to C positions. The verb *invite* requires an internal argument, and since no overt element is observed, it is assumed that the verb is followed by a trace having *whom* as its antecedent. The surface and the deep structures of the RC are illustrated by (13a) and (13b) as follows;

S-str? (13) a. [CP *whom_i* [IP Emsworth will invite *ti*]].

D-str? b. [CP [IP Emsworth will [VP invite *whom*]]].

It is claimed that RCs are constructed by *wh*-movement which is considered to be an A'-type of movement.

2.2.2. Closed-Class (Function) Words and Inflectional Morphology

Higgins ([www. marlodge.supanet.com/museum/functionword.html](http://www.marlodge.supanet.com/museum/functionword.html)) mentions that linguists usually draw a distinction between content words whose meaning is best described in a dictionary and belong in open sets so that new ones can freely be added to the language, and function words, which carry little inherent meaning, but grammatical roles in a language.

Therefore, nouns, verbs, adjectives, and some adverbs may be classified as typical content words, while, pronouns, conjunctions, prepositions, auxiliary verbs, and some adverbs may be considered as closed-class (function) words.

Moreover, as Grodzinsky (1984:100,101) explains that the closed-class vocabulary items are considered within two morphologically distinct categories as the bound and free grammatical morphemes, the former of which includes inflectional morphology, and the latter constitutes prepositions, pronouns, determiners, etc. Concerning the typological properties of languages, there are three possible forms of relations that inflectional morphology can enter into with items of the major lexical categories;

Lexical items may exist independent of inflection as it is the case in English morphology.

Major lexical category items may be morphologically, but not phonologically dependent on the inflection, that is, an uninflected element is a well-formed phonological string but a non-word and must be inflected in order to become a real word. Russian and Italian are of this type.

Lexical items depend both morphologically and phonologically on the inflectional morphology, that is, an uninflected item is not only a non-word, but also an illegal phonological string, which is the case for semitic languages.

On the other hand, Münte and colleagues emphasize the neuropsychological aspect of the issue (2001:91) proposing that, since closed-class and open class words have different linguistic functions, they are processed by different neural systems. They (2001:92) argue that;

The differentiation can be supported with findings from neuropsychology suggesting that the processing of open and closed class words is subserved by separable brain systems. Evidence for this view has come primarily from observations on patients that showed a differential impairment for open and closed class words.

Finally, Gordon and Caramazza (1982: 144) mention that, the open class of words consist of words which bear semantic meaning, while the closed class words are the subset of the grammatical operators of the language. Therefore, the distinction between them is analogically experimental and has theoretical importance for linguists and psycholinguists, reflecting the differences between syntactic and semantic processing both in normal subjects and aphasics.

2.3. CONSIDERATIONS ON TURKISH

This section mainly aims at providing an overview of Turkish language, in order to provide relevant information about the observed grammatical constructions operating in Turkish.

2.3.1. An Overview of Turkish

Kükürt (2004: 27) explains that, belonging to the Altaic family, Turkish is an agglutinative language which has a quite rich morphology. As well as the categories of case, tense, aspect, and modality which are represented by suffixation (to the verbal stem), even some syntactic constructions like passivization and relativization are also realized through suffixation (to the root).

Therefore, she points out that, “syntax and morphology do not appear readily as distinct packages as they do in, say, Germanic languages.” She restates the examples of

Temürçü to illustrate the issue as follows:

- (17) a. sokak -ta -ki -ler -in
 street -LOC -REL -PLU -GEN
 (of those who are on street)

- b. gör -ül -ebil -ir -sin
 see -PASS -ABLE -AOR -2sg.
 (you can be seen)

- (18) git -meli -y -dik
 go -NECC -PAST-1pl
 (we should have gone)

As for the head parameter, Turkish is a head-final language, that is, heads consistently follow their complements, therefore, Turkish has postpositions, and nominal modifiers such as relative clauses and adjectives etc., which precede their head nouns. Kükürt (2004: 29) further explains that the morpheme –DIK is used for complementization in Turkish.

The subject of a complement phrase is marked with genitive case, and the verb of the phrase agrees with the subject in person, and optionally in number. Agreement is overt and maintained via verbal morphology following –DIK as in the following example:

- (20) Ahmet [çocuk-lar-in Ayse-yi sev -dik -(ler)-i]-ni bil-I-yor.
 Ahmet child -PL -GEN Ayse -ACC love -DIK -(PL) -3-ACC know - PROG
 (Ahmet knows that the children love Ayse.)

2.3.2. The Word Order in Turkish

As Erguvanli (1984:1) states, Greenberg's work (1963) on typology of languages with regard to the positions of the elements in a sentence has been pioneering impact on linguistic research on word order. Classification of the world languages into three major word order types (SVO, VSO, SOV) has constituted much of the recent work in both

synchronic and diachronic linguistics. The position of the object with respect to the verb (whether it precedes or follows the verb) is a determining factor in classifying a language as either VO (SVO, VSO) or OV (SOV), distinguishing a set of properties correlated with each word order type. In VO languages, modifiers follow their head, (verb-adverb, verb-infinitive, verb-obj.complement, N-adj., N-genitive, N-relative clause) whereas in OV languages they precede their head (adverb-verb, infinitive-verb, obj. complement-verb, adj-N, genitive-N, relative clause-N). Postpositions are also predominantly a property of OV languages, while prepositions are a property of VO languages.

Erguvanli (1984:5) explains that Turkish is characterized as being a verb final agglutinative language (exclusively suffixing) with postpositions, a regular casemarking system, and modifier-head constructions, which means word order in Turkish has no 'primary' grammatical function, such as signaling grammatical relations (as in languages which have no case system) or the syntactic form (e.g., statement, question, embedded sentence). The case system of Turkish marks the grammatical roles of the NPs in a sentence, so, there is no need to utilize the word order mechanism in order to signal such grammatical relations, as in English. However, this does not mean that Turkish has no basic word order or has a free word order. Most of the properties of OV languages hold true for Turkish, and there are critical instances where the only possible word-order for a sentence with a given semantic interpretation is SOV. Moreover, in a sentence in which the NPs are not case-marked, and there are no semantic distinctions between the grammatical roles of different NPs, word order is fixed, hence, grammaticized. She illustrates the issue as follows;

(1) Mutluluk huzur getirir.

Happiness peace-of-mind bring-aor

(Happiness brings peace of mind.) (*Peace of mind brings happiness.)

(2) Huzur mutluluk getirir

Peace-of-mind happiness bring-aor

(Peace of mind brings happiness) (*Happiness brings peace of mind)

A change in the word order of (1) produces (2), which is a different sentence. This case illustrates that there is a basic word order in Turkish and that it is SOV.

However, Erguvanli (1984:5) mentions that,

Such sentences are rather infrequent, in most cases, there is either case-marking on one of the NPs, or the NPs differ in their semantic features, which then distinguish their grammatical roles. Once the grammatical roles of the NPs are made transparent, word order variation becomes permissible. It is in this respect that Turkish fits into the Pragmatic Word Order Type (Thompson 1978), where the linear ordering of elements and their variations serve pragmatic purposes such as signaling topics or distinguishing between old and new information (Focus).

Similarly, Hoffman (<http://books.google.com/books?hl=tr&lr=&id>) also puts forward that, as many other free word order languages, the arguments of a verb in Turkish as well, do not have to occur in a fixed word order. Turkish allows all the six permutations of the transitive sentence, since casemarking, rather than word order, serves to differentiate the arguments:

(1)

- a. Fatma Ahmet'i gördü.
- b. Ahmet'i Fatma gördü.
- c. Fatma gördü Ahmet'i.
- d. Ahmet'i gördü Fatma.
- e. Gördü Ahmet'i Fatma.
- f. Gördü Fatma Ahmet'i.

However, although all the permutations represent the same propositional interpretation, each word order conveys a different discourse meaning, appropriate to specific discourse situation. As **Hoffman** (<http://books.google.com/books?hl=tr&lr=&id>) defines, the sentence initial position is associated with the *topic*, the immediately preverbal position with the *focus*, which receives the primary stress in the sentence, and postverbal positions with *backgrounded* information.

Therefore, Erguvanli (1984:169) argues that, the word order variation found in Turkish can be explained by ‘stylistic’ rules that apply only to surface structures, and are independent of syntactic operations. The introduction of these ‘stylistic’ rules into a transformational grammar, then, formally reflects the distinction between formal semantics (logical form) and pragmatics (utterer’s meaning in a social discourse).

Duman (2005: 12) discusses the issue as word order variation in Turkish involves two distinct but interacting levels of representation: a formal syntactic level (phrase structure) and a pragmatic one (information structure);

...it has been suggested that while SOV-OSV alternation (object scrambling or fronting) in Turkish has a formal syntactic import (as well as a pragmatic one), SOV-OVS alternation (object post-posing) is exclusively information driven (Temürçü, 2002; among others).

2.3.3. Scrambling in Turkish

Erguvanli (1984:167) states that, movement rules (by Underhill, 1972; Hankamer, 1971) proposed to account for the free word order in Turkish consider the S-DO-IO-V to be the underlying order generated by the phrase structure rule. As Erguvanli mentions, Underhill proposed two rules, one of which is the ‘indefinite NP movement’ rule obligatorily moves any indefinite NP to the immediate left of the verb, and the other one is ‘scrambling’ rule, applying optionally, only when all the NPs of the sentence are definite, and moves a definite NP to any position in the sentence. Also, Hankerman (1984:167) defines all rules that permute constituents as ‘scrambling rules’, but distinguishes the types of scrambling rules as topicalization (when the subject follows the object) and extraposition (when the subject or the object is inverted with respect to the verb). Furthermore, Uzun (2000:324) mentions that, the constituents in Turkish are able to move, even though there exists no convenient position in the d-structure, which characterizes the free word order property of Turkish. In Turkish sentences, the constituents are extremely free to appear at different s-structure positions. Uzun (2000:325) illustrates this property of Turkish as follows:

- ? Ali kitabı Ayşe'ye verdi.
- ? Ali Ayşe'ye kitabı verdi.
- ? Kitabı Ali Ayşe'ye verdi.
- ? Ayşe'ye Ali kitabı verdi.
- ? Kitabı Ayşe'ye Ali verdi.
- ? Ayşe'ye kitabı Ali verdi.
- ? Ali kitabı verdi Ayşe'ye.
- ? Kitabı Ali verdi Ayşe'ye.
- ? Ali Ayşe'ye verdi kitabı.
- ? Ayşe'ye Ali verdi kitabı.
- ? Kitabı Ayşe'ye verdi Ali.
- ? Ayşe'ye kitabı verdi Ali.
- ? Ali verdi kitabı Ayşe'ye.
- ? Ali verdi Ayşe'ye kitabı.
- ? Kitabı verdi Ali Ayşe'ye.
- ? Kitabı verdi Ayşe'ye Ali.
- ? Ayşe'ye verdi Ali kitabı.
- ? Ayşe'ye verdi kitabı Ali.
- ? Verdi Ali kitabı Ayşe'ye.
- ? Verdi Ali Ayşe'ye kitabı.
- ? Verdi kitabı Ali Ayşe'
- ? Verdi kitabı Ayşe'ye Ali.
- ? Verdi Ayşe'ye Ali kitabı.
- ? Verdi Ayşe'ye kitabı Ali.

Uzun (2000:325) also puts forward that, this process which is referred to as 'scrambling', is considered to be a 'movement operation' within the frame of UG, since the argument relations remain constant, although the positions of the constituents change. In all of the sentences, *Ali* appears as the subject, *kitab* appears as the direct object, *Ayşe* appears as the indirect object, and *verdi* is the verb. Therefore, according to the movement approach, it is argued that, all the varieties of the sentences are derived

from a basic underlying word order, via movement operation.

Kornfilt (2003: 128) explains this extremely free movement of the constituents with respect to their overtly case-marked condition in the sentence. She states that, while direct objects with overt accusative and subjects with overt genitive case can freely scramble to various positions, their counterparts without any structural case markers cannot be scrambled.

Scrambled Accusative direct object:

- (3) Ahmet sahane (*bir*) *pasta*-yi dün aksam ye-di.
 Ahmet fantastic a cake-ACC yesterday evening eat-PAST

Unsuccessfully scrambled non-specific direct object

- (4) * Ahmet (*bir*) *pasta* dün aksam ye-di.
 Ahmet a cake yesterday evening eat-PAST

2.3.4. NP Movement in Turkish

2.3.4.1. Object Scrambling in Turkish

Duman states that the canonical position of adverbs in Turkish is just before the verb, however, the definite object can move over the adverb, which is called ‘object scrambling.’ According to Duman (2005:11-12), Turkish is a Subject-Object-Verb (SOV) language that means that the base position of the object is just before the verb. She illustrates the base order as follows;

- (1) Adam duvari boyadi (SOV)
 The man-nom the wall-acc paint-past/3rd prs.sing.
 (The man painted the wall.)

However, as cited in (Karimi 2003), Duman mentions that many SOV languages like Turkish allow argument-argument (or argument-adjunct) reordering which is named as scrambling. She illustrates five possible options that a basic sentence might have in Turkish as follows;

(2)

a. Duvari adam boya-di **(OSV)**

The wall-acc the man-nom paint-past/3rd prs.sing.

b. Adam boya-di duvari **(SVO)**

The man-nom paint-past/3rd prs.sing. the wall-acc

c. Duvar-i boya-di adam **(OVS)**

The wall-acc paint-past/3rd prs.sing. the man-nom

d. Boya-di duvar-i adam **(VOS)**

paint-past/3rd prs.sing. the wall-acc the man-nom

e. Boya-di adam duvar-i **(VSO)**

paint-past/3rd prs.sing. the man-nom the wall-acc

Citing Aygen (2004), Duman (2005:12) further explains clause internal object scrambling in Turkish as follows;

In object scrambling (OSV), the direct object (DO), which must be marked definite by the presence of accusative morphology on it, leaves its VP internal base position and moves over the subject. This is shown in (3a) below, where *ti* shows the basic position of the object, which is co-indexed with the object in sentence initial position.

(3)

a. Duvari *i* adam *ti* boya-di

The wall the man-nom painted'

(The man painted the wall.)

However, she (2005: 13) states that in Turkish there are some restrictions on object scrambling as indefinite objects that are not marked with accusative case cannot be moved in front of subjects:

(3)

b. * Duvar *i* adam *ti* boya-di

wall the man-nom painted

(The man painted the wall.)

Duman (2005: 13) mentions that a syntactic movement is called ‘overt’ when a word or a phrase is pronounced in an unexpected position and therefore changes the order of the arguments in a sentence, and this is the case for object scrambling as OSV order is derived from the base SOV order by means of overt movement of the object over the subject. She continues that according to the Minimalist Program (1995), another type of movement is ‘feature’ (covert) movement, however, it has no phonological effect on the spell-out and thus, does not change the order of the arguments in a sentence.(i.e., verb raising).

2.3.4.2. Passivization in Turkish as an A-movement

In Turkish, passivization is considered to be a typical instance of NP movement enabling the movement of the object NP, to the subject position. Uzun (2000:291) states that, the verbs have passive morphology in the deep structure, therefore are unable to assign theta role to the NP in the subject position, case to the NP in the object position. (These two insufficiency of passive verbs are known as Burzio principle.) Therefore, the external argument which is supposed to be in the subject position cannot exist at the deep structure, so the subject position remains empty. Besides, the internal argument which is assigned internal theta role but lacks a case, takes the place of the empty subject position of the deep structure at the surface structure in order to satisfy the case filter, and also to provide a subject to the sentence, emptying the object position of deep structure. Hence, there occurs an empty position at the surface structure this time, which is filled by the trace of the moved NP. Uzun (2000:323) also indicates that, in passive constructions in Turkish, the movement of object NP is considered to be a type of A-movement.

2.3.4.3. Relativization in Turkish as an A'-movement

In Turkish, there are two distinct strategies for relativization, constituting different types of RC constructions, namely subject $-(y)An$ and non-subject $(-DIK)$ relativization. As stated in Kükürt (2004:30), in both types of relativization, the head nominal is preceded by a clause in which some noun phrase (which is coindexed with the head nominal) is missing. Kükürt explains the issue as follows:

- (23) Çocuk okula gider
 child school-DAT go-AOR
 (The child goes to school)

Non-subject NP relativization:

- (24) [RC Çocuk-un _{ei} gittiği] okulu
 child-GEN go-DIK-POSS.3sg school
 (The school that the child goes to)

When the non-subject NP *okula* is relativized, -DIK morpheme is used as a complementizer, the subject *çocuk* is marked with genitive case, and the complementizer is followed by a possessive suffix marking the agreement with the subject. The missing NP (RC gap) *okul* is the object of the matrix verb of the RC. On the other hand, when the subject NP is relativized, complementization is carried out by the morpheme -(y)An, and in this case no agreement morphology follows.

This time, the missing NP is *çocuk*.

- (25) [RC _{ei} okul-a gid-en] çocuğu
 school-DAT go-(y)An child
 (The child who goes to school)

Therefore, Kükürt demonstrated that, the appropriate morphological strategy is determined by the grammatical category of the missing NP. Citing Kornfilt, she (2004: 35) continues that, the difference between Turkish and English RCs is the overt wh-element in English, however, Turkish has an empty operator corresponding to it.

The movement of this phonologically null operator leaves a phonologically empty bound variable (i.e. RC gap) in the modifying domain of an RC construction. This similarity indicates that Turkish relativization (just like wh-movement in English) can be considered as a type of A' -movement.

2.3.5. Closed-Class (Function Words) words in Turkish

2.3.5.1. Postpositions

Göksel and Kerslake (2005:241) state that, Turkish has no prepositions, but a large number of postpositions following their complements. A postpositional phrase consists of a noun phrase which is the complement, and a postposition which is the head of the phrase.

Moreover, postpositions in Turkish are considered within two main categories, according to the way in which they relate syntactically to their complements, as

1. Bare Postpositions carrying no suffixes, and
2. Possesive-marked postpositions carrying a possessive suffix agreeing with the complement and an oblique (dative, locative, ablative) case marker.

Bare postpositions can also be classified according to the case of their complements as follows:

1. Postpositions taking non-case marked or genitive complements
2. Postpositions taking dative complements
3. Postpositions taking ablative complements

Examples of bare postpositions can be stated as follows:

“ Öğretmen sinirli **gibi** görünüyor.”

“ Çocuklar kursun kalem**le** yazıyorlar.”

“ Kapi **kadar** uzun.”

On the other hand, case-marked postpositions or postpositions taking case-marked complements can be illustrated as follows:

“Gittiginden **beri** aramadi.”

“Bundan **baska** bi sey yok.”

“Aksama **dogru** gelir.”

“Anahtar masanın **üstünde**.”

“Duvarın **arkasında**.”

2.3.5.2. Inflectional Morphology in Turkish

2.3.5.2.1. Noun Paradigm

As stated by Göksel and Kerslake (2005: 68), the suffixes inflecting the nominals are those marking number, possession, and case. The only number suffix is the plural suffix *-lar*, while the forms of the possessive suffix vary according to the person and number:

1st person singular	-(I)m	‘my’
2nd person singular (familiar)	-(I)n	‘your’
(formal)	-(I)nIz	‘your’
3rd person singular	-(s)I(n)	‘his’, ‘her’, ‘its’, ‘their’
1st person plural	-(I)mIz	‘our’
2nd person plural	-(I)n(I)z	‘your’
3rd person plural	-lArI(n)	‘their’

Also, Turkish has an overt case system, which are listed together with their surface realizations and examples by Kükürt (2004: 28) as follows:

CASE SYSTEM

CASE	REALIZATION	EXAMPLE
Nominative	Null	Adam, araba, Ahmet
Accusative	-(y)H	Adamı, arabayı, Ahmet'i
Dative	-(y)A	Adama, arabaya, Ahmet'e
Locative	-dA	Adamda, arabada, Ahmet'te
Ablative	-dAn	Adamdan, arabadan, Ahmet'ten
Instrumental	-(y)lA	Adamlarla, arabayla, Ahmet'le
Genitive	-(n)Hn	Adamın, arabanın, Ahmet'in

2.3.5.2.2. Verb Paradigm

Göksel and Kerslake (2005: 73) explains that, in Turkish there are two types of verb forms, namely, finite and non-finite. The inflectional suffixes that can be attached to finite verbs respectively are:

Voice suffixes (causative, passive, reflexive, reciprocal)

The negative marker

Tense/aspect/modality (TAM) markers

Copular markers

Person markers

Göksel and Kerslake (2005:74) exemplifies the issue as follows:

Dög	-üs -tür -t-ül	-me	-yebil	-iyor	-mus	sunuz	-dur.
Beat	REC -CAUS-CAUS-PASS	-NEG	-PSB	-IMPF	-COP	-2PL	-MODALITY
ROOT	VOICE SUFFIXES	-NEG	TAM SUFFIXES		COPULAR MARKER	PERSON MARKER	MARKER

“It is presumably the case that you sometimes were not made to fight”.

On the other hand, non-finite verb forms in Turkish may carry respectively:

Voice suffixes (causative, passive, reflexive, reciprocal)

The negative marker

Tense/aspect/modality (TAM) markers

Subordinating suffixes

Nominal inflectional suffixes

Bak	-tir	-ma	-dig	- in	-dan
check	-CAUS	-NEG	-SUB	-2SG.POSS	-ABL
ROOT	VOICE	NEG.	SUBORDINATOR	PERSON	CASE
	SUFFIX	MARKER		MARKER	MARKER

“Because you haven't had (it) checked”.

2.4. RELEVANT RESEARCH ON APHASIOLOGY

As Kolk and colleagues mention, “uptill now, agrammatic sentence production has escaped systematic experimental investigation.” Agrammatism, which is a disorder that leads to difficulties with sentences, relates both to correct comprehension and to correct production <http://www.lot.let.uu.nl/GraduateProgram/LotSchools/Summerschool2003/haverkort2.pdf>).

They argue that the majority of research on agrammatism concentrate on comprehension, yet, agrammatism was originally concieved of as a disorder of production.

Kolk and colleagues explain that, with the analysis of spontaneous speech, three main types of symptoms for agrammatism can be established. (cited in Goodglass and Kaplan 1983)

- i. Reduced variety of grammatical form. The sentences that are produced have little subordination or phrasal elaboration.
- ii. Omission of function words (i.e. articles, pronouns, auxiliaries, copulas, prepositions, etc.
- iii. Slow rate of speech or non-fluency, referred to as the ‘rate’ symptom.

By means of aphasiology, Duman (2005:1-2)) has conducted a similar study that aims to investigate verb inflection (finiteness) and overt syntactic movement (word order) with respect to two structurally different languages; Turkish and Dutch comparatively. She tried to find out whether the main problem in agrammatic aphasia is finiteness or (performing) syntactic movement.

Finally, Duman (2005: 50) concluded that agrammatic patients have difficulties in performing sentences involving overt syntactic movement rather than producing sentences in which all constituents are in their base position and both the difficulties with overt syntactic movement and verb inflection hold regardless of the position of the elements in the syntactic tree.

Another related study that is held by Bastiaanse, Koekkoek and Zonneveld (2002) investigates object scrambling in Dutch Broca's aphasia in order to evaluate whether the production of constructions with moved objects is impaired in Broca's aphasia and if so, whether that is for syntactic or pragmatic reasons. They have put forward that for individuals with Broca's aphasia, sentences with the scrambled word order are more difficult to produce than sentences with the basic word order, even if the scrambled order results in a pragmatically more acceptable sentence.

Moreover, observing that verb production in agrammatic Broca's aphasia is problematic due to the omission of verb inflections and auxiliaries, Bastiaanse and Zonneveld (1998) have suggested that these problems are caused by the fact that finite verbs need to be moved from their base-generated position to inflectional nodes in the syntactic tree. In order to test this hypothesis, Bastiaanse and Thompson (2003) have conducted a cross-linguistic study of Dutch and English and found out that the requirement for verb or auxiliary movement is a critical factor in the production of deficit patterns.

A similar but more extensive study has been held by Friedmann concerning verb movement in agrammatic aphasia in Modern Hebrew both in production and comprehension. It is argued that the deficit in agrammatism is related to a deficit in movement. In the realm of comprehension deficit, Friedmann (2001) cites Grodzinsky (1990, 2000a) who suggested that the trace of a moved constituent is deleted in the agrammatic representation, and therefore, agrammatic aphasics fail to understand structures that are derived by movement. In describing the deficit in agrammatic production, Friedmann suggests that the deficit is related to an impairment in the highest nodes of the syntactic tree or in accessing them. Thus, he states;

It seems that the notions of movement and movement impairment are central to the understanding of the underpinnings of the syntactic deficit in agrammatism, both in production and in comprehension.

2.4.1. The Agrammatic Condition

Garcia (2005:40) states that, at the time agrammatic condition was formulated, agrammatism was considered as the omission of closed-class words (function words and inflectional morphology). However, as he further states, “this characterization of agrammatism held only for English, and not for other languages where agrammatics made mis-selections of both function words and inflectional morphology, but never omission of closed-class words.”

Garcia (2005:40) states the findings of Grodzinsky (1984) as follows:

- ? Patients omit free grammatical morphemes, i.e. prepositions, determiners, auxiliaries, etc.
- ? Whenever the well-formedness of a lexical item does not depend on its being inflected (i.e. it has zero-inflected, unmarked form), the form chosen tends to be the unmarked one.
- ? In every other case, (i.e. where the lexical item depends morphologically or phonologically on the inflection vis-a-vis its well-formedness), any form may be selected from the set of permissible inflectional configurations, regardless of syntactic constraints.

Therefore, it can be concluded that, there is a ‘default procedure’ that, patients tend to select the zero-marked form of inflections if the language is available, otherwise, some form of unconscious guessing takes place that mostly results in mis-selections.

For example, in English, agrammatism can be characterized by the omission of closed-class words since its typology allows the lexical items to exist without the bound morphology. Conversely, in languages such as Italian and Hebrew, the omission of the closed class words is impossible, since it would lead to the presence of non-words. Hebrew agrammatics would then be mute.

In order to account for this, the ‘Agrammatic Condition’ is proposed. It is a condition on the S-structure, so that the grammar of the agrammatics allows the sentences they utter, i.e. with omission or mis-selection of closed-class words.

? **The Agrammatic Condition (AC):**

- (a) If a terminal element at S-structure is not lexically specified, then it will be unspecified at this level.
- (b) Every preposition at S-structure will be deleted, unless it is a head of a prepositional phrase attached to S.

2.4.2. The Tree-Pruning Hypothesis:

Contrary to what is claimed by the AC, it is arguable that, not all closed-class words are equally hampered. Garcia (2005:44) cites Friedman’s (2000) study that represents a selective impairment among (subject-verb) agreement and tense. He found out that four kinds of verb inflection errors exist in agrammatism, which are as follows:

1. The use of bare verbs in English instead of tensed forms.
2. The use of gerunds in English or infiniteness in German instead of tensed forms.
3. The use of participles in Italian instead of tensed forms.
4. Finite verb omission in spontaneous speech.

Tree- pruning hypothesis tries to explain the situation and claims that the syntactic tree of the agrammatic patients at language production is damaged, or terminologically, pruned, from the T(ense) node on. (i.e. T’, TP, C’, and CP where as lower nodes such as NegP, AgrP, and VP are unimpaired). Therefore, elements which must be generated in those underspecified nodes, such as complementizers, or the tense feature of the verb, cannot be generated. Furthermore, for an element to move to those nodes is not possible. (Explaining why wh-movement is damaged in agrammatic production.)

? **The Tree Pruning Hypothesis (TPH):**

- (a). T is underspecified in agrammatic production.
- (b). An underspecified node cannot Project any higher.

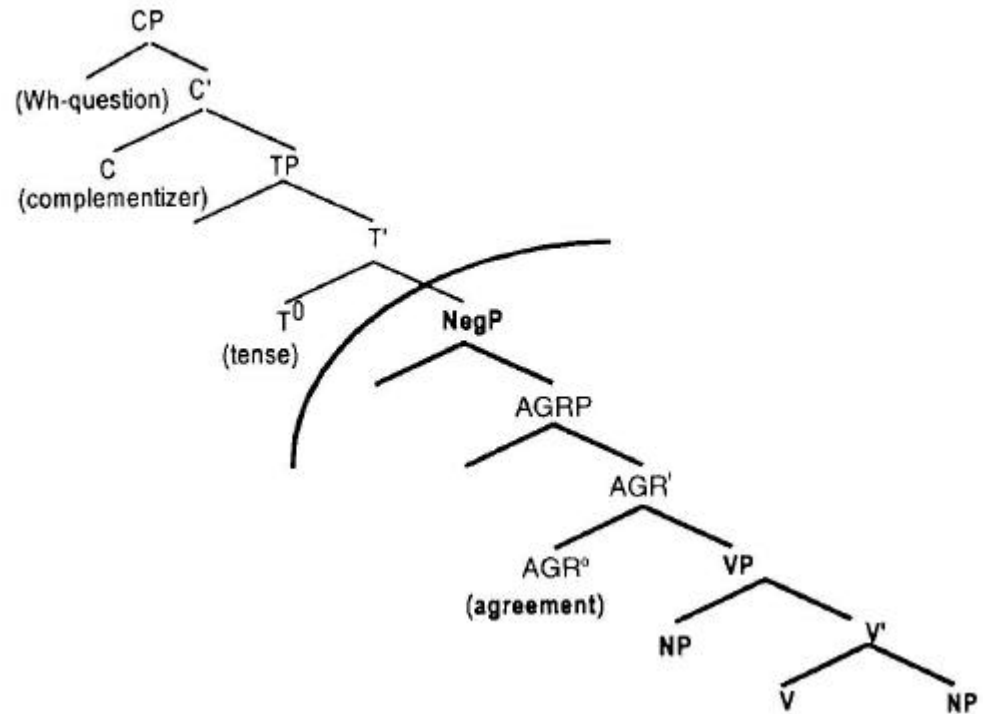


Figure 1: The Tree Pruning Hypothesis (Friedmann 2000)

2.4.3. Agrammatism and Syntactic Movement

The majority of the studies on agrammatism emphasize that syntactic movement is seriously impaired in Broca's aphasic patients, both in production and comprehension. However, three kinds of syntactic movements are to be distinguished, namely, X^0 movement, A-Movement, A'-movement. Grodzinsky 1995 and Bastiaanse 2001 (cited in Garcia, 2005:14) put forward that, X^0 movement seems not to be impaired in agrammatism, whereas, A- and A'- movements are clearly hampered. There are a variety of hypotheses handling the issue with different attitudes. Apart from Tree Pruning (TPH), another remarkable one is the Trace Deletion Hypothesis (TDH), also known as the Trace- Based Account (TBA).

2.4.4. Trace Deletion Hypothesis

As Garcia (2005:14) explains, in order to account for Broca's aphasics impaired performance on semantically reversible passive sentences and unimpaired performance on semantically reversible active sentences, Grodzinsky (1995a, 1995b, 1998) formulated the Trace Deletion Hypothesis.

? Trace Deletion Hypothesis:

In agrammatism, all traces of movement are deleted from S-structure representation

Consequently, theta role transmission to moved constituents, normally mediated by the chain formed through the trace and its antecedent could not take place. Thus, any moved NP would lack its thematic role. So, the structures that contained traces were not normally understood whereas the rest, i.e. structures without traces were preserved.

2.4.5. Agrammatism and Case Theory

Contradicting the Trace Based Account, Case Theory claims that the erroneous thematic role assignment of Broca's aphasic patients cannot be explained by the inappropriate working of the theta module, rather by the impairment of the case module. In other words, the wrong thematic role assignment is the consequence of a case module that does not work properly.

If the case modules of the agrammatic patients are impaired, verbal arguments that are not case marked cannot be visible at the level of Logical Form, and cannot be interpreted by the semantic system.

Also, it is worth noting that there are two types of cases, namely, inherent and structural. Structural case (nominative and accusative cases) is assigned under government, and constitutes a purely structural relationship between the two constituents, whereas, the assignment of the inherent case (dative and oblique cases) depends on thematic role assignment. In other words, an element assigns an inherent case to an element which it also theta marks. The thematic role and the inherent case are tightly related.

Accordingly, Druks and Marshall 1995 (cited in Garcia, 2005:33) claim that, the proper assignment of structural case requires the patients to perform above chance on actives, whereas the impairment of inherent case assignment, which is needed to understand the DP within the by-phrase, leads to a disruption in the performance of passives. Conversely, if a patient performed above chance on passives and at chance level on actives, he is considered to have an impaired structural case assignment.

Garcia (2005:35) summarizes the overall predictions as follows;

1. Structural case unimpaired, inherent case impaired: Normal performance in actives, relatives and cleft sentences, chance in passives and active sentences containing other prepositional phrases.
2. Structural case impaired, inherent case unimpaired: Chance performance in actives, relatives and cleft sentences, normal performance in passives, and active sentences containing other prepositional phrases.
3. Structural case impaired, inherent case impaired: Chance performance in all sentence types, above chance performance on actives, and below chance performance on passives.

As Garcia states (2005:33), “one criticism to this approach is the treatment of case filter claiming that if inherent case is not impaired, the passives are interpreted due to the fact that the by-phrase is correctly interpreted in spite of the fact that nominative case has not been assigned. If this were to be the case, then the verbal argument lacking the nominative case would not be interpreted at LF., since it would not be visible.”

CHAPTER III: METHODOLOGY

3.1. PARTICIPANTS

Two individuals who are monolingual native speakers of Turkish, diagnosed as Broca's aphasia by using Güllhane Aphasia Test (GAT) were chosen among the aphasic patients in Hacettepe University Hospital, Department of Audiology, in Ankara. The following criteria were used while selecting the patients:

2. Left frontal damage involving Broca's area (supplied by CT scan when possible)
3. Both had a single lesion in the left hemisphere; none of them had major articulatory problems.
4. Both patients were at least six months post-onset
5. The patients were neuro-psychologically diagnosed as Broca's aphasics who present effortful, non-fluent, telegraphic speech with normal comprehension at the conversational level.
6. None of the patients suffered from apraxia of speech.
7. They were at the age of approximately 45, with no history of drug abuse, demantia, or disabilities in vision and hearing.
8. Both subjects were right-handed native speakers of Turkish.
9. Further information of the patients was received by the audiologist by means of an information chart, concerning the social and medical backgrounds

Patient	Age	Gender	Handedness	Etiology	Month Post Onset	Duration of therapy
Subject1	49	female	right	stroke	2.5 years	1.5 years
Subject2	44	Male	right	stroke	3 years	2.5 years

Along with the patients, a non-brain damaged control group including two males and two females, ranging in age from 28 to 59 (mean age: 43.75) were tested, and they performed perfectly through the test.

3.2. PROCEDURE AND MATERIALS

In order to derive at a general description of the nature of 'agrammatism' in Turkish Broca's aphasic patients, and to establish an explicitly defined basis needed further to clear the theoretical hypotheses trying to explain the nature of the deficiency as a syndrome, this study is primarily designed to analyze certain specific linguistic patterns that are acknowledged to be impaired in the production of agrammatic patients.

In order to elicit the corpus of Turkish data concerning the production of certain particular linguistic structures, mainly two experiments including three types of experimental techniques are prepared including *i.* interview, *ii.* picture narration *iii.* sentence completion. The two of the techniques, namely, the interview and the picture narration are designed to obtain the data concerning the inflectional morphology, providing with a free narrative sample of agrammatic speech production in Turkish. The interview section includes approximately 20 personal questions providing with the data of approximately 10 minutes of free conversation whereas the picture narration requires the description of the “cookie theft” picture of the Boston Diagnostic Aphasia Examination (BDAE).

In order to receive the data of the production of non-canonical and scrambled word order structures of various types and closed class words such as prepositions, restricted sentence completion tests concerning each and every particular structure are preferred to be applied to the aphasic participants. These tests are developed by the adaptation of the studies of Yarbay Duman (2004) and Bastiaanse, Koekkoek, and Zonneveld (2003). The patients were presented a pair of contextual pictures for each coordinated sentence. The former part of the sentence before the coordinating conjunction “ama” (but) is produced by the investigator and the participants are required to complete the lacking part after the coordinator with the help of the presented pairs of pictures.

During the preparation of the experiments, a pilot study has been carried out according to which the design of the tests and the construction of the testing sentences are organized, as well as the ordering and number of the sentences and the choosing of the coordinators and the pictures. After the pilot study, the sentences are reduced in number

and ordered in a random way. In sentence completion tests, for the coordination of sentences the conjunction “ama” (but) is preferred rather than “ve” (and), since it indicates the incompleteness of the sentences more clearly. Also the pictures which were charcoal drawings are replaced by colorful photos.

During the experiments, no time limit was imposed, self corrections were allowed and the final answer was analyzed. Elicited free conversation samples of the patients were audio recorded and then transcribed into script for analysis. The findings were evaluated throughout a simple error analysis.

In order to verify the tests, a control group including two male and two female non-brain damaged native speakers of Turkish, ranging in age from 28 to 59 (mean age: 43.75) is experimented. Assuming that the non-brain damaged control group performed the test perfectly well, all the errors that the Broca's aphasics perform is supposed to result from their aphasia and not from test constructions.

3.3. STUDY DESIGN

With the aim of describing “agrammatism” in Turkish Broca's aphasic patients, the study is conducted within two aspects; morphological and syntactic, each presenting relevant experiments. The first part including the morphological analysis concerns with Turkish Broca's aphasic patients' a) production of closed-class (function) words, observing postpositions as their representative, b) performance in inflectional morphology, considering both the noun (case , number) and the verb paradigms (tense, agreement) respectively.

The second part involves syntactic analysis with respect to a) the performance of Turkish Broca's aphasics' in object scrambling and other word-order variations as postpositioning and subject scrambling b) the production of movement operations, namely, relativization and passivization. The overall design of the complete linguistic analysis can be plotted as follows;

- I. Morphological Analysis (Experiment 1)
 - A. Closed-class (Function) Words/ Postpositions
 - B. Inflectional Morphology
 - 1. Noun Paradigm
 - a. Case Inflections
 - b. Number Inflections
 - 2. Verb Paradigm
 - a. Tense Inflections
 - b. Agreement Inflections
- II. Syntactic Analysis (Experiment 2)
 - A. Word-Order
 - 2. Base-order (SOV)
 - 3. Object Scrambling (OSV)
 - 4. Postpositioning (SVO)
 - 5. Subject Scrambling (OVS)
 - B. Movement Operations
 - 1. Relativization
 - i. Object Relative Clause
 - ii. Subject Relative Clause
 - 2. Passivization

Since this study concerns only the production in agrammatic aphasia, the results were evaluated disregarding the semantic and/or pragmatic errors of content. In this study, only the structural errors of production were assessed.

3.4. EXPERIMENTATION

3.4.1. Morphological Analysis: Experiment 1, Part A: Postpositions

In order to investigate the production of postpositions in Turkish, a sentence completion test, which is composed of 12 sentences is developed eliciting 6 postpositions of two conditions. 3 of the postpositions are bare-postpositions and represented by condition 1, while the other 3 involve case-marked postpositions and postpositions taking case-

marked complements as condition 2. Therefore 6 of the sentences have bare-postpositions, while the other 6 involve postpositions with case- markings. The participants were presented 12 pairs of pictures in each of which, the same proposition exists with a different context (presented at appendix A).

A sentence was read followed by an incomplete sentence. The sentences are coordinated by the conjunction 'but' (ama). The subjects were required to complete the preceding sentence in the same way, with the same proposition. The test was started with an example that was repeated until it was clear that the subjects understood the task.

Assuming that the non-brain damaged control group performed the test perfectly well, all the errors that the Broca's aphasics perform is supposed to result from their aphasia and not from test constructions.

The procedure was audio-recorded and transcribed into script. No time limit was imposed, self corrections were allowed and the final answer was analyzed. If requested, the clue sentence was repeated one more time.

3.4.1.1. Sentence Completion Tests for Postpositions: Condition I

Condition 1: Bare Postpositions taking non-case marked complements

1. Kadın mutlu gibi görünüyor ama çocuk [patient: üzgün gibi görünüyor.]
2. Kedi topla oynuyor ama çocuk [patient: bebekle oynuyor.]
3. Çocuk bisikletle gidiyor ama adam [patient: arabayla gidiyor .]
4. Limonata soguk gibi görünüyor ama kahve [patient: sıcak gibi görünüyor.]
5. Zürafa ağaç kadar uzun ama adam [patient: kapi kadar uzun.]
6. Ağaç dag kadar yüksek ama merdiven [patient: bina kadar yüksek.]

3.4.1.2. Sentence Completion Tests for Postpositions: Condition II

Condition II: Bare postpositions taking dative complements and Possessive Marked Postpositions

1. Adam parka dogru yürüyor ama kadın [patient: arabaya dogru yürüyor.]
2. Kadın yukariya dogru bakıyor ama adam [patient: asagiya dogru bakıyor.]
3. Kitap masanın üstünde duruyor ama fincan [patient: sehbanin üstünde duruyor.]
4. Çocuk okulun önünde bekliyor ama adam [patient: arabanin önünde bekliyor.]
5. Çocuk duvarin üstünde oturuyor ama kadın [patient: masanın üstünde oturuyor.]
6. Kedi pencerenin önünde yatiyor ama köpek [patient: kapinin önünde yatiyor.]

3.4.2. Morphological Analysis: Experiment 1, Part B: Inflectional Morphology

In order to investigate the performance of inflectional morphology, the patients' general linguistic outputs that are elicited first by a short interview and then by a picture narration are analyzed. The elicited data are analyzed with respect to the production of inflectional morphology concerning both noun (case and number) and verb (tense and agreement) paradigms. The interview contains 16 personal questions providing with the data of approximately 10 minutes of free conversation, whereas the picture narration requires the description of the “cookie theft” picture from the Boston Diagnostic Aphasia Examination (BDAE). While narrating the picture, the patients are prompted with relevant questions when needed. Elicited free conversation samples of the patients are audio recorded and then transcribed into script for analysis. The findings are evaluated throughout a simple error analysis.

3.4.2.1. Interview

The following questions are asked to the aphasic participants in order to elicit noun and verb paradigm inflections.

1. Adiniz nedir?
2. Hangi yilda dogdunuz?
3. Egitim durumunuz nedir?
 - Hangi okuldan mezun oldunuz?

- İlkokulu nerde okudunuz?

4. Çalışıyor musunuz?

- Ne zaman emekli olacaksınız?

- Ne zaman emekli oldunuz?

5. Aslen nerelisiniz?

- Ankarada mı yaşıyorsunuz?

- Ne zamandır Ankara'da yaşıyorsunuz?

- Memleketi ziyarete gidiyor musunuz?

- En son ne zaman gittiniz?

-Tekrar ne zaman gideceksiniz?

6. Evli misiniz?

- Çocuklarınız var mı?

- Kaç yaşındalar?

- Çocuklarınız okuyor mu?

- Kaçınıci sınıfa gidiyorlar?

- Hangi okula gidiyorlar?

- Ne zaman karne alacaklar?

- Esiniz ne iş yapıyor? /esiniz güzel yemek yapıyor mu?

7. Anne-babanız hayattalar mı? / nerede yaşıyorlar?/ Sağlıkları yerinde mi?

8. Hangi nedenle rahatsızlandınız?

9. Ne zamandır tedavi görüyorsunuz?

10. Hastanede mi kalıyorsunuz?

11. Ne kadar kalacaksınız hastanede?

12. Ne zaman taburcu olacaksınız?

? taburcu olduktan sonra işe başlayacak mısınız tekrar?

13. Genelde boş vakitlerinizi nasıl değerlendirirsiniz?

14. Bu gün neler yapacaksınız mesela?

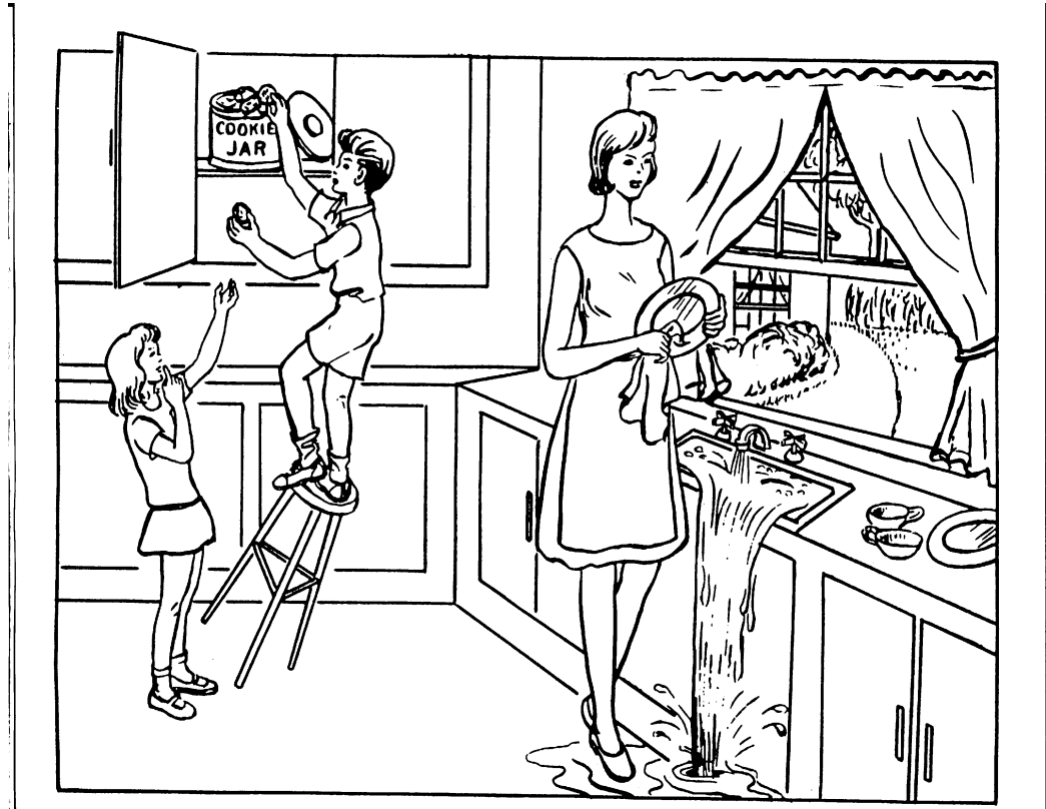
15. Tv dizilerini takip ediyor musunuz?

- Hangilerini en çok beğeniyorsunuz?

- Bu akşam ne seyredeceksiniz TV'de?

16. Yazın ne yapmayı planlıyorsunuz?

3.4.2.2. “Cookie Theft” picture of the Boston Diagnostic Aphasia Examination (BDAE)



3.4.3. Syntactic Analysis: Experiment 2, Part A: Non Canonical Word Order and Movement Operations

Considering that one of the most striking deficiencies in characterizing agrammatism is the production of non-canonical word order, the aim of the experiment is to investigate and describe the production of non-canonical word order in Turkish speaking Broca's aphasics, namely, Object Scrambling, Postposing, Subject Scrambling and comparing them with the production of canonical Base-Order sentence constructions.

A sentence completion test was prepared including 36 sentences of basically four different types of syntactic conditions. **Condition 1** consists of 9 canonical sentences in their base SOV order, **Condition 2** includes 9 sentences of object scrambling, **Condition 3** includes 9 sentences of postposing and finally, **Condition 4** includes 9 subject scrambling sentences.

The experiment was restricted with the sentences in which only the NPs are moved, and the conditions were given to the patients randomly in a mixed order.

The participants are presented totally 9 pairs of pictures (that are presented at Appendix B) in which the same action is performed by different subjects and with different objects.

A sentence is read followed by an incomplete sentence. The sentences were coordinated by the the conjunction ‘ama’(but). Then, the subjects were asked to complete the preceding sentence in a similar way. Each pair of pictures was used four times with each and every condition. The test was started with an example that was repeated until it was clear that the patients understood the task.

Assuming that the non brain- damaged speakers performed the tests perfectly well, all the errors that the Broca’s aphasics perform are supposed to result from their aphasia and not from test constructions. The procedure was recorded by a camera in order to be analyzed.

Self corrections are allowed and the final answer was analyzed. If requested, the clue sentence was repeated one more time. The elicited data are evaluated in terms of both the correct and incorrect constructions.

3.4.3.1. Sentence -Completion Tests for Non-Canonical Word Order: Condition 1

Condition I

Base Order (SOV)

1. Bu adam gitar çalıyor ama bu [patient: kadın piyano çalıyor.]
2. Bu çocuk kediye seviyor ama bu [patient: adam köpeği seviyor.]
3. Bu kadın kitap okuyor ama bu [patient: adam gazete okuyor.]
4. Bu adam domatesi kesiyor ama bu [patient: kadın pastayı kesiyor.]
5. Bu kadın su içiyor ama bu [patient: adam çay içiyor.]
6. Bu adam duvarı boyuyor ama bu [patient: çocuk kapıyı boyuyor.]

7. Bu adam kutuyu taşıyor ama bu [patient: kadın bavulu taşıyor.]
8. Bu kadın çocuğu öpüyor ama bu [patient: adam kadını öpüyor.]
9. Bu adam köpeği ıslatıyor ama bu [patient: çocuk kadını ıslatıyor.]

3.4.3.2. Sentence -Completion Tests for Non-Canonical Word Order: Condition 1I

Condition II

Object Scrambling (OSV)

1. Bu gitarı adam alıyor ama bu [patient: piyanoyu kadın alıyor.]
2. Bu kediyi ocuk seviyor ama bu [patient: köpeği adam seviyor.]
3. Bu kitabı kadın okuyor ama bu [patient: gazeteyi adam okuyor.]
4. Bu domatesi adam kesiyor ama bu [patient: pastayı kadın kesiyor.]
5. Bu suyu kadın içiyor ama bu [patient: ayı adam içiyor.]
6. Bu duvarı adam boyuyor ama bu [patient: kapıyı ocuk boyuyor.]
7. Bu kutuyu adam taşıyor ama bu [patient: bavulu kadın taşıyor.]
8. Bu ocuğu kadın öpüyor ama bu [patient: kadını adam öpüyor.]
9. Bu köpeği adam ıslatıyor ama bu [patient: kadını ocuk ıslatıyor.]

3.4.3.3. Sentence -Completion Tests for Non-Canonical Word Order: Condition 1II

Condition III

Postposing (SVO)

1. Bu adam alıyor gitarı ama bu [patient: kadın alıyor piyanoyu.]
2. Bu ocuk seviyor kediyi ama bu [patient: adam seviyor köpeği.]
3. Bu kadın okuyor kitabı ama bu [patient: adam okuyor gazeteyi.]
4. Bu adam kesiyor domatesi ama bu [patient: kadın kesiyor pastayı.]
5. Bu kadın içiyor suyu ama bu adam [patient: içiyor ayı.]
6. Bu adam boyuyor duvarı ama bu [patient: ocuk boyuyor kapıyı.]
7. Bu adam taşıyor kutuyu ama bu [patient: kadın taşıyor bavulu.]
8. Bu kadın öpüyor ocuğu ama bu [patient: adam öpüyor kadını.]
9. Bu adam ıslatıyor köpeği ama bu [patient: ocuk ıslatıyor kadını.]

3.4.3.4. Sentence -Completion Tests for Non-Canonical Word Order: Condition 1V

Condition IV

Subject Scrambling (OVS)

1. Gitari alıyor bu adam ama [patient: piyanoyu alıyor bu kadın.]
2. Kediye seviyor bu ocuk ama [patient: kpegi seviyor bu adam.]
3. Kitabı okuyor bu kadın ama [patient: gazeteyi okuyor bu adam.]
4. Domatesi kesiyor bu adam ama [patient: pastayı kesiyor bu kadın.]
5. Suyu iiyor bu kadın ama [patient: ayı iiyor bu adam.]
6. Duvarı boyuyor bu adam ama [patient: kapıyı boyuyor bu ocuk.]
7. Kutuyu taşıyor bu adam ama [patient: bavulu taşıyor bu kadın.]
8. ocuğu pyor bu kadın ama [patient: kadını pyor bu adam.]
9. Kpegi islatıyor bu adam ama [patient: kadını islatıyor bu ocuk.]

3.4.4. Experiment 2, Part B: Movement Operations

The aim of the experiment is basically to investigate the production of sentences containing transformations and to observe whether the production of syntactic movement involves a kind of selective impairment among non-canonical sentence constructions and movement derived sentences along with the comparison of constructions involving a-bar and a -movement.

Friedman (2001:1) mentions that, according to several accounts, the deficit in agrammatism, is related to a deficit in movement both in comprehension and in production. He further suggests the tree-pruning hypothesis stating that the deficit is related to an impairment in the highest nodes of the syntactic tree or in accessing them which causes impairment in structures that include constituents that move to the high nodes. Therefore, he (2001:1) continues as “it seems that the notions of movement and movement impairment are central to the understanding of the underpinnings of the syntactic deficit in agrammatism, both in production, and in comprehension.”

In order to obtain the data, sentence-completion tests are prepared including mainly two conditions of movement operations, namely, relativization (Condition 1) and passivization (Condition 2). Condition 1 consists of 18 sentences of relativization, 9 of

which are object relative clauses, while the other 9 is of subject relative clauses. On the other hand, Condition 2 includes 9 sentences of passive constructions. Therefore, the overall experiment involves totally 27 sentences.

The experiment was restricted with the sentences in which only the NPs are moved, and the conditions will be given to the patients randomly in a mixed order.

The participants were presented totally 9 pairs of pictures (that are the same with that of part A, presented in appendix B) in which the same action is performed by different subjects and with different objects.

A sentence is read followed by an incomplete sentence. The sentences were coordinated by the the conjunction ‘ama’(but). Then, the subjects were asked to complete the preceding sentence in a similar way. Each pair of pictures was used four times with each and every condition. The test was started with an example that was repeated until it was clear that the patients understood the task.

Assuming that the non-brain-damaged speakers performed the tests perfectly well, all the errors that the Broca’s aphasics perform will be supposed to result from their aphasia and not from test constructions. The procedure is recorded by a camera in order to be analyzed. Self corrections were allowed and the final answer was analyzed. If requested, the clue sentence was repeated one more time. The elicited data are evaluated by a simple correct/incorrect scoring system and a kind of error analysis.

3.4.4.1. Sentence- Completion Tests for Movement Operations: Condition I

Condition I: Relativization

a. (Obj. Relative Clause)

1. Bu adamin çaldigi gitar ama bu kadinin [patient: çaldigi piyano.]
2. Bu çocugun sevdigi kedi ama bu adamin [patient: sevdigi köpek.]
3. Bu kadinin okudugu kitap ama bu adamin [patient: okudugu gazete.]
4. Bu adamin kestigi domates ama bu kadinin [patient: kestigi pasta]

5. Bu kadının içtiği su ama bu adamın [patient: içtiği çay.]
6. Bu adamın boyadığı duvar ve bu çocuğun [patient: boyadığı kapi.]
7. Bu adamın tasıdığı kutu ama bu kadının [patient: tasıdığı bavul.]
8. Bu kadının öptüğü çocuk ama bu adamın [patient: öptüğü kadın.]
9. Bu adamın islattığı köpek ama bu çocuğun [patient: islattığı kadın.]

b. (Subj. Relative Clause)

1. Bu gitari çalan adam ama bu piyanoyu [patient: çalan kadın.]
2. Bu kediyi seven çocuk ama bu köpeği [patient: seven adam.]
3. Bu kitabı okuyan kadın ama bu gazeteyi [patient: okuyan adam.]
4. Bu domatesi kesen adam ama bu pastayı [patient: kesen kadın.]
5. Bu suyu içen kadın ama bu çayı [patient: içen adam.]
6. Bu duvari boyayan adam ama bu kapiyi [patient: boyayan çocuk.]
7. Bu kutuyu tasiyan adam ama bu bavulu [patient: tasiyan kadın.]
8. Bu çocuğu öpen kadın ama bu kadını [patient: öpen adam.]
9. Bu köpeği islatan adam ama bu kadını [patient: islatan çocuk.]

3.4.4.2. Sentence- Completion Tests for Movement Operations: Condition II

Condition II: Passivization

1. Gitar adam tarafından çaliniyor ama piyano [patient: kadın tarafından çaliniyor.]
2. Kedi çocuk tarafından seviliyor ama köpek [patient: adam tarafından seviliyor.]
3. Kitap kadın tarafından okunuyor ama gazete [patient: adam tarafından okunuyor.]
4. Domates adam tarafından kesiliyor ama pasta [patient: kadın tarafından kesiliyor.]
5. Su kadın tarafından içiliyor ama çay [patient: adam tarafından içiliyor.]
6. Duvar adam tarafından boyanıyor ama kapi [patient: çocuk tarafından boyanıyor.]
7. Kutu adam tarafından tasiniyor ama bavul [patient: kadın tarafından tasiniyor.]
8. Çocuk kadın tarafından öpülüyor ama kadın [patient: adam tarafından öpülüyor.]
9. Köpek adam tarafından islatiliyor ama kadın [patient: çocuk tarafından islatiliyor.]

3.5. LIMITATIONS OF THE STUDY

Due to the following facts, there are some restrictions on the content and the results of the study:

1. The study is a descriptive case study with a purpose of analyzing the basic properties in the production of agrammatic language in Turkish Broca's aphasic patients in general; therefore the data is limited for each tested condition. However, more patients can be investigated more specifically.
2. It is almost impossible to match the patients in severity of the aphasia type.
3. Since it is difficult to find aphasic patients, the maintenance of a homogeneous group in terms of educational background is quite difficult.
4. Aphasia tests used to label the type of aphasia are mostly the adaptations of foreign language tests, therefore, it is difficult to reach at the typical type of aphasia, and the linguistic view in this sense is not always in line with the literature.
5. Since the subjects are patients, maintaining long-sessioned experiments is not possible. The tests are carried out at intervals.
6. The literature concerning the studies in agrammatism and aphasia in Turkish is limited.

CHAPTER IV: LINGUISTIC ANALYSIS and DISCUSSION

4.1. Introduction

This section illustrates the analysis and transcription of the data received from two Turkish Broca's aphasic patients through two types of experiments. Throughout the experiments, mainly sentence completion tests were applied to the aphasic patients in order to elicit and investigate the data concerning certain specific grammatical constructions. Also, 'interview' and 'picture narration' tasks were performed for further support as free conversation samples. During the sentence completion tests, a group of picture pairs sharing the same action but differing in their subjects and objects were presented to the patients. The first one of the picture pair was uttered by the researcher including the conjunction and also the subject of the next picture. Where the researcher left the sentence incomplete, the patient was required to complete it to form a coordinated sentence. On the other hand, the interview section was composed of 15 personal questions asked to the patients, to which they are required to reply independently in terms of a free conversation. Finally, a picture narration task was applied using the “cookie theft” picture prepared by the Boston Diagnostic Aphasia Examination (BDAE). The experiments are prepared to analyze the language production of the patients in terms of both morphology (experiment1) and syntax (experiment2), both including two sub-parts. Experiment 1 involves a morphological analysis concerning the production of closed-class words and grammatical inflections in Turkish, while experiment 2 deals with the analysis of the production of complex sentence types with movement and transformational operations. The speech samples of the two Turkish Broca's aphasic patients are audio recorded and then transcribed to be analyzed. During the analysis, the errors of the patients are evaluated considering the basic assumptions defining agrammatism as a symptom throughout the literature. The transcribed data are illustrated by the tables and the statistical findings are discussed.

The main concerns of experiment 1 and experiment 2 can be presented further as follows:

4.1.1. Experiment 1

4.1.1.1. Purpose

This part of the study mainly investigates the morphological performance of Turkish Broca's aphasic patients. Therefore, the experiment involves two parts concerning a) the production of postpositions as a representative category of Turkish function words, and b) the production of inflections. The aim is to observe whether the attitude of Turkish Broca's aphasics is compatible with the linguistic profile of agrammatism.

4.1.1.2. Problem

It has been argued so far that, (Bates, Friederici and Wulfeck, 1987: 545), (Grodzinsky, 1984:100) one of the defining characteristics of agrammatism is the omission/substitution of grammatical inflections and function words mainly including auxiliaries, determiners, classifiers and prepositions. However, as mentioned by Slobin (1991: 150 -155), Turkish is an agglutinating inflectional language where postpositions are used rather than prepositions and which does not have free-standing closed-class morphemes (function words) and articles. Also, the use of conjunctions or subordinating particles are rare. Therefore, as Slobin (1991:155) mentions, "if agrammatism is defined as the absence of closed-class elements, it is clear that Turkish patients cannot be classified as agrammatic." On the other hand, although Turkish postpositions belong to the same category as prepositions, the functional role, as well as the word category itself, is another determining issue in the retrieval of the morphemes. Friederici (1982) (cited in Cheng Man Yee, 2001:2) distinguishes two types of prepositions as syntactic-obligatory prepositions and semantic-lexical prepositions. She found that Broca's aphasic patients have more difficulty in producing the former prepositions, while Wernicke aphasics have more errors in the latter. As Terzi, Kondyli and Stephani (2007:1) mention, category P (preposition), is a less clear type of element in the theory of grammar posing problems primarily with respect to classifying them along the functional vs. lexical dimension (van Riemsdijk 1990, 1998, den Dikken 2003, Botwinik-Rotem 2004, Svenonius 2006). Therefore, even if they belong to the same category, prepositions can differ with respect to their functional/lexical property among languages.

4.1.2. Experiment 2

4.1.2.1. Purpose

The aim of the experiment is to investigate and describe the production of un-canonical word order in Turkish speaking Broca's aphasics beside their performance in movement-derived sentence constructions, in order to evaluate the results with respect to grammatical symptoms characterizing agrammatism, and to observe whether the production of syntactic movement involves a kind of selective impairment among scrambling and movement.

4.1.2.2. Problem

One of the most striking deficiencies in agrammatism is the production of un-canonical word order and formation of movement derived sentences. Friedmann (2001:1) mentions that, according to several accounts, the deficit in agrammatism is related to a deficit in movement both in comprehension and in production. He further suggests the tree-pruning hypothesis stating that the deficit is related to an impairment in accessing the highest nodes of the syntactic tree, therefore Broca's aphasic patients have problems in structures that include constituents that move to the high nodes. As he (2001:1) further mentions, "it seems that the notions of movement and movement impairment are central to the understanding of the underpinnings of the syntactic deficit in agrammatism, both in production, and in comprehension." Therefore, in order to determine whether the movement operation is applied by the Broca's aphasic patients, two criteria (syntactic cues) can be considered: *i.* the use of the passive morphology, and, *ii.* the assignment of case to the object NP, with respect to the following principles of the Government and Binding Theory:

1. Extended Projection Principle (EPP):

Each clause requires a subject.

2. Case Filter:

Each and every NP in a sentence must be assigned case.

3. Burzio's Generalization:

Passive morpheme deletes the agent role of the sentence, and the verb with a passive morpheme can not assign case to the NP.

If the verb has a passive morpheme, it is arguable that the verb will not be able to assign the accusative case to the object NP. If each and every NP must carry a case, the NP will move to the immediate position available where it can receive case. As passive sentences lack their agent, the subject position is empty and therefore available, so, the object NP will (move from) leave the object position of the VP and will land to the spec. TP (subject) position of the sentence where it will take nominative case, therefore will satisfy both the case-filter and EPP principles. However, since nominative case has no apparent inflection, it is not possible to observe the assignment of case for sure. Therefore, the clue criteria to observe the application of passive movement are; i) the proper use of the 'by phrase' and ii) the passive morphology.

4.2. Analysis of the Data

4.2.1. Morphological Analysis

As for the morphological analysis of the study, the elicited data are transcribed and then evaluated in terms of closed-class words(postpositions) and inflectional morphology in Turkish in terms of experiment 1. Closed-class words are considered with respect to both bare postpositions and postpositions requiring case inflections. On the other hand, the production of inflectional morphology is analyzed concerning both noun and verb paradigms. Experiment 1 deals with the investigation of the morphology module of the two Turkish Broca's aphasic patients in terms of the production of postpositions (closed class words) in Part A, and production of the inflectional morphology in Part B. Therefore, both of the sections provided the data to observe the operation of functional categories in Turkish Broca's aphasic patients, which have significant importance in defining agrammatism.

4.2.1.1. Experiment 1: Closed Class Words, Part A (postpositions)

The postpositions considered in Part A involve basically two types as bare postpositions

and postpositions with case inflections. The latter type also include both case-marked postpositions as well as postpositions taking case-marked complements. Since Turkish, unlike Indo-European languages, does not have much free standing closed class words, postpositions are chosen to be analyzed as they are the basic representatives of Turkish closed-class words.

4.2.1.1.1. Patient 1

4.2.1.1.1.1. Condition I: Bare Postpositions

Picture / Sentence 1:

Researcher: Kadın mutlu gibi görünüyor ama çocuk

Patient: *mutsuz

Though it is elliptical, the sentence is indeed grammatical in Turkish. Yet, it is considered to be incorrect since the patient violated the terms of instruction by avoiding the production of the required postposition 'gibi' (like), which is the main concern of the experiment.

Picture / Sentence 2:

Researcher: Kedi topla oynuyor ama çocuk

Patient: bebekle

Though the patient omitted the verb itself and produced an elliptical sentence, she managed the grammatical production of the postposition '-le' (with), therefore, the sentence is considered to be correct.

Picture / Sentence 3:

Researcher: Çocuk bisikletle gidiyor ama adam

Patient: *arabaya biniyor.

Actually, the sentence that the patient produced is totally grammatical, however, it is counted as incorrect since it involves a tendency of evasion in producing the required postposition '-le' (with). The patient simply avoided the production of the required postposition for the sake of providing grammaticality.

Picture / Sentence 4:

Researcher: Limonata soguk gibi görünüyor ama kahve

Patient: *sicak

Though it is elliptical, the sentence is indeed grammatical in Turkish. Yet, it is considered to be incorrect since the patient violated the terms of instruction by avoiding the production of the required postposition 'gibi' (like), which is the main concern of the experiment.

Picture / Sentence 5:

Researcher: Zürafa ağaç kadar uzun ama adam

Patient: kapi kadar

Though the patient omitted the predicate and presented an elliptical structure, the sentence is considered as correct, due to the fact that she managed to produce the required postposition 'kadar' (as) grammatically.

Picture / Sentence 6:

Researcher: Ağaç dağ kadar yüksek ama merdiven

Patient: bina kadar

Though the patient omitted the predicate and presented an elliptical structure, the sentence is considered as correct, due to the fact that she managed to produce the required postposition 'kadar' (as) grammatically.

4.2.1.1.1.2. Condition II: Case-marked Postpositions and Postpositions Taking Case-marked Complements

Picture / Sentence 1:

Researcher: Adam parka doğru yürüyor ama kadın

Patient: yola doğru gidiyor.

The substitution of the required verb form is ignored by the patient. However, the sentence is considered to be correct since the patient formed both the postposition 'doğru' (towards) and the case of its complement (yol-a) grammatically.

Picture / Sentence 2:

Researcher: Kadın yukarıya doğru bakıyor ama adam

Patient: asaga doğru

The omission of the required verb form is ignored by the patient and the elliptical sentence that the patient produced is considered to be correct since she formed both the postposition 'doğru' (towards) and the case of its complement (asagi-**ya**) grammatically.

Picture / Sentence 3:

Researcher: Kitap masanın üstünde duruyor ama fincan

Patient: sehpanin üstünde

The omission of the required verb form by the patient is ignored and the elliptical sentence that the patient produced is considered to be correct since she formed the postposition 'üst-**ün-de**' (on top of) grammatically as well as the case of both the postposition itself (-**de**) and also its complement (sehpa-**nin**).

Picture / Sentence 4:

Researcher: Çocuk okulun önünde bekliyor ama adam

Patient: *arabanin önü bekliyor.

The patient managed the production of the postposition 'ön' (in front of) as well as the case of its complement 'araba-**nin**'. However, the sentence that the patient produced is incorrect since she omitted the case of the postposition itself. 'ön-**ün-de**'.

Picture / Sentence 5:

Researcher: Çocuk duvarın üstünde oturuyor ama kadın

Patient: masanın üstünde oturuyor.

The sentence is fully grammatical in which the patient managed the production of the postposition '**üst**' (on top of) and also the case of both the postposition 'üst-**ün-de**' as well as the case of its complement 'masa-**nin**'.

Picture / Sentence 6:

Researcher: Kedi pencerenin önünde yattıyor ama köpek

Patient: kapının önünde

Though it is elliptical by the omission of the verb, the sentence is still fully grammatical in which the patient managed the production of the postposition 'ön' (in front of) and also the case of both the postposition itself 'ön-ün-de' as well as the case of its complement 'kapi-nin'.

4.2.1.1.2. Patient 2:**4.2.1.1.2.1. Condition I: Bare Postpositions****Picture / Sentence 1:**

Researcher: Kadın mutlu gibi görünüyor ama çocuk

Patient: üzgün gibi görüyor.

Although the patient failed at the production of the reflexive morphology required by the verb, he managed the production of the postposition 'gibi'. Therefore, the sentence is counted as correct.

Picture / Sentence 2:

Researcher: Kedi topla oynuyor ama çocuk

Patient: *bir bebek almış...

Actually, the sentence that the patient produced is totally grammatical, however, it is counted as incorrect since it involves a tendency of evasion in producing the required postposition '-le' (with). The patient simply avoided the production of the required postposition for the sake of providing grammaticality.

Picture / Sentence 3:

Researcher: Çocuk bisikletle gidiyor ama adam

Patient: bir arabayla gidiyor.

The sentence that the patient formed is totally correct as he managed the production of the required postposition correctly.

Picture / Sentence 4:

Researcher: Limonata soguk gibi görünüyor ama kahve

Patient: sıcak gibi görüyor.

Although the patient failed at the production of the reflexive morphology required by the verb, he managed the production of the postposition 'gibi'. Therefore, the sentence is counted as correct.

Picture / Sentence 5:

Researcher: Zürafa ağaç kadar uzun ama adam

Patient: *bir kapının kadar uzun.

Although the patient produced the required postposition 'kadar' (as), he failed at its nominative ($\emptyset$) case. He substituted the nominative case with genitive case (-nin) ungrammatically.

Picture / Sentence 6:

Researcher: Ağaç dağ kadar yüksek ama merdiven

Patient: *binanın kadar yüksek.

Although the patient produced the required postposition 'kadar' (as), he failed at its nominative ($\emptyset$) case. He substituted the nominative case with genitive case (-nin) ungrammatically. However, this attitude may not be considered as an error, rather a misselection of the appropriate case marking since the postposition “kadar” in Turkish may require both nominative and genitive cases. Therefore, it can be argued that the patient has this information in his morphology module, but just lacks the appropriate selection among the two possible case markings.

4.2.1.1.2.2. Condition II: Case-marked Postpositions and Postpositions Taking Case-marked Complements

Picture / Sentence 1:

Researcher: Adam parka doğru yürüyor ama kadın

Patient: *bir arabayla doğru yürümüştür.

The patient managed the production of the postposition 'dogru' (towards).

However, the sentence that the patient produced is incorrect since he substituted the dative case (-a) of the postposition with instrumental case (-yla), therefore failed at producing a grammatical sentence.

Picture / Sentence 2:

Researcher: Kadın yukarıya doğru bakıyor ama adam

Patient: yere doğru bakmaktadır.

The sentence that the patient formed is totally correct as he managed the production of both the required postposition 'doğru' (towards) and the dative case of its complement (yer-e) correctly.

Picture / Sentence 3:

Researcher: Kitap masanın üstünde duruyor ama fincan

Patient: sehpanin üzerinde duruyor.

The sentence that the patient formed is totally correct as he managed the production of the required postposition 'üzerinde' (on top of), as well as the locative case of both the postposition's itself (üzerin-de) and also the genitive case of its complement (sehpa-nin) correctly.

Picture / Sentence 4:

Researcher: Çocuk okulun önünde bekliyor ama adam

Patient: bir arabanın önünde bekliyor.

The sentence that the patient formed is totally correct as he managed the production of the required postposition 'önünde' (in front of), as well as the locative case of both the postposition (önün-de) and also the genitive case of its complement (araba-nin) correctly.

Picture / Sentence 5:

Researcher: Çocuk duvarın üstünde oturuyor ama kadın

Patient: bir masanın üzerinde oturuyor.

The sentence that the patient formed is totally correct as he managed the production of the required postposition 'üzerinde' (on top of), as well as the

locative case of both the postposition (üzerin-de) and also the genitive case of its complement (masa-nin) correctly.

Picture / Sentence 6:

Researcher: Kedi pencerenin önünde yattıyor ama köpek

Patient: kapinin önünde yattıyor.

The sentence that the patient formed is totally correct as he managed the production of the required postposition 'önünde' (in front of), as well as the locative case of both the postposition (de) and also the genitive case of its complement (kapi-nin) correctly.

4.2.1.2. Experiment 1: Part B (Inflectional Morphology)

This section of the experiment investigates the Turkish Broca's aphasic patients' production of the inflectional morphology in terms of both noun and verb paradigms. The data is elicited by a short interview, then the obtained sentences are analyzed and evaluated with respect to the inflectional suffixes produced by the patients.

4.2.1.2.1. Patient 1

4.2.1.2.1.1. Part 1: Interview

Question 1:

Researcher: Adiniz nedir?

Patient: Fatma Alakara

Question 2:

Researcher: Hangi yilda dogdunuz?

Patient: Ellidokuz

The answer of the patient is grammatical, yet it is a simple phrase lacking the case inflection which appears in the question form.

Question 3:

Researcher: İlkokulu okudunuz mu?

Patient:

No valid reply is received, therefore is not evaluated.

Question 4:

Researcher: Neler yapıyorsunuz evde?

Patient: ugras-(i)**yor+uz** iste

The reply is a grammatical simple sentence in which the patient properly performed the verb inflections such as tense, person and number in appropriate order.

Question 5:

Researcher: Güzel yemek yapar mısınız?

Patient: *yap-**ar+sin+iz**

Actually, the reply of the patient is a grammatical sentence with the grammatical use of verb inflections in the appropriate order. However, being influenced by the question form, the patient produced an inappropriate person inflection. The expected form should have included 1st person singular suffix.

Question 6:

Researcher: Ankara'da mi oturuyorsunuz?

Patient: *bura otur-(u)**yor+uk**

The error in the sentence is the omission of the locative case inflection of the demonstrative pronoun. The person inflection of the verb is observed to be a sub-standard form but still considered to be grammatical.

Question 7:

Researcher: Kaç yıldır burada oturuyorsunuz?

Patient: 8 yıl

The answer of the patient is grammatical, yet it is a simple phrase lacking the required postposition which appears in the question form.

Question 8:

Researcher: Çocuklarınız var mı?

Patient: İki tane, bir kız, bir oğlan

Though it is elliptical, the sentence is grammatical in terms of the nominative cases of the nouns.

Question 9:

Researcher: Torunlarınız da var mı?

Patient: he

Question 10:

Researcher: Okula gidiyorlar mı?

Patient: Biri gid-(i)**yo**, biri git-**mi+yo**

The sentence is fully grammatical with respect to the proper use of the tense and negative inflections of the verbs in appropriate order after the verb stem.

Question 11:

Researcher: Nasıl oldu bu rahatsızlığınız?

Patient: ev+**de+(y)di+m**, banyo+**ya** git-**ti+m**, o ara takil-**di+m**, kay-**di+m** yer bez+**i+ne**.

Though the patient performed a restricted speech in answering the question, the sentence she produced is grammatical and presents certain noun and verb inflections such as locative case, dative case, possessive morpheme, tense and person properly.

Question 12:

Researcher: Kaç yıl oldu rahatsızlandığınızdan beri?

Patient: Sekiz yıl ol-du

The sentence is fully grammatical with respect to the proper use of the nominative case inflection of the noun and the tense inflection of the verb.

Question 13:

Researcher: Ne kadar süre tedavi aldiniz?

Patient: ... tedavi gör-dü+m....türbe+ye git-ti+m

Although the sentence is incomplete still valuable with respect to the noun and verb inflections that the patient used. The tense, person and dative case inflections are noticable.

Question 14:

Researcher: Daha devam edecek misiniz tedaviye?

Patient: gel-(i)yi+k, gid-(i)yi+k

The progressive tense and person inflections attached to the verb are observed to be sub-standard forms but still considered to be grammatical. The patient managed to form these inflections in the appropriate order.

Question 15:

Researcher: Genelde, bos vakitlerinizde neler yapıyorsunuz?

Patient: ne yapayim, otur+up dur-u+yor+um

The sentence is grammatical with respect to the proper use of the infinitive, tense and person inflections attached to the verb stem in appropriate order.

Question 16:

Researcher: Televizyonda sevdiginiz dizileriniz var mi?

Patient: var var

Question 17:**Researcher:** Hangi dizileri seyrediyorsunuz?**Patient:** köprü

The patient avoided the production of a full sentence, but, rather replied the question in a simple word sentence. Though her answer lacks the required accusative case in the question, the sentence is still acceptable.

Question 18:**Researcher:** Ne zaman oynayacak Köprü?**Patient:** sali günü**Question 19:****Researcher:** Yazlari Ankara'da mi geçiriyorsunuz?**Patient:** ev+de

Although the patient avoided a full sentence and replied in a short, single word sentence, she managed the locative case inflection after the noun stem.

Question 20:**Researcher:** Planlariiniz var mi çocuklarla, torunlarla?**Patient:** kesin deel.**Question 21:****Researcher:** Memlekete gidecek misiniz?**Patient:** memleket+e git+me+yi düşünü...

As a reply, the patient produced an incomplete sentence, however, still performed the proper attachment of the dative case to the noun and infinitive suffix to the verb stems.

Question 22:

Researcher: En son ne zaman gittiniz memlekete?

Patient: ne kadar ol-**du**?.... 7 ay ol-**du**.

The patient grammatically performed the past tense inflection of the verb stem.

Question 23:

Researcher: Orada var mi akrabalarınız?

Patient: var ya. Kız kal-**di** köy+**de**...bura+**da** yok....öbürü bur+**da**....biz yok-**uz**.

Although the sentence is semantically vague, the production of inflectional morphology, in terms of tense (past tense), case (locative) and person (1st person plural) is grammatically well formed.

4.2.1.2.2. Patient 2**4.2.1.2.2.1. Part 1: Interview****Question 1:**

Researcher: Nasilsiniz?

Patient: İyi-(y)**im** ya, sagol sen nasil-**sin**?

The patient produced the required person inflections (1st person singular and 2nd person singular) grammatically.

Question 2:

Researcher: Adiniz nedir?

Patient: Turan, siz-**in**?.....memnun ol-**du+m**.

The patient produced the required inflections of possessive, tense (past) and person (1st person singular) appropriately.

Question 3:

Researcher: Hangi yilda dogdunuz?

Patient: 1964..dog-**du**+**m** evet.

The patient produced the past tense and 1st person singular inflections appropriately .

Question 4:

Researcher: Egitim durumunuz nedir?

Patient: üniversite üniversite....git-**ti**+**k** ondan sonra elektrik mühendisi oku....

Though the patient could not complete the sentence, he was still was able to produce the past tense and 1st person plural inflections.

Question 5:

Researcher: Hangi üniversite?

Patient: imm.....Yildiz Üniversite-(s)i...Kocaeli mühendislik fakülte-(s)i
3rd person singular possessive inflection of the nouns are observed to be properly produced by the patient.

Question 6:

Researcher: Kaç yıl oldu siz mezun olalı?

Patient: çok ol-**du** ya, çok ol-**du**.

The patient grammatically performed the past tense inflection of the verb stem.

Question 7:

Researcher: Çalışıyor musunuz?

Patient: çalış-(i)**yor**+**um** evet.

The reply is a grammatical simple sentence in which the patient properly performed the verb inflections such as tense, person and number in appropriate order.

Question 8:**Researcher:** Nerede çalışıyorsunuz?**Patient:** RTÜK

Although no prominent grammatical error is observed, the reply of the patient is a short, single word sentence lacking the required locative case inflection of the noun that appears in the question form.

Question 9:**Researcher:** Aslen nerelisiniz?**Patient:** *aslen Ardahan...

The patient failed at producing the adjectival form of the noun (Ardahanlı) and could not manage to complete the sentence with proper person inflection (-im).

Question 10:**Researcher:** Ankara'da mı yaşıyorsunuz?**Patient:** evet evet Ankara+da yas(a)-(i)yor+um.

The sentence is grammatical with respect to the proper use of the locative case and also the progressive tense and person inflections are attached to the verb stem in appropriate order.

Question 11:**Researcher:** Ne kadar zamandır yaşıyorsunuz burada?**Patient:** çok ol-du ya.

The patient grammatically performed the past tense inflection of the verb stem.

Question 12:**Researcher:** Memleketi ziyarette gidiyor musunuz?

Patient:imm..Bilecik...dogma orasi. Ben-im anne-m anne-m anne-m
 Istanbul+a git-ti, gitti. Ben Istanbul+a *Istanbul+a anne+m+in
 yan+in+da+(y)di+m.Üniversite..üniversite+de...ilkokul..ilkokul...

üniver...imm... yok..ilkokul imm...der+se+n *istanbul+a basliyor.
 Ilkokul+a *Istanbul+a basli+yor+um. *Istanbul+a
 okudum.....*üniversite bitir-di+m ondan sonra Ankara+ya gel
 di+m.

This is the longest reply of the patient in which he was trying to explain his educational background. Concerning the narrative speech sample, several errors of noun inflections ara observed. These are the substitution of locative case with dative case inflection and omission of the accusative case inflection . Yet, the patient was able to produce possessive inflections along with the tense and person inflections of the verb paradigm.

Question 13:

Researcher: Evli misiniz?

Patient: ev-li-(y)im evet.

In the sentence, it is apparent that the production of the required person inflection is produced appropriately by the patient.

Question 14:

Researcher: Çocuklarınız var mı, kaç tane?

Patient: var-dir, var. 3 tane

Question 15:

Researcher: Okula gidiyorlar mı?

Patient: gid-(i)yor+lar evet. Biraz kız var. Üniversite, yok, lise...lise
 Anadoluluk, liseli var, ondan sonra Yusuf orta 2+de, orta 1+de,
 bir de ufak var.

In the sentence, it is observed that the patient grammatically performed the tense, person and number inflections of the verb as well as the locative case inflections of the nouns.

Question 16:

Researcher: Esiniz çalışıyor mu?

Patient: yok. Ev hanım-ı

The patient performed the possessive inflection properly.

Question 17:

Researcher: Hangi nedenle rahatsızlandınız?

Patient: ah....bir imm pihti dı-**yor+lar+di**, ondan sonra benim biraz gece ol-**du**. Beni götürmen götürmen de-**di+m** ben ayak+**ta-(y)di+m** ayak+**ta-(y)di+m** ondan sonra gazi+**ye** git-**ti+k** hemen. N'oldu n'oldu bilmiyorum da, daha doktor mokter tanımadım, hemen ol-**mus**.

The patient managed the production of the tense (progressive and past), person, (1st person singular, 1st person plural) number, locative and dative case inflections properly.

Question 18:

Researcher: Peki, ne kadar zaman oldu?

Patient: 2 yıl ol-**du** bi de yarım ol-**du** mu bil-**mi-yor+um**.

Observing the sentence, it is noticable that the patient produced the negation, tense and person inflections attached to the verb stem properly in the appropriate order.

Question 19:

Researcher: Ne zamandır tedavi görüyorsunuz konuşma için?

Patient: Biraz Didem hanımla çalış-**ti+k**, ondan sonra o+**na** basla-**di+k** hemen, o da sag olsun iyidir. Biraz çalış-**ti+k**, kendisi 3-4 ay *yurt dis-i git-**mis+ti**, ondan sonra ara ver-**di+k**...ondan sonra bu konuşma+**yi** ben çalış-**ti+m**.

Although the patient did not reveal a cohesively well formed narration, he performed basic noun and verb inflections such as, dative case, accusative case, 1st person plural, 1st person singular and past tense inflections properly. He omitted the dative case in only one situation which is marked by an asterisk.

Question 20:

Researcher: Bos vakitlerinizde neler yapıyorsunuz?

Patient: Biraz ben kitap oku-**du+m**, oku-**yo+du+m**, roman oku-**mus+tu+m** ondan sonra biraz gezmek isti-**yo+du+m**, televizyon var, maç-**a gid-i-yor+um**.

The patient managed the production of the tense (progressive and past), person, (1st person singular) and dative case inflections properly.

Question 21:

Researcher: Futbola merakli misiniz?

Patient: yok ama biraz izl(e)-(i)**yor+um**.

The sentence is grammatical in terms of tense (progressive) and person inflections of the verb paradigm.

Question 22:

Researcher: Yaz için ne planlariınız var? Tatile gidecek misiniz?

Patient: imm.. benim el bi de ayak-**lar** biraz var, ondan sonra ben bur-**da-y-im**. Çocuklar-**i gönder-ir+im** bil-mi-**yor+um** da.

Concerning the noun paradigm, the patient managed the production of number, locative case and accusative case inflections. Also, he grammatically performed the verb inflections such as person, mood and tense.

4.2.1.2.2.2. Part 2: Cookie -Theft Picture Narration

In order to obtain more data concerning the inflectional morphology, the patients are required to explain the 'Cookie-Theft Picture' of the Boston Diagnostic Aphasia Examination (BDAE). The free speech samples of the patients are evaluated with respect to noun and verb paradigm inflections.

4.2.1.2.2.2.1. Patient 1

“ çocuk kurabiye topla-**mis** kurabiye, oğlan kurabiye kutu-**su** al-**(i)yo**, sandalye-**den** düş-**(ü)yo**. Kız dur-**(u)yor**, oğlan-**in** yan-**in+da** kız dur-**(u)yo**... *kız haber-**i** yok.”

Researcher: Baska neler var? “Pasta... aman, tabak mabak...” **Researcher:** Ne olmus orada? “kir-**len-mis**....kadin bulasik yık-**(i)yor**, lavabo tika-**n-mis**...tikanmis tas-**(i)yo**.

Researcher: Neresi burasi? “mutfak” **Researcher:** Neler var mutfakta? “tabak, fincan, ön-**ün+de** lavabo.” **Researcher:** Baska neler dikkatinizi çekiyor disarida, neler görünüyor camdan? “ev gör-**ün+(ü)yor**, park gör-**ün-(ü)yor**.”

The free narrative speech sample of patient 1 reveals that the patient has an effortful speech with pauses in between the words. Also she performed a restricted type of speech, in which she evaded the production of long and complex sentence types. However, by the analysis of the narration it is evident that the morphology of the patient, although involves some errors, is not lost. Rather, the main problem of the patient is the difficulty that she encounters in accessing certain grammatical morphemes. Throughout the speech sample, no erroneous inflectional substitution is observed, only a simple omission of one of the noun's genitive case is detected which is shown by an asterisk. The rest of the narration was grammatical in terms of both noun and verb paradigm inflections and therefore the speech of the patient cannot be considered as being 'telegraphic'.

4.2.1.2.2.2.2. Patient 2

“Biraz imm sura-**da** imm mutfak mutfak-**tan** imm mutfak-**tan** imm mutfak-**ta** ol-**an** imm ol-**an** imm çocuk-**lar** çocuk-**lar** ve de adam bu yok bayan ...bayan mi di-**yor-sun-uz**, ya da anne-**si** mi di-**yor-uz**? Imm... resim, yok kullan-**dig-i** manzara-**lar**. Biraz bir adam, adam yani bayan yok kadın-**dan** bahsed-**e-lim**. Biraz su aç-**mis** imm adam yok

bayan, kadın. *Kadın-**in** su-yu aç-**mis** ve su imm asagi-**ya** tas-**mis**.”

Researcher: Ne yapıyor kadın, ne iş yapıyor mutfakta? “: *Bu kadın-**in** el-**i-ne**... el-**i-ne** tabak al-**mis** ve yıka-**ma**-ya basla-**mis**.” **Researcher:** Çocuklar arkada ne yapıyor? “Biraz çocuk-**lar** iki tane çocuk ol-**uyor-lar**, bir-**i-si** bir-**i-si** sandalye-**nin** üst-**ün-de** imm üst-**ün-de** kek al-**ma**-ya çal...ama *sandalye-**ye** üst-**ün-den** yer-**e** düş-**me**-**ye** çalış-**(i)yor**.” **Researcher:** Peki, mutfagin perdeleri ne renk? “Penye-**ler-i** sarı.” **Researcher:** Disarida neler var? “Disari-**da**....biraz...bun-**lar** yol ol-**abil-ir**, bir de ev göster-**(i)yor** bi de ağaç göster-**(i)yor**.” **Researcher:** Mutfak tezgahında neler var? “Bir.... bu tabak, bu fincan ol-**abil-ir**.”

Considering the free narrative sample of patient 1, it is observed that the patient has an effortful and also a restricted type of speech with pauses, incomplete and uncoherent sentence types.

Though he made certain errors of case, substituting the nominative case with the genitive and also the genitive with the dative, he was able to use quite various types of noun and verb paradigm inflections such as locative and ablative case, possessive and number inflections, nominalization, relativization, tense, aspect, ability, properly in the appropriate order. This reflects that the morphology of the patient is not lost, therefore he is able to produce certain functional categories properly.

4.2.2. Syntactic Analysis

As for the syntactic analysis of the study, the data concerning different types of possible word order constructions in Turkish are elicited and evaluated in order to observe the movement operations respectively. The analysis involves the investigation of the production of movement operations with respect to both un-canonical word order formation in Part A, and also the production of transformational operations in Part B.

4.2.2.1. Experiment 2: Movement Operations, Part A (un-canonical word order)

In this section, the un-canonical word order production of the Turkish Broca's aphasic patients are tested and analyzed considering four different types of constructions,

namely, the basic word order (SOV), object scrambling (OSV), postposing (SVO), and subject scrambling (OVS). The elicited data are evaluated in order to understand the syntax module operating in agrammatism in Turkish. Transcribed sentences are shown by 'v' when they are correct, and by 'X' when they are ungrammatical.

4.2.2.1.1. Patient 1

4.2.2.1.1.1. Condition 1: Base Order (SOV)

1. Bu adam gitar çalıyor ama bu [patient: kadın piyano çalıyor.] v
2. Bu çocuk kediye seviyor ama bu [patient: adam köpeği seviyor.] v
3. Bu kadın kitap okuyor ama bu [patient: adam gazete okuyor.] v
4. Bu adam domatesi kesiyor ama bu [patient: kadın pastayı kesiyor.] v
5. Bu kadın su içiyor ama bu [patient: adam çay içiyor.] v
6. Bu adam duvarı boyuyor ama bu [patient: çocuk kapıyı boyuyor.] v
7. Bu adam kutuyu taşıyor ama bu [patient: kadın valiz taşıyor.] v
8. Bu kadın çocuğu öpüyor ama bu [patient: adam kadını öpüyor.] v
9. Bu adam köpeği islatıyor ama bu [patient: çocuk kadını islatıyor.] v

It is observed that patient 1 completed all the sentences of the base order (SOV) condition grammatically. She even managed the assignment of the accusative case to maintain the direct object when necessary. Therefore, it is evident that the patient has no problem with the base order constructions.

4.2.2.1.1.2. Condition 2: Object Scrambling (OSV)

1. Bu gitari adam çalıyor ama bu [patient: kadın piyano çalıyor.] X
2. Bu kediye çocuk seviyor ama bu [patient: adam köpeği seviyor.] X
3. Bu kitabı kadın okuyor ama bu [patient: gazeteyi adam okuyor.] v
4. Bu domatesi adam kesiyor ama bu [patient: kadın pasta kesiyor.] X
5. Bu suyu kadın içiyor ama bu [patient: adam çay içiyor.] X
6. Bu duvarı adam boyuyor ama bu [patient: kapıyı çocuk boyuyor.] v
7. Bu kutuyu adam taşıyor ama bu [patient: valizi kadın taşıyor.] v
8. Bu çocuğu kadın öpüyor ama bu [patient: kadını adam öpüyor.] v

9. Bu köpegi adam islatiyor ama bu [patient: çocuk kadini islatiyor.] X

It is observed that patient 1 has problems in producing object scrambling. She failed in the formation of the required word order (OSV) in 5 of the sentences out of 9 as she preferred the base order (SOV) instead of object scrambling.

4.2.2.1.1.3. Condition 3: Postposing (SVO)

1. Bu adam çalıyor gitari ama bu [patient: kadın piyano çalıyor.] X
2. Bu çocuk seviyor kediyi ama bu [patient: adam seviyor köpegi.] v
3. Bu kadın okuyor kitabı ama bu [patient: adam gazete okuyor.] X
4. Bu adam kesiyor domatesi ama bu [patient: kadın pastayı kesiyor.] X
5. Bu kadın içiyor suyu ama bu [patient: adam çay içiyor.] X
6. Bu adam boyuyor duvarı ama bu [patient: çocuk kapıyı boyuyor.] X
7. Bu adam taşıyor kutuyu ama bu [patient: kadın valizi taşıyor.] X
8. Bu kadın öpüyor çocuğu ama bu [patient: adam öpüyor kariyi.] v
9. Bu adam islatıyor köpegi ama bu [patient: çocuk kadini islatıyor.] X

The patient achieved the required word order in only 2 of the sentences. The rest 7 sentences she produced involve the basic (SOV) word order.

4.2.2.1.1.4. Condition 4: Subject Scrambling (OVS)

1. 1.Gitari çalıyor bu adam ama [patient: piyano çalıyor bu kadın.] v
2. Kediyi seviyor bu çocuk ama [patient: adam köpegi seviyor.] X
3. Kitabı okuyor bu kadın ama [patient: bu adam gazete okuyor.] X
4. Domatesi kesiyor bu adam ama [patient: pasta kesiyor.] X
5. Suyu içiyor bu kadın ama [patient: bu adam çay içiyor.] X
6. Duvarı boyuyor bu adam ama [patient: kapıyı boyuyor bu çocuk.] v
7. Kutuyu taşıyor bu adam ama [patient: valiz taşıyor kadın.] v
8. Çocuğu öpüyor bu kadın ama [patient: adam kadini öpüyor.] X
9. Köpegi islatıyor bu adam ama [patient: çocuk kadini islatıyor.] X

Patent 1 could not achieve the formation of the required subject scrambling (OVS) word order in 7 sentences, rather she preferred the basic word order (SOV) in all of them. In the other 3, she managed the movement of the object noun. Though she did not attach the accusative case for the direct object in two of the moved sentences, they are still grammatical.

4.2.2.1.2. Patient 2

4.2.2.1.2.1. Condition 1: Base Order (SOV)

1. Bu adam gitar çalıyor ama bu [patient: bayan bir piyanoyu çalmaktadır.] v
2. Bu çocuk kediyi seviyor ama bu [patient: adam köpeği oksuyor.] v
3. Bu kadın kitap okuyor ama bu [patient: adam gazeteyi okuyor.] v
4. Bu adam domatesi kesiyor ama bu [patient: kadın(in) pastayı kesiyor.]v
5. Bu kadın su içiyor ama bu [patient: adam çay içmektedir.] v
6. Bu adam duvarı boyuyor ama bu [patient: çocuk kapıyı boyuyordu.] v
7. Bu adam kutuyu taşıyor ama bu [patient: bayan bavul taşıyordur.] v
8. Bu kadın çocuğu öpüyor ama bu [patient: adam bayanı öpüyor.] v
9. Bu adam köpeği islatıyor ama bu [patient: çocuk islatıyor kadını.] X

Patient 2 managed the production of the required base order (SOV) in 8 of the sentences. However, in sentence 4, although he achieved the required word order, he failed at assigning the proper nominative case, rather he preferred the genitive case inappropriately. He made an error of base order in sentence 9, where he used the SVO (postposing) order inappropriately.

4.2.2.1.2.2. Condition 2: Object Scrambling (OSV)

1. Bu gitari adam çalıyor ama bu [patient: piyanoyu bayan çalmaktadır.] v
2. Bu kediyi çocuk seviyor ama bu [patient: köpek bir adamı seviyor.] X.
3. Bu kitabı kadın okuyor ama bu [patient: adam gazeteyi okumaktadır.] X
4. Bu domatesi adam kesiyor ama bu [patient: pastayı kadın kesiyor.] v
5. Bu suyu kadın içiyor ama bu [patient: çayı içiyor adam.] X
6. Bu duvarı adam boyuyor ama bu [patient: kapıyı boy.....] X

7. Bu kutuyu adam taşıyor ama bu [patient: bavulu bayan taşıyor.] v
8. Bu çocuğu kadın öpüyor ama bu [patient: bayan öpüyor adam.] X.
9. Bu köpeği adam ıslatıyor ama bu [patient: çocuk kadını ıslatıyor.] X

The patient achieved the production of object scrambling in only 3 of the test sentences (1,4,7). In sentences 3 and 9, he rather preferred the basic word order, in sentence 6, he tried to do subject scrambling but could not complete the sentence, in sentence 5, he produced subject scrambling instead of object scrambling, the sentences 2 and 8 are semantically reversible constructions in which both of the actors can equally act as an agent as well as patient. Therefore, it seems that the patient has a problem in thematic role assignment. In sentence 2, the erroneous accusative case assignment of the patient leads to an inappropriate thematic role assignment, while in sentence 9, he provided no accusative case assignment to indicate the patient of the action.

4.2.2.1.2.3. Condition 3: Postposing (SVO)

1. Bu adam çalışıyor gitari ama bu [patient: adam piyanoyu çalmaktadır.] X
2. Bu çocuk seviyor kediyi ama bu [patient: adam sevdiği köpektir.] X
3. Bu kadın okuyor kitabı ama bu [patient: adam gazeteyi okuyor.] X
4. Bu adam kesiyor domatesi ama bu [patient: bayan pastayı kesmektedir.] X
5. Bu kadın içiyor suyu ama bu [patient: adam çayı içiyormuş.] X
6. Bu adam boyuyor duvarı ama bu [patient: çocuk kapıyı boyuyor.] X
7. Bu adam taşıyor kutuyu ama bu [patient: bayan bavulu taşıyor.] X
8. Bu kadın öpüyor çocuğu ama bu [patient: adam kadını öpüyor.] X
9. Bu adam ıslatıyor köpeği ama bu [patient: çocuk ıslatıyor kadın.] v

The patient could not achieve the production of postposing constructions in 8 out of 9 sentences. His error in all 7 of them was the inappropriate choice of the basic word order, while he used relativization instead of postposing in sentence number 2. The only correct postposing order is observed in sentence 9, yet, the patient was still unable to assign the accusative case to indicate the direct object (patient) of the sentence.

4.2.2.1.2.4. Condition 4: Subject Scrambling (OVS)

1. Gitari alıyor bu adam ama [patient: bu piyano alıyordu bayan.] v
2. Kediye seviyor bu ocuk ama [patient: bu kpegi sevdiği adamdır.] X
3. Kitabı okuyor bu kadın ama [patient: bu gazeteyi okumaktadır adam.] v
4. Domatesi kesiyor bu adam ama [patient: bu bayan pastayı kesiyor.] X
5. Suyu iiyor bu kadın ama [patient: bu adam ay iiyor.] X
6. Duvarı boyuyor bu adam ama [patient: kapıyı boyuyor ocuk.] v
7. Kutuyu taşıyor bu adam ama [patient: kadın bavulu taşıyor.] X
8. ocuęu pyor bu kadın ama [patient: kadını pmstr adam.] v
9. Kpeęi islatıyor bu adam ama [patient: kadını ocuk islatıyor.] X

It is observed that the patient managed the required subject scrambling order in only 4 of the sentences. He preferred the basic word order in the sentences 4, 5 and 6, while he inappropriately produced relativization in sentence 2 and object scrambling in sentence 9.

4.2.2.2. Experiment 2: Part B (transformations)

At this part of the syntactic analysis, tests concerning the transformational operations in Turkish are analyzed and evaluated with respect to relativization (object relative clause and subject relative clause) and pasivization which are known to be problematic in agrammatism.

4.2.2.2.1. Patient 1

4.2.2.2.1.1. Condition 1: Relativization

4.2.2.2.1.1. a. Object Relative Clause

1. Bu adamın aldığı gitar ama bu kadının [patient: aldığı piyano.] v
2. Bu ocunun sevdiği kedi ama bu adamın [patient: sevdiği kpek.] v
3. Bu kadının okuduęu kitap ama bu adamın [patient: bu adam gazete okuyor.] X
4. Bu adamın kestigi domates ama bu kadının [patient: kestigi pasta] v
5. Bu kadının itięi su ama bu adamın [patient: ay iiyor.] X

6. Bu adamin boyadigi duvar ama bu çocukun [patient: kapiyi boyuyor.] X
7. Bu adamin tasidigi kutu ama bu kadinin [patient: valiz tasiyor.] X
8. Bu kadinin öptüğü çocuk ama bu adamin [patient: öptüğü kadın.] v
9. Bu adamin islattigi köpek ama bu çocukun [patient: çocuk kadini islatiyor.] X

Patient 1 produced object relativization in only 4 of the sentences, with the rest she displayed a tendency in constructing the basic word order.

4.2.2.2.1.1. b. Subject Relative Clause

1. Bu gitari çalan adam ama bu piyanoyu [patient: çalan kadın.] v
2. Bu kediyi seven çocuk ama bu köpegi [patient: seven adam.] v
3. Bu kitabı okuyan kadın ama bu gazeteyi [patient: okuyan adam.] v
4. Bu domatesi kesen adam ama bu pastayı [patient: kesen kadın.] v
5. Bu suyu içen kadın ama bu çayı [patient: adam içiyor.] X
6. Bu duvarı boyayan adam ama bu kapiyi [patient: boyayan çocuk.] v
7. Bu kutuyu taşıyan adam ama bu çantayı [patient: taşıyan kadın.] v
8. Bu çocuğu öpen kadın ama bu kadını [patient: adam öpüyor.] X
9. Bu köpegi islatan adam ama bu kadını [patient: çocuk islatıyor.] X

It is observed that the 6 sentences out of 9 were perfectly well-formed subject relative clause constructions, the other 3 sentences share the same error of inappropriate use of object scrambling.

4.2.2.2.1.2. Condition 2: Passivization

1. Gitar adam tarafından çaliniyor ama piyano [patient:kadın tarafından çaliniyor.]v
2. Kedi çocuk tarafından seviliyor ama köpek [patient:adam tarafından seviliyor.]v
3. Kitap kadın tarafından okunuyor ama gazete [patient: adam tarafından okunuyor.] v
4. Domates adam tarafından kesiliyor ama pasta [patient: kadın tarafından.....] v
5. Su kadın tarafından içiliyor ama çay [patient: adam tarafından içiliyor.] v
6. Duvar adam tarafından boyanıyor ama kapi [patient: çocuk tarafından boyanıyor.] v
7. Kutu adam tarafından tasiniyor ama bavul [patient: kadın tarafından tasiniyor.] v

8. Çocuk kadın tarafından öpülüyor ama kadın [patient:adam tarafından öpülüyor]v
9. Köpek adam tarafından ıslatılıyor ama kadın [patient: çocuk tarafından ıslatılıyor.] v

It is clearly observed that patient 1 managed the production of movement operation in all of the test sentences.

4.2.2.2.2. Patient 2

4.2.2.2.2.1. Condition 1: Relativization

4.2.2.2.2.1. a. Object Relative Clause

1. Bu adamin çaldığı gitar ama bu kadının [patient: piyanoyu çalıyor.] X
2. Bu çocuğun sevdiği kedi ama bu adamin [patient: sevdiği köpektir.] v
3. Bu kadının okuduğu kitap ama bu adamin [patient: gazeteyi okumaktadır.] X
4. Bu adamin kestigi domates ama bu kadının [patient: pastayı kestigidir.] X
5. Bu kadının içtiği su ama bu adamin [patient: çay almış içiyordu.] X
6. Bu adamin boyadığı duvar ve bu çocuğun [patient: boyadığı kapı.] v
7. Bu adamin taşıdığı kutu ama bu kadının [patient: bavulu taşıyordu.] X
8. Bu kadının öptüğü çocuk ama bu adamin [patient: öptüğü kadın.] v
9. Bu adamin ıslattığı köpek ama bu çocuğun [patient: ıslattığı kadındır.] v

Out of 9 sentences, patient 2 achieved only 4 object relative constructions. In most of his errors he produced base order sentences.

4.2.2.2.2.1. b. Subject Relative Clause

1. Bu gitari çalan adam ama bu piyanoyu [patient: çalan bayan.] v
2. Bu kediyi seven çocuk ama bu köpeği [patient: seven adamdır.] v
3. Bu kitabı okuyan kadın ama bu gazeteyi [patient: okuyan adamdır.] v
4. Bu domatesi kesen adam ama bu pastayı [patient: kesen bayandır.] v
5. Bu suyu içen kadın ama bu çayı [patient: içmeye çalışan adam.] v

6. Bu duvari boyayan adam ama bu kapiyi [patient: boyayan çocuk.] v
7. Bu kutuyu tasiyan adam ama bu çantayi [patient: tasiyan bir bayan.] v
8. Bu çocuğu öpen kadın ama bu kadini [patient: öpen adam.] v
9. Bu köpegi islatan adam ama bu kadini [patient: islatan çocuktur.] v

It is apparent that patient 2 succesfully produced all of the 9 test sentences without any error.

4.2.2.2.2. Condition 2: Passivization

1. Gitar adam tarafından çaliniyor ama piyano [patient: kadın tarafından çalıyor.]
2. Kedi çocuk tarafından seviliyor ama köpek [patient: adamin tarafından oksaniyor.]
3. Kitap kadın tarafından okunuyor ama gazete [patient: adam tarafından okunmaktadır.]
4. Domates adam tarafından kesiliyor ama pasta [patient: bayan tarafından kesmektedir.]
5. Su kadın tarafından içiliyor ama çay [patient: adam tarafından içiyor.]
6. Duvar adam tarafından boyanıyor ama kapı [patient: çocuk tarafından boyalanmaktadır.]
7. Kutu adam tarafından tasiniyor ama bavul [patient: bir bayan tarafından tasimak.]
8. Çocuk kadın tarafından öpülüyor ama kadın [patient: adam tarafından öpmektedir.]
9. Köpek adam tarafından islatiliyor ama kadın [patient: çocuğun tarafından islaniyor.]

It is a fact that, sentences that do not involve movement operation take no inserted element in between the argument and the verb. The insertion of the by-phrase which is a PP between the NP and the Verb signals that the patient managed the movement of the Subject NP to the spec.TP position. Therefore, it is noticable that, although the patient performed errors in passive morphology, he presented no deficiency in the movement operations (by-phrases). The errors of passive inflections attached to the verb stem were considered to be the errors of morphology, but not syntax.

4.3. FINDINGS

Findings of both morphological and syntactic analyses considering each experiment can be stated separately as follows:

4.3.1. Experiment 1: Closed-Class words

4.3.1.1. Part A, Postpositions

Turkish has no prepositions but a large number of postpositions following their complements. Postpositions in Turkish may be classified according to the way in which they relate syntactically to their complements.

4.3.1.1.1. Condition 1: Bare Postpositions

Bare postpositions are the ones that carry no suffixes. Table 1 simply illustrates the general performance of the two patients in the production of Bare Postpositions in Turkish.

Table 1: The general performance of the patients in the production of Bare Postpositions (n=2)

Bare Postpositions	Correct	Incorrect
Sentence 1	Patient 2	Patient 1
Sentence 2	Patient 1	Patient 2
Sentence 3	Patient 2	Patient 1
Sentence 4	Patient 2	Patient 1
Sentence 5	Patient 1	Patient 2
Sentence 6	Patient 1	Patient 2

Concerning the overall 6 sentences, it is observed that both Patient 1 and Patient 2 performed 3 correct and 3 incorrect sentences. The evaluation of the errors indicate that Patient 1 generally tended to evade the postpositions by the use of elliptical but still grammatical sentences such as;

Researcher: Kadın mutlu gibi görünüyor ama çocuk

Patient: *mutsuz

Researcher: Limonata soguk gibi görünüyor ama kahve

Patient: *sicak

However, during the analysis, these elliptical sentences are considered to be errors since the patient violated the instructions which are told previously.

On the other hand, Patient 2 did not avoid postpositions except in one sentence, rather he made errors by assigning extra case to the complements of the postpositions, as in the examples;

Researcher: Zürafa ağaç kadar uzun ama adam

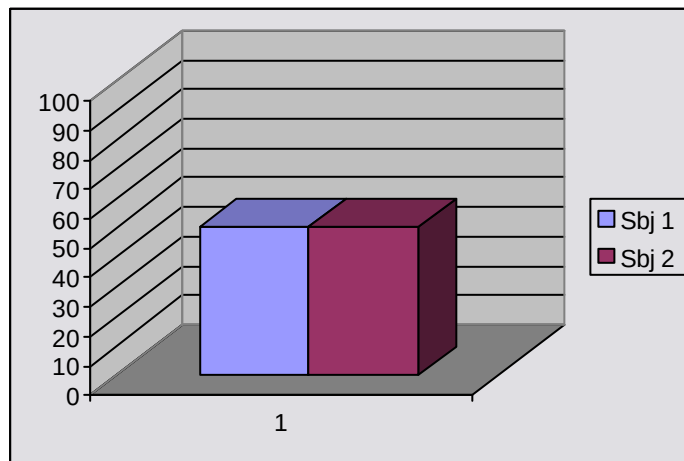
Patient: *bir kapinin kadar uzun

Researcher: Ağaç dağ kadar yüksek ama merdiven

Patient: *binanın kadar yüksek.

The statistical findings of the production of bare postpositions are illustrated in figure 2 below. It is observed that the production of the bare postpositions are at chance level in both patients, with the same score of 50%.

Figure 2: The statistical illustration of the production of the bare postpositions



Patient 1: 50%

Patient 2: 50%

The situation indicates that, although postpositions belong to the functional category of closed-class words, they are still applicable by the Turkish Broca's aphasic patients at chance level. It is not only the word category itself but the functional role is also determinant in the retrieval of morphemes.

Although Turkish postpositions belong to the same category as prepositions, unlike Indo-European languages, they also carry a lexical/semantic content. To conclude, as opposed to the definitions of agrammatism, closed-class words in Turkish are not problematic as much as they are in Indo-European languages.

4.3.1.1.2. Condition 2: Case-marked Postpositions and Postpositions Taking Case-marked Complements

Case-marked postpositions are the possessive marked postpositions. They have a nominal stem which is attached first a possessive suffix (which shows person agreement with the complement noun phrase) and then an oblique case marker (dative, locative or ablative). Noun + POSS + OBL. Case-marked postpositions and postpositions taking case-marked complements of the patients are shown in table 2:

Table 2: Case-marked Postpositions and Postpositions Taking Case-marked Complements

Case-marked Postpositions		Patient 1		Patient 2	
		correct	incorrect	correct	incorrect
Sentence 1	Comp.case	*			*
	postposition	*		*	
Sentence 2	Comp.case	*		*	
	postposition	*		*	
Sentence 3	Comp.case	*		*	
	Postposition	*		*	
	Postpos. case				
Sentence 4	Comp.case	*		*	
	Postposition			*	
	Postpos. case		*		
Sentence 5	Comp.case	*		*	
	Postposition	*		*	
	Postpos. case				
Sentence 6	Comp.case	*		*	
	Postposition	*		*	
	Postpos. case				

Concerning the overall 6 sentences, it is observed that both Patient 1 and Patient 2 performed 5 correct and 1 incorrect sentences. Patient 1 misproduced the case of the postposition itself, rather than the case of the postposition's complement. For example:

Researcher: Çocuk okulun önünde bekliyor ama adam

Patient: *arabanin önü bekliyor

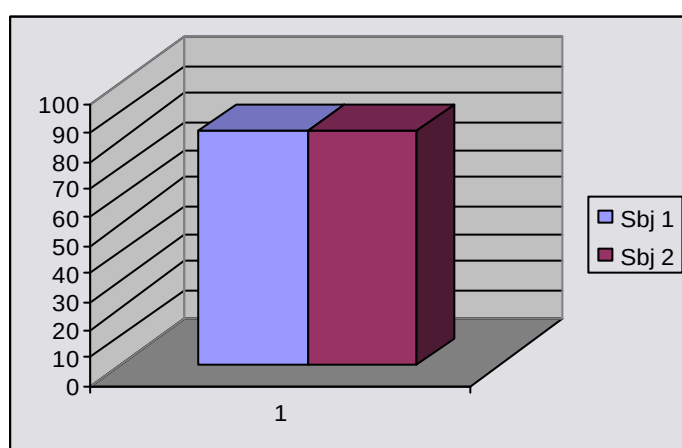
On the other hand, Patient 2 made an error in producing the (dative) case of the complement of the postposition:

Researcher: Adam parka dogru yürüyor ama kadın

Patient: *bir arabayla dogru yürümüstür

Both patients performed no errors with the postpositions, they had a problem with the case of either postposition or the complement in just one of the test sentences. The statistical illustration of the production of case-marked postpositions and postpositions taking case-marked complements is shown in figure 3.

Figure 3: The statistical illustration of case-marked postpositions and postpositions taking case-marked complements



Patient 1: 83.3 % Patient 2: 83.3 %

With only one error sentence out of 6 sentences, both patients performed a score of 83.3 % which is at above chance level. The situation is contradictory to the definitions of agrammatism, since Turkish patients have no problems with postpositions of closed class words or with case inflections of the functional category.

4.3.1.2. Part B, Inflectional Morphology

4.3.1.2.1. Interview

The production of the inflectional morphology in Turkish Broca's aphasic patients are elicited by a short interview, and the findings are evaluated with respect to noun and verb paradigm respectively.

4.3.1.2.1.1. Patient 1

4.3.1.2.1.1.1. Noun Paradigm

During the interview, patient 1 used 15 nouns in which 7 of them are only case inflected. Though the patient made no errors in producing noun inflections, it is because she performed a limited language production with limited use of nouns where she avoided complex noun constructions. All the possible inflections of the noun paradigm are shown in the table, and the ones used by the patient are illustrated under the related column:

Table 3: Noun Paradigm Inflections of Patient 1

Stem	Plural	Possessive	Case
kız			
oglan			
ev			+de (locative)
banyo			+ya (dative)
Yer bez		+i	+ne (dative)
yıl			
tedavi			
türbe			+ye (dative)
köprü			
Sali gün		+ü	
ev			+de (locative)
memleket			+e (dative)
ay			
kız			
köy			+de (locative)

4.3.1.2.1.1.2. Verb Paradigm

Throughout the interview, Patient 1 performed 19 verbs. She presented a good maintenance of basic noun inflections such as negative, tense, person and number. Still, her speech was generally nonfluent, with appropriate use of a restricted set of verb

paradigm morphology. The illustration of the verb paradigm inflections produced by Patient 1 are given in Table 4 below which shows all the possible inflections of the verb paradigm. The ones used by the patient is illustrated under the related column:

Table 4: Verb Paradigm Inflections of Patient 1

Stem	Nonfinite	ability	negative	tense/aspect	modality	person -number
ugras				(i)yor		uz
yap				ar		sin-iz
otur				(u)yor		uk
git				(i)yor		Ø (3 rd p. sing.)
git			mi	yor		Ø (3 rd p. sing.)
git				ti		m
takil				di		m
kay				di		m
ol				du		
gör				dü		m
git				ti		m
gel				(i)y		ik
git				(i)y		ik
yap					a(y)	im
otur	up					
dur				(u)yor		um
git	mek					
ol				du		
kal				di		Ø (3 rd p. sing.)

4.3.1.2.1.1.3. Ungrammatical and Omitted Elements

The inflectional errors of patient 1 are illustrated below. However, these errors are few and do not reflect the total loss of morphology, rather the retrieval problem in accessing the required morpheme as in the examples:

R: Güzel yemek yapar misiniz?

P1: Yaparsiniz. (error of person and number inflection of the verb)

R: Ankara’da mi oturuyorsunuz?

P1: Bura oturuyoruk. (omission of locative case inflection)

R: Kaç yıldır burada oturuyorsunuz?

P1: Sekiz yıl. (omission of the postposition “dir”)

R: Yazları Ankara’da mi geçiriyorsunuz?

P1: Evde (omission of the verb)

R: Memlekete gidecek misiniz?

P1: Memlekete gitmeyi düşün... (omission of the tense, person and number inflections of the verb)

4.3.1.2.1.2. Patient 2

4.3.1.2.1.2.1. Noun Paradigm

It was clearly observed that, Patient 2 performed a better speech production during the interview, both in terms of the number and the complexity of the nouns he used. Of the 37 nouns he performed, 17 were inflected. The overall inflections he performed include 2 plural, 2 possessive and 13 case inflections. His most complex noun structure includes 2 postnominal suffixes after the stem as in the case “anne-m-in”. The nominals and their inflections produced by Patient 2 is illustrated in Table 5 as follows:

Table 5: Noun Paradigm Inflections of Patient 2

Stem	Plural	Possessive	Case
üniversite			
elektrik mühendisi			
Yıldız üniversitesi			
Mühendislik fakültesi			
Ardahan			
Ankara			da
Bilecik			
Anne		m	
Istanbul			a
Istanbul			a
Anne		m	in
Üniversite			de
İlkokul			
Istanbul			a
İlkokul			a
Üniversite			
Ankara			ya
Kız			
Üniversite			
Lise			
ev hanımı			
Pihti			
Gece			
Gazi			ye
Doktor			
Yıl			
Hanım			la
Ay			
Konusma			yi
Kitap			
Roman			
Televizyon			
Maç			a
El			
Ayak	lar		
Çocuk	lar		i

4.3.1.2.1.2.2. Verb Paradigm

Though his speech was effortful and nonfluent, Patient 2 performed totally 33 verbs. It was observed that he managed the production of negativity, tense, modality, person and number inflections appropriately. His most complex verb structure includes 4 postverbal suffixes after the stem as in the case “dersen”. The verb paradigm inflections performed by Patient 2 during the interview are illustrated in Table 6 as follows:

Table 6: Verb Paradigm Inflections of Patient 2

Stem	Nonfinite	ability	negative	tense/aspect	modality	person -number
ol				du		m
dog				du		m
git				ti		k
ol				du		
ol				du		
çalış				(i)yor		um
yas(a)				(i)yor		um
ol				du		
git				ti		Ø (3rd per.sing.)
basl(a)				(i)yor		Ø (3rd per.sing.)
basl(a)				(i)yor		um
oku				du		m
bitir				di		m
gel				di		m
git				(i)yor		lar
di				yor		lar
ol				du		
götür			me			n
de				di		m
git				ti		k
bil			m	(i)yor		um
çalış				ti		k
git				mis-ti		Ø (3rd per.sing.)
ver				di		k
çalış				ti		m
oku				du		m
oku				yor-du		m
oku				mus-tu		m
ist(e)				(i)yor-du		m
git				(i)yor		um
izl(e)				(i)yor		um
gönder				ir		im
bil			m	(i)yor		um
de				er	se	n

4.3.1.2.1.2.3. Ungrammatical and Omitted Elements

The errors of patient 1 can be illustrated as follows:

R: Memleketi ziyarete gidiyor musunuz?

P2: *Bilecik...dogma orasi. (dogum yerim/ error in nominalization and omission of direct object Noun).

*Ben Istanbul+a annemin yanındaydim. (substitution of the locative case with inappropriate dative case inflection).

*İlkokul dersin Istanbul+a baslıyor. (substitution of the locative case with inappropriate dative case inflection).

*İlkokula Istanbul+a baslıyorum. (substitution of the locative case with inappropriate dative case inflection and also inappropriate use of tense).

*İstanbul+a okudum. (substitution of the locative case with inappropriate dative case inflection).

*Üniversite bitirdim ondan sonra Ankara'ya geldim. (Omission of the accusative case)

R: Çocuklarınız var mı, okula gidiyorlar mı?

P2: *Biraz kız var. (Bir kızım var/ inappropriate substitution of the determiner and omission of the possessive noun inflection)

*...lise Anadolulu. (Anadolu lise/)

R: Bos vakitlerinizde neler yapıyorsunuz?

P2: *Televizyon var. (Televizyon seyrediyorum/ Omission of the verb).

R: Tatile gidecek misiniz?

P2: *Benim el bir de ayaklar biraz var. (el, ayak çalışmalarım var/ omission of the object noun)

R: Ne zamandır tedavi görüyorsunuz konuşma için?

P2 : * biraz çalıştık, kendisi 3-4 ay yurt dışı gitmişti

It is observed that, although patient 2 has an effortful speech with several errors of inflections, he did not reveal a telegraphic speech. He generally tended to evade complex constructions which led him to the use of unusual and incoherent expressions. His errors do not reflect a loss in the operation of morphology, but rather a problem in accessing the required morphemes, due to the focal brain damage.

4.3.1.2.2. Cookie-theft Picture Narration

4.3.1.2.2.1. Noun Paradigm

The analysis of the data concerning the spontaneous speech of the two Broca's aphasic patients reveals that, Turkish agrammatics perform a disjointed speech by using limited number of words with pauses in between, and uncompleted sentences. However, the overall speech of the patients were not telegraphic, due to the production of closed-class words and the use of bound inflectional morphemes both in noun and in verb paradigms, contradicting the universal characterization of agrammatism.

Speech samples of the two patients representing the appropriate use of the inflectional morphology in Noun Paradigm can be illustrated as follows;

Patient 1:

- ? Kurabiye kutusu (stem+definite object marker)
- ? Sandalyeden düşüyor. (stem+ablative case)
- ? Oğlanın yanında kız duruyor. (stem+genitive case, postposition)
- ? Önünde lavabo. (postposition)

Patient 2:

- ? Biraz mutfaktan, mutfakta olan bahsedelim.(ablative and locative case)
- ? Annesi, ... kadın suyu açmış, ... su aşağıya tasmış. (possessive, accusative case, dative case)
- ? Çocuklar sandalyenin üstünde. (pluralization, genitive case, postposition)
- ? Perdeler-i sarı. (stem+pluralization+possessive)
- ? Yıldız üniversitesi, mühendislik fakültesi (definite object marker)

- ? Kadın el-**in-e** tabak almış. (stem+possessive +dative case)
- ? Su **asagaya** tasmış. (postposition)
- ? mutfakta olan çocuk**lar**. (stem+pluralization)
- ? kullandığı manzaralar. (stem+pluralization)
- ? Perdeler**i** sarı. (stem+pluralization+ accusative case)

4.3.1.2.2. Verb Paradigm

As further inflections in verb paradigm, the following speech samples can be cited:

Patient 1:

- ? Oğlan kurabiye kutusu alı**yor**. (stem+tense+ø morpheme for 3rd per.sing)
- ? Kız duru**yor**. (stem+tense+ø morpheme for 3rd per.sing)
- ? Tabak kirlen**miş**. (stem+tense+ø morpheme for 3rd per.sing)
- ? Lavabo tikan**mış**. (stem+reflexive+tense+ø morpheme for 3rd per.sing)
- ? Lavabo tasi**yor**. (stem+tense+ø morpheme for 3rd per.sing)
- ? Sandalye**den** düşüyor. (stem+ablative case+ø morpheme for 3rd per.sing)
- ? Ev **görünüyor**, park **görünüyor**. (stem+passive morpheme+tense+ø morpheme for 3rd per.sing)

Patient 2:

- ? Kadın....yıkamaya başla**mış**. (postposition, tense+ø morpheme for 3rd per.sing)
- ? Kurabiye almaya çalış.... (stem+postposition)
- ? Kadından.... bahsedel**im**. (stem+modality+ 1st per. plural)
- ? Kadın suyu aç**mış**. (stem+tense+ ø morpheme for 3rd per.sing)
- ? Su tas**mış**. (stem+tense+ ø morpheme for 3rd per.sing)
- ? Kadın tabak al**mış**. (stem+tense+ ø morpheme for 3rd per.sing)
- ? Bunlar....iki tane çocuk olu**yorlar**. (stem+tense+ ø morpheme for 3rd per. + plurality)
- ? Bu...yol olab**ilir**. (stem+ ability+ ø morpheme for 3rd per.sing)
- ? Kulland**ığı** manzaralar. (stem+relative clause inflection+ ø morpheme for 3rd per.sing)

- ? Mutfakta olan çocuklar. (stem+relative clause inflection)

4.3.1.2.2.3. Ungrammatical and Omitted Elements

Although they are rare, the ungrammatical use of inflectional morphology in both of the patients can be illustrated as follows:

Patient 1:

- ? Kız haberi yok. (omission of the accusative case as direct object marker)
 ? Kirlenmis. (omission of the subject NP)
 ? Tikanmis, tasiyor. (omission of the subject NP)

Patient 2:

- ? Biraz mutfakta olan çocuklar ve bayan bahsedelim. (omission of the ablative case)
 ? Kadinin suyu açmis. (inappropriate substitution of nominative case with genitive case)
 ? Kadinin eline tabak almis. (inappropriate substitution of nominative case with genitive case)
 ? Kek almaya çalis..... (omission of verb inflections after the stem)
 ? Sandalyeye üstünden yere..... (inappropriate substitution of genitive case with dative case)
 ? Disarida bir ev gösteriyor bir de ağaç gösteriyor. (omission of passivization)

Both of the patients revealed a very short and effortful narration of the picture. Yet, they performed the basic noun and verb inflections and postpositions properly. They both made morphological errors of omission and substitution, yet, these errors do not reflect the loss of the functional category in grammar. It is observed that their speech was restricted but not telegraphic as opposed to the basic definition of agrammatism.

4.3.1.2.3. Errors of Noun and Verb Paradigm Inflections

The errors of both Patient 1 and Patient 2 observed by the morphological analysis concerning the interview and picture narration tasks are shown in Table 7 as follows:

Table 7: Error Chart of Noun and Verb Paradigm inflections of patient 1 and Patient 2

Errors	Omission		Substitution	
Noun Paradigm	Patient 1	Patient 2	Patient 1	Patient 2
Case	2	3		7
Possessive.		1		
Number				
Sbj. Noun	1			
Obj. Noun	1	1		
Total	4	5		7
Verb Paradigm				
Verb	1			
Nonfinite				
Ability				
negative				
Tense/aspect	1	1		
Modality				
Person/number	1	1	1	
Total	3	2	1	0

4.3.2. Experiment 2: Movement Operations

4.3.2.1. Non-canonical Word Order

4.3.2.1.1. Condition 1: Base Order (SVO)

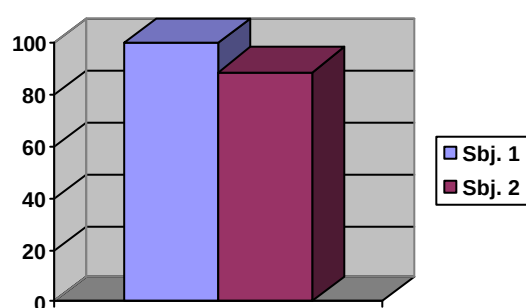
The performance of Base Order sentences of the two patients are illustrated in Table 8 below. It was clearly seen that both of the patients performed perfectly well without any problem.

Table 8: Illustration of Condition 1: Base Order (SVO), (P1: patient 1, P2: patient 2), (n=2)

SOV	Correct	Incorrect
Sentence 1	P1 P2	
Sentence 2	P1 P2	
Sentence 3	P1 P2	
Sentence 4	P1 P2	
Sentence 5	P1 P2	
Sentence 6	P1 P2	
Sentence 7	P1 P2	
Sentence 8	P1 P2	
Sentence 9	P1	P2

The base order performances of the patients are statistically illustrated by Figure 4 which reveals that both of them scored at above chance level.

Figure 4: Statistical Illustration of the Base Order Condition (SOV)



Patient 1: 100% Patient 2: 88.9%

It is apparent that both of the patients do not have problems in the production of base order. This finding is parallel to the basic definitions of agrammatism.

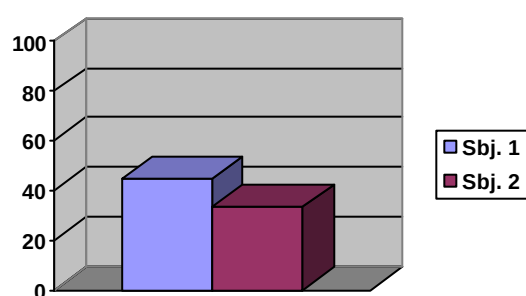
4.3.2.1.2. Condition 2: Object Scrambling (OSV)

The performances of Object Scrambling condition of the two patients are illustrated by Table 9 below. It was observed that both patients have problems in constructing the derived order required.

Table 9: Illustration of Condition 2: Object Scrambling (OSV), (P1: patient 1, P2: patient 2), (n=2)

SOV	Correct	Incorrect
Sentence 1	P2	P1
Sentence 2		P1 P2
Sentence 3	P1	P2
Sentence 4	P2	P1
Sentence 5		P1 P2
Sentence 6	P1	P2
Sentence 7	P1 P2	
Sentence 8	P1	P2
Sentence 9		P1 P2

Figure 5: Statistical Illustration of the Object Scrambling (OSV) Condition



Patient 1: 44.4 % Patient 2: 33.3 %

The object scrambling performances of the patients are statistically illustrated by Figure 5 above. It is clearly noticeable that both of the patients have scored at below chance level. This finding is parallel to the basic definitions of agrammatism stating that Broca's aphasic patients have problems in derived word order constructions.

4.3.2.1.3. Condition 3: Postposing (SVO)

The performances of postposing (SVO) condition of the two patients are illustrated by Table 10 below. It was observed that both patients have severe problems in producing the required noncanonical word order. Both of them managed to produce only the two of

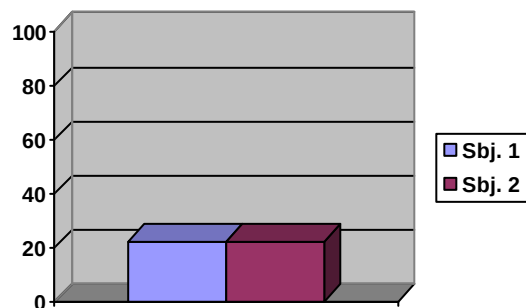
the nine sentences properly. However, the rest seven sentences were incorrect in both of the patients.

Table 10: Illustration of Condition 3: Postposing (SVO), (P1: patient 1, P2: patient 2), (n=2)

SOV	Correct	Incorrect
Sentence 1		P1 P2
Sentence 2	P1	P2
Sentence 3		P1 P2
Sentence 4		P1 P2
Sentence 5		P1 P2
Sentence 6		P1 P2
Sentence 7		P1 P2
Sentence 8	P1	P2
Sentence 9	P2	P1

Figure 6: Statistical Illustration of the Postposing (OVS) Condition

The postposing performances of the patients are statistically illustrated by Figure 6 below. It is clearly noticeable that both of the patients scored at below chance level and this condition presented the lowest scores in both of the patients. This finding is parallel to the definitions of agrammatism as Broca's aphasic patients have severe problems in the production of un-canonical word order constructions.



Patient 1 : 22.2 %

Patient 2: 11.1 %

4.3.2.1.4. Condition 4: Subject Scrambling (OVS)

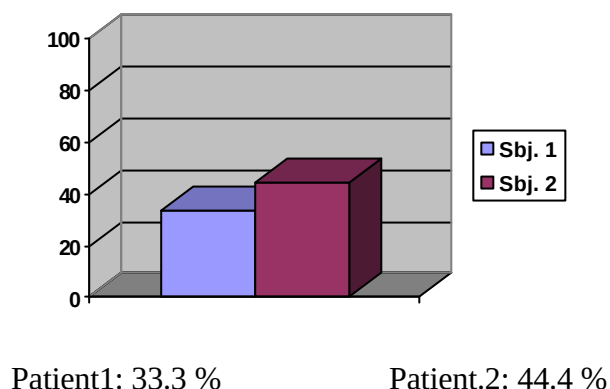
The performances of subject scrambling (OVS) condition of the two patients are illustrated by Table 11 below. It is noticeable that patient 1 presented 3 correct and 6 incorrect sentences, while patient 2 managed the production of 5 of the sentences properly and failed at 4 of them.

Table 11: Illustration of Condition 4: Subject Scrambling (OVS), (P1: patient 1, P2: patient 2), (n=2)

SOV	Correct	Incorrect
Sentence 1	P1 P2	
Sentence 2	P2	P1
Sentence 3	P2	P1
Sentence 4		P1 P2
Sentence 5		P1 P2
Sentence 6	P1 P2	
Sentence 7	P1	P2
Sentence 8	P2	P1
Sentence 9		P1 P2

Figure 7: Statistical Illustration of the Subject Scrambling (SVO) Condition

The subject scrambling performances of the patients are statistically illustrated by Figure 7 below. This condition is significant since both patient scored at below chance level.



4.3.2.2. Transformations

4.3.2.2.1. Condition 1: Relativization

4.3.2.2.1.1. Object Relative Clause (SVO + obj. relative morpheme -DIK)

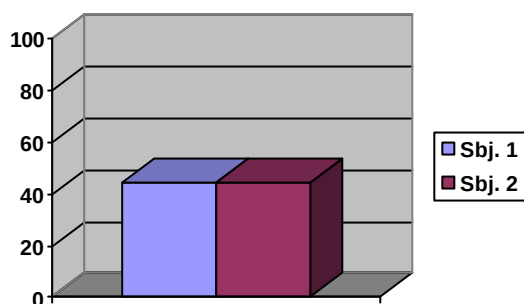
The performance of the object relative clause condition of the two patients are illustrated by Table 12 below. The evaluation of the performances reveal that both of the patients have problems in producing sentences with object relativization. The construction of object relativization in Turkish requires a derivation in the word order, as well as an insertion of a relative morpheme to the verb stem. Therefore, in order to be counted as correct, the patients were required to manage both of the cases. The error in either one of the requirements were considered to be the failure of the whole sentence.

Table 12: Illustration of Object Relative Clause (SVO + obj. relative morpheme - DIK) Condition

Object Relativization		Patient 1		Patient 2	
		correct	incorrect	correct	incorrect
Sentence 1	word-order	*			*
	relative morph.	*			*
Sentence 2	word-order	*		*	
	relative morph.	*		*	
Sentence 3	word-order		*		*
	relative morph.		*		*
Sentence 4	word-order	*			*
	relative morph.	*		*	
Sentence 5	word-order		*		*
	relative morph.		*		*
Sentence 6	word-order		*	*	
	relative morph.		*	*	
Sentence 7	word-order		*		*
	relative morph.		*		*
Sentence 8	word-order	*		*	
	relative morph.	*		*	
Sentence 9	word-order		*	*	
	relative morph.		*	*	

Figure 8: Statistical Illustration of Object Relative Clause condition

The object relative clause performances of the patients are statistically illustrated by Figure 8 below. The number of the correct and incorrect sentences were found to be the same in both of the patients. Therefore, the scoring of both patients were 44.4 % which is at below chance level. This finding is also in line with the definition of agrammatism.



Patient 1: 44.4 %

Patient 2: 44.4 %

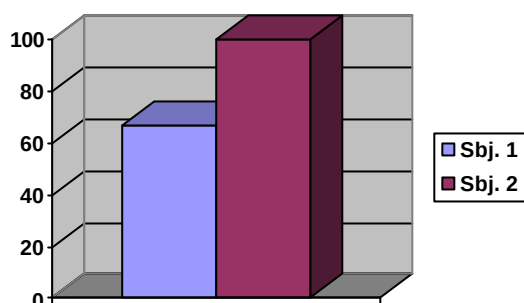
4.3.2.2.1.2. Subject Relative Clause (OVS + subj. relative morpheme -yAn)

The performances of the subject relative clause condition of the two patients are illustrated by Table 13 as follows. The evaluation of the performances reveals that both of the patients were generally successful in producing the relative clause morphology and derived word order appropriately. Patient 1 performed 3 error sentences, while Patient 2 managed all of the sentences correctly.

Table 13: Illustration of Subject Relative Clause (OVS + subj. relative morpheme - yAn) Condition

Subject Relativization		Patient 1		Patient 2	
		correct	incorrect	correct	incorrect
Sentence 1	word-order	*		*	
	relative morph.	*		*	
Sentence 2	word-order	*		*	
	relative morph.	*		*	
Sentence 3	word-order	*		*	
	relative morph.	*		*	
Sentence 4	word-order	*		*	
	relative morph.	*		*	
Sentence 5	word-order		*	*	
	relative morph.		*	*	
Sentence 6	word-order	*		*	
	relative morph.	*		*	
Sentence 7	word-order	*		*	
	relative morph.	*		*	
Sentence 8	word-order		*	*	
	relative morph.		*	*	
Sentence 9	word-order		*	*	
	relative morph.		*	*	

Figure 9: Statistical Illustration of Subject Relative Clause condition



Patient 1: 66.6% Patient 2: 100%

The subject relative clause performances of the patients are statistically illustrated by Figure 9 above as follows. It is quite significant that both of the patients scored at above chance level, though according to the definitions of agrammatism transformational operations should be impaired. Also, this finding indicates a selective impairment of the two types of relative clauses since the object relative clause constructions were found to be impaired in both of the patients.

4.3.2.2.2. Condition 2: Passivization

The performances of the passive condition of the two patients are illustrated by Table 14 below. The construction of passivization in Turkish requires first an insertion of a *by* phrase along with the insertion of a passive morpheme to the verb stem. However, the evaluation of passivization in Turkish is relatively more difficult since the movement operation in question is not overtly observable. Still, the application of movement can be inferred with the help of the apparent production of *by*-phrases with respect to the information that, sentences that do not involve movement operation take no inserted element in between the argument and the verb, so, the insertion of the *by*-phrase which is a PP between the NP and the Verb signals the movement of the Subject NP to the spec.TP position. Therefore, in order to evaluate the achievement of the movement operation concerning the passivization, only the production of the *by*-phrases was considered. The errors of passive inflections attached to the verb stem were considered to be the errors of morphology, but not syntax.

The evaluation of the performances reveals that although they performed errors in passive morphology, both of the patients presented no deficiency in the movement operations (by-phrases). However, in terms of passive morphology, no deficit was observed in Patient 1. Except that she omitted the verb in one of the sentences (sentence 4), the other 8 sentences that she produced were all intact. On the other hand, when the verbal errors of Patient 2 are evaluated, the errors observed can be generalized under 3 conditions that are;

- i. unaccusative,
- ii. Infinitive V forms
- iii. reflexive V forms

Sentence 1: active + unaccusative *	“piyano kadın tarafından çalıyor. ”
Sentence 2: passive v	“köpek adamın tarafından oksaniyor. ”
Sentence 3: passive + infinitive v	“gazete adam tarafından okunmaktadır. ”
Sentence 4: active + infinitive*	“domates bayan tarafından kesmektedir. ”
Sentence 5: active*	“çay adam tarafından içiyor. ”
Sentence 6: reflexive + infinitive*	“kapi çocuk tarafından boyalanmaktadır. ”
Sentence 7: active + infinitive*	“bavul bir bayan tarafından tasimak. ”
Sentence 8: active + infinitive*	“adam tarafından öpmektedir. ”
Sentence 9: active + reflexive*	“kadın çocuğun tarafından islaniyor. ”

What is significant is that, all the error conditions have a similar character with passivization, that is, all of the conditions require the deletion of one of the arguments from the sentence. Also, what is more striking is that, the patient was able to correctly distinguish that the Subject (patient) argument should be deleted (since all the erroneous conditions he performed requires subject deletion), however, he failed at applying the correct strategy; passivization, to delete the subject. This shows that the syntax module of the patient allows him to determine that passivization requires the subject to be moved to the adjunct position, and the object to be raised to the subject position.

Furthermore, since he failed at applying the passive morpheme to the verb, the verb still keeps its accusative case assignment property, however finds no argument there to assign that accusative case. Therefore it is possible to say that the patient's module of assigning accusative case is impaired. He is able to apply passive movement but not able to block the verb's accusative case assignment with passive morpheme. Since accusative is structural type of case, the situation can be generalized so as to say that the patient 2 has problem in structural case assignment.

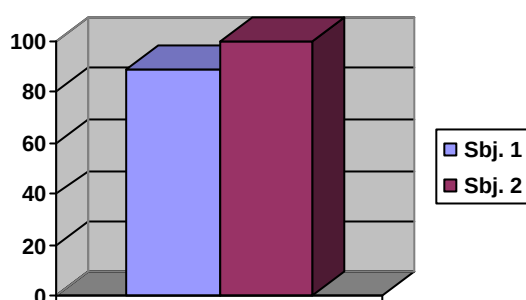
Considering the predictions of case theory (cited in Garcia, 2005:33), knowing that the patient's structural case assignment is impaired, and also remembering that he was above chance in active sentences, it can further be inferred that his inherent case assignment would also be impaired. However, the test sentences involve no inherent case (dative or ablative) in order to test the hypothesis.

Table 14: Illustration of the Passivization Condition

The performances of both patients concerning the passive constructions can be illustrated by table 14 as follows;

Passivization		Patient 1		Patient 2	
		correct	incorrect	correct	incorrect
Sentence 1	by phrase/movement	*		*	
	passive morph.	*			*
Sentence 2	by phrase/movement	*		*	
	passive morph.	*		*	
Sentence 3	by phrase/movement	*		*	
	passive morph.	*		*	
Sentence 4	by phrase/movement	*		*	
	passive morph.		*		*
Sentence 5	by phrase/movement	*		*	
	passive morph.	*			*
Sentence 6	by phrase/movement	*		*	
	passive morph.	*			*
Sentence 7	by phrase/movement	*		*	
	passive morph.	*			*
Sentence 8	by phrase/movement	*		*	
	passive morph.	*			*
Sentence 9	by phrase/movement	*		*	
	passive morph.	*			*

Figure 10: Statistical Illustration of the Passive Movement Condition



Patient 1: 88.9% Patient 2: 100%

The performances concerning the movement operations of passive constructions of the both patients are statistically illustrated by Figure 10 above. It is quite significant that both of the patients perfectly scored (patient 1=88.9%, patient 2= 100%) which is at above chance level. Though they have certain errors in the passive morphology, they were able to apply the required movement operation. Since one of the defining characteristics of agrammatism is the deficiency of the production of the transformational operations, this finding contradicts the general ideas stated in the literature.

4.4. DISCUSSION OF THE FINDINGS

4.4.1. Morphology

It is remarkably observable that the production of bare postpositions are at chance level in both subjects with the score of 50 %. On the other hand, case-marked postpositions and postpositions taking case-marked complements are produced with a score of 83.3 % in both subjects, which represent an above chance level performance, in spite of case inflections. This finding in Turkish agrammatism is contradictory to the universal descriptions of ‘agrammatism’ proposing that Broca’s aphasic patients omit/substitute prepositions that are the members of closed-class words.

The error analysis illustrates that, the production of bare postpositions involves postposition omission, rather than substitution, whereas, the errors in the production of case-marked postpositions involve substitution, rather than omission of cases. However, these errors are quite rare and both subjects perform at least at chance level in both conditions.

According to the ‘Agrammatic Condition’ Hypothesis, it was expectable that the patients would omit the postpositions at S-structure, if they are not heads of the PP. However, Turkish patients presented no omission in the production of postpositions in the tested sentences, where the postposition is not the head but a suffix attached to the head noun;

(1). Çocuk bebek**le** oynuyor.

(2). Adam arabay**la** gidiyor.

Considering the basic noun and verb inflections, both of the Broca’s patients presented a maintenance of basic noun and verb inflections. In Turkish, the stem form of the noun indicates the nominative case. As a result of our analysis, it is observed that both of the patients used this form of the noun appropriately and the other instances of case inflection are also at chance level.

Moreover, it was noticed that, the patients preserve the basic inflections of the verb paradigm as well, such as tense, person and number. All grammatical morphemes occurred in the correct order following noun or verb stems.

Most of the errors made by the patients are omissions rather than substitutions, yet those omissions are semantic gaps rather than ungrammatical constructions. Furthermore, since the omission in Turkish Broca's aphasic patients includes only the inflections but not the verb or noun stem, no telegraphic speech is formed as it is the case in English. The analysis of the data concerning the spontaneous speech of the two Broca's aphasic patients reveals that, Turkish agrammatics perform a disjointed speech by using limited number of words with pauses in between, and uncompleted sentences. However, the overall speech of the patients were not telegraphic, due to the production of closed-class words and the use of bound inflectional morphemes both in noun and in verb paradigms. Therefore, the speech of Turkish Broca's aphasic patients can be generally defined as nonfluent with appropriate use of a restricted set of grammatical morphemes. This result contradicts the universal characterization of agrammatism.

As Mavis (2000: 312) emphasizes, the lack of omissions and/or substitutions in the use of bound morphemes in Turkish Broca's aphasic patients can be explained by the regularity of the morphological system of Turkish. She further states that, the acquisition of nominal markings in Turkish at early ages (15 months) also confirms Jacobson's hypothesis stating, "early acquired language is safe from damages."

To conclude, the morphological findings in defining agrammatism in Turkish contradict the reports of typologically different languages (i.e. English), due to its typological characterization, but goes parallel with Slobin stating (1991:162) that

For Turkish aphasics, difficulties with grammatical morphology do not reflect impairment of a portion of the language system, but, rather reflect retrieval problems. clearly, morphology is not lost, rather, focal brain damage seems to affect the patients' ability to access these morphemes.

As also stated by Slobin (1991: 155),

If agrammatism is defined as the absence of closed-class elements, ...these (Turkish) patients cannot be classified as agrammatic. Turkish by and large, does not have free-standing closed-class morphemes (such as articles, auxiliaries, copula, etc.) that could be detected to produce telegraphic speech.

4.4.2. Syntax

In order to provide with a clear outlook to the situation, the overall syntactic scores performed by both Patient 1 and Patient 2 can be illustrated as follows;

Table 15: Overall Syntactic Scores

Overall Scores	Patient 1	Patient 2
Base Order (SOV)	100 %	88.9 %
Object Scrambling (OSV)	44.4 %	33.3 %
Postposing (SVO)	22.2 %	11.1 %
Subject Scrambling (OVS)	33.3 %	44.4 %
Relativization		
Object Relatives	44.4 %	44.4 %
Subject Relatives	66.6 %	100 %
Passivization	88.9 %	100 %

The syntactic analysis shows that both of the subjects performed at above chance level in SOV base order (subject 1, 100% and subject 2, 83.3%) as it is expected. However, the other conditions of derived word orders such as object scrambling, postposing, and subject scrambling were all at below chance level in both of the patients. Among all the un-canonical word order conditions SVO type was the most erroneous one, presenting a score of 22.2% in both of the subjects.

In accordance with Bastiaanse and Koekkoek (2002), it is noticable that syntactic complexity is the critical factor in agrammatic language production, and as it was predicted, sentences with NP movement is more difficult than sentences with basic word-order.

It is observed that, in both of the patients, there is a tendency of choosing the basic word order, also, the production of the sentences with basic word order are at above chance level, whereas, both subjects have problems in producing the required moved orders, namely, object scrambling, postposing and subject scrambling, with appropriate case assignments.

Moreover, the observed fact, that both of the subjects have problems in the production of object scrambling, postposing and subject scrambling conditions, contradicts the report of Grodzinsky (1995) (cited in Garcia 2005:14) who claims, X° movement seems not to be impaired in agrammatism since those mentioned un-canonical word orders require NP movement which is a type of head-to-head movement (X°).

Furthermore, 'Trace Deletion Hypothesis', claims that in agrammatism, all traces (in theta positions) of movement are deleted from S-structure representation, and consequently, theta role transmission to the moved constituent could not take place and structures that contained traces would be problematic in semantically reversible sentences. Considering this, it is expected that the production of sentences 8, and 9 would be impaired in all conditions, except the canonical base order. In object scrambling and postposing, the moved object NP therefore will lack its accusative case, whereas, in subject scrambling, an impairment in the nominative case of the moved subject NP can be observed. However, it is observed that Patient 1 could not achieve movement in 3 sentences, out of 6, while in the other 3 of the sentences of NP movement, she managed to assign the required case to the moved NP, and provided the theta role assignment. The performance of Patient 1 therefore is at chance level with a score of 50%. On the other hand, Patient 2 failed only in 1 of the (NP moved) sentences, but achieved proper NP movement and theta role, with appropriate case assignment, and therefore performed at above chance level with a score of 83.3%. This remarkable finding, which is not in line with the Trace Deletion Hypothesis, may be the concern of a further and a more extensive study with the arguments 1) Scrambling may not involve movement or 2) Trace Deletion Hypothesis may not be valid.

It is significantly noticeable that, within the production of relativization, performances of both subjects in object and subject relative clauses are selectively impaired, where, the patients performed at chance (Patient 1) and above chance (Patient 2) levels in subject relative clauses, while both performed at below chance level in object relative clauses.

It is known that the two types of (object and subject) relative clauses involve syntactically different constructions in that, in subject relative clauses, the NP is the subject of both the relative clause (RC) and the inflectional phrase (IP), whereas, in object relative clauses, NP is the object of the relative clause (RC) and subject of the inflectional phrase (IP). This leads to the fact that the construction of the Subject Relative Clauses is more akin to the base order, and therefore less complex. Similarly, Grodner and colleagues (2002), Hsiao and Gibson (2003), Temperly (2003) and Traxler and colleagues (2002) put forward that the processing of Object Relative Clauses is more difficult even in the normal native speakers.

The findings of the Turkish Broca's aphasic patients are also in line with this argument. A further and more extensive study can be conducted to analyse the structures of the two types of relative clauses both in processing and in production with evidence from Broca's aphasia.

On the other hand, according to the 'Derived Order Problem Hypothesis' (DOP-H), (Bastiaanse and von Zonneveld 2006:140-141) that captures both the comprehension and production deficits in Broca's aphasia, Broca patients have difficulties in understanding and producing sentences with derived word order which is the result of a movement operation, whereas the basic word order (of the language) remains intact. This hypothesis, thus, claims that, sentences with derived subjects such as passives, or derived objects as in object scrambling will be more difficult to produce and parse than sentences containing the basic word order.

Concerning the DOP-H, it is expected that scrambling and passivization, though they are movements at different levels (scrambling in PF, passivization in LF), involve a parallelism in that, both would be impaired in Broca's aphasic patients.

However, during the analysis, a significant discrepancy has been observed among the two conditions; passivization and object scrambling; In both of the patients, passivization was at above chance level, while object scrambling is at below chance level. This situation indicates a selective impairment between scrambling and passivization constructions, which leads us to consider either one of two situations.

1. Since it is certain that passivization requires movement, scrambling is not movement.
2. Since passivization is a -movement, scrambling is a -bar movement.

According to the Trace-Deletion hypothesis, aphasic patients could not manage to form movement operations as they delete the case, therefore if scrambling was not movement, the aphasic patients would perform no problem in producing them, while they would have problems with the passive constructions. However, the situation is observed to be the opposite as the patients are quite successful with passive constructions and unsuccessful with scrambling. Therefore, it can be stated that scrambling is also movement but differ in its movement type from passivization. Since passivization involves a -movement, scrambling is a -bar movement. On the other hand, tree-pruning hypothesis claims that agrammatic patients have problems with producing the higher nodes of the syntactic tree. It is apparent that the selective impairment between scrambling and passivization supports the tree-pruning hypothesis as the patients are observed to manage the production of passivization which involves a lower node than scrambling constructions in the syntactic tree.

CHAPTER V: CONCLUSION

The modularity hypothesis of language considers language as an independent module separate from other cognitive systems such as problem solving, reasoning or memory. Therefore, aphasia which is an impairment that affects only the language faculty of patients without any influence on other cognitive modules, provides an excellent source of information to analyze the processing of unimpaired adult language. That is why aphasiology has an important role in explaining the relationship between language and the brain. However, as Garcia (2005:1, 3) emphasizes, aphasiology needs a theoretical background regarding the structure of the language on which it can rely, and theoretical linguistics offers such a support. In this respect, defining agrammatism cross-linguistically is crucial, in order to derive at a universal account of aphasia as a syndrome.

Considering the studies related with aphasiology, it is observed that the prominent issues of impairment in defining agrammatism as a syndrome appear to emphasize three main symptomatic aspects as 1) the tendency to avoid movement-derived non-canonical sentence structures and transformations, 2) omission of the closed-class function words and 3) omission and/or substitution of noun and verb paradigm inflections. Therefore, in our study, the obtained data have been analyzed with respect to these three criteria in order to derive at a definition of agrammatism in Turkish, concerning morphological and syntactic domains.

On these grounds, this study aims at describing 'agrammatism' in Turkish Broca's aphasic patients, in line with the basic symptoms reported, presenting a cross-linguistic contribution to the issue. Defining agrammatism linguistically and cross-linguistically as a syndrome would also contribute to the therapeutical methods in clinical domain both theoretically and practically. The study, as a case report, investigates the language production of Turkish Broca's aphasic patients, with respect to fundamental morphological and syntactic characteristics of agrammatism, therefore involves a two dimensional analysis consisting of two main experiments.

Within the morphological dimension, the production of closed-class (function) words with respect to postpositions and inflectional morphology of both noun and verb paradigms is observed, whereas, the syntactic dimension investigates the production of non-canonical word order variations, namely, base-order, object scrambling, postposing and subject scrambling, and movement operations (transformations) such as relativization and passivization.

As for the morphological characteristics of agrammatism in Turkish, one of the research questions that this study aimed to observe was: Do Turkish Broca's aphasic patients omit closed-class words? It was remarkably observed that the production of bare postpositions, which are the representatives of Turkish closed-class words are at chance level in both of the patients with the score of 50%. Furthermore, case marked postpositions and postpositions taking case marked complements are produced with a score of 83.3% in both patients which represents an above chance level performance. Due to the fact that typologically, Turkish does not have free-standing closed-class morphemes (such as articles, auxiliaries, copula, etc.), this finding concerning agrammatism in Turkish is contradictory to the universal descriptions of agrammatism which proposes that Broca's aphasic patients generally tend to omit/substitute prepositions that are the members of closed -class words. In this study, it is observed that, in the production of bare postpositions, Turkish patients had errors of omission, whereas they tend to substitute the required case inflection in producing case-marked postpositions. Yet, these errors are observed to be quite rare and both patients performed at least at chance level in both conditions. Moreover, the content of postpositional phrases in Turkish seems to be lexical rather than functional. Since the postpositions in Turkish as opposed to prepositions in English, involve a lexical (semantic) nature rather than functional (syntactic), they are not lost from the morphological modules of the patients, but rarely omitted (rather than substitution). However, a further study can be carried out to investigate the nature of postpositional phrases in Turkish with respect to their categorial properties. A comparative study among language types is needed to evaluate their functional content. Although postpositions are considered as the representatives of Turkish function words, their functional value may be lower than the prepositions in Indo-European languages and this fact may affect the testing and

evaluation of the criteria in defining agrammatism universally.

Other research questions concerning the morphological analysis were as follows: “Do Turkish Broca's aphasic patients have problems in grammatical inflections?” and “Is there a selective impairment among noun and verb paradigm inflections?” Similar to closed-class words, the inflections of both noun and verb paradigms are not lost but sometimes substituted.

Due to the retrieval problems caused by the brain damage, it is observed that Turkish patients sometimes have difficulties in accessing them, but the inflectional morphology exists in their morphological modules. Furthermore, no selective impairment is observed among the production of noun and verb paradigm inflections.

Consequently, it can be stated that morphological findings of agrammatism in Turkish appear to vary from other languages, due to its typological characterization, and should be reconsidered in defining agrammatism as a symptom.

On the other hand, the syntactic characterization of agrammatism in Turkish Broca's aphasic patients represents a rather parallel pattern with the findings of other languages. The analysis reveals that both of the patients performed at above chance level in SOV base order as it was expected. However, the other conditions of word order were all at below chance level in both of the patients. Among all conditions, SVO postposing type was the most erroneous one, presenting a score of 22% in both of the patients. It can be stated that, derived ordered sentence types are found to be more difficult for the patients since they involve syntactically more complex constructions. This finding corresponds to the research question “Are Turkish Broca's aphasic patients able to produce uncanonical, scrambled and derived word order structures?”

It is also observed that both of the patients have problems in the production of object scrambling, postposing and subject scrambling conditions which are instances of head-to-head movement (X^0) that require the movement of NP. This finding contradicts the report of Grodzinsky (cited in Garcia, 2005:14) claiming that X^0 movement seems not to

be impaired in agrammatism.

As for the transformations, it was significantly noticed that, within the production of relativization, performances of both patients in object and subject scrambling are selectively impaired, where the patients performed at chance (P1) and at above chance (P2) levels in subject relative clauses, while both performed at below chance level in object relative clauses.

Another research question which the current study tried to answer was that about the selective impairment among different types of movement operations. It is known that the two types of (subject and object) relative clauses involve syntactically different constructions in that, in subject relative clauses, the NP is the subject of both the relative clause (RC) and the inflectional phrase (IP), whereas in object relative clauses, the NP is the object of the RC and subject of the IP.

This leads to the fact that the construction of subject relative clauses is more akin to the base order and therefore less complex. Similarly, Grodner and colleagues (2002), Hsiao and Gibson (2003), Temperly (2003) and Traxler and colleagues (2002) put forward that the processing of object relative clauses is more difficult even in the normal native speakers.

The findings of the Broca's aphasic patients in this study, are also in line with this argument. However, a further and more extensive study can be conducted to analyze the structures of the two types of relative clauses both in processing and in production with evidence from Broca's aphasia.

On the other hand, in the production of movement operations concerning passive constructions, no deficit was observed in both of the Turkish patients though they have errors in the passive morphology. According to the 'Derived Order Problem Hypothesis' (DOP-H) (Bastiaanse and von Zonneveld 2006:140-141) that involves both the comprehension and production deficits in agrammatism, Broca's aphasic patients have problems in understanding and producing sentences with derived word order as a result

of movement operations, whereas the basic word order (of the language) remains intact. Therefore, the above chance level performances of the two Turkish patients in passivization reflect a controversy concerning the issue. Moreover, the fact that both of the patients in our study presented a selective impairment among scrambling and movement operations, brings out the query whether scrambling involves movement or not, which may be the concern of a further and more extensive study. Yet, it is predictable that scrambling involves an $\bar{a}$ -bar movement, and the selective impairment among scrambling and passivization supports both the trace-deletion and the tree-pruning hypotheses.

Finally, for the overall characterization of the Turkish agrammatic language production, it can be stated that, the analysis of the data concerning the free speech samples of the two Broca's aphasic patients reveals that Turkish agrammatics perform a disjointed speech by using limited number of words with pauses in between, in which they produce incomplete sentences. However, the overall characteristic of their speech is not telegraphic, due to the production of closed-class words and the use of bound inflectional morphemes both in noun and verb paradigms. It can be stated that, this fact contradicts the universal definitions of agrammatism.

To conclude, it can be stated that agrammatism is a universal phenomenon; however it has a parametrical nature, varying according to the typology and the structure of the language that it appears in. This is a descriptive study observing the basic characteristics of agrammatism in Turkish. However, on the basis of these generally observed findings, the study should further be carried into an explanatory dimension concerning the basic theoretical considerations and by testing the various hypotheses proposed so far.

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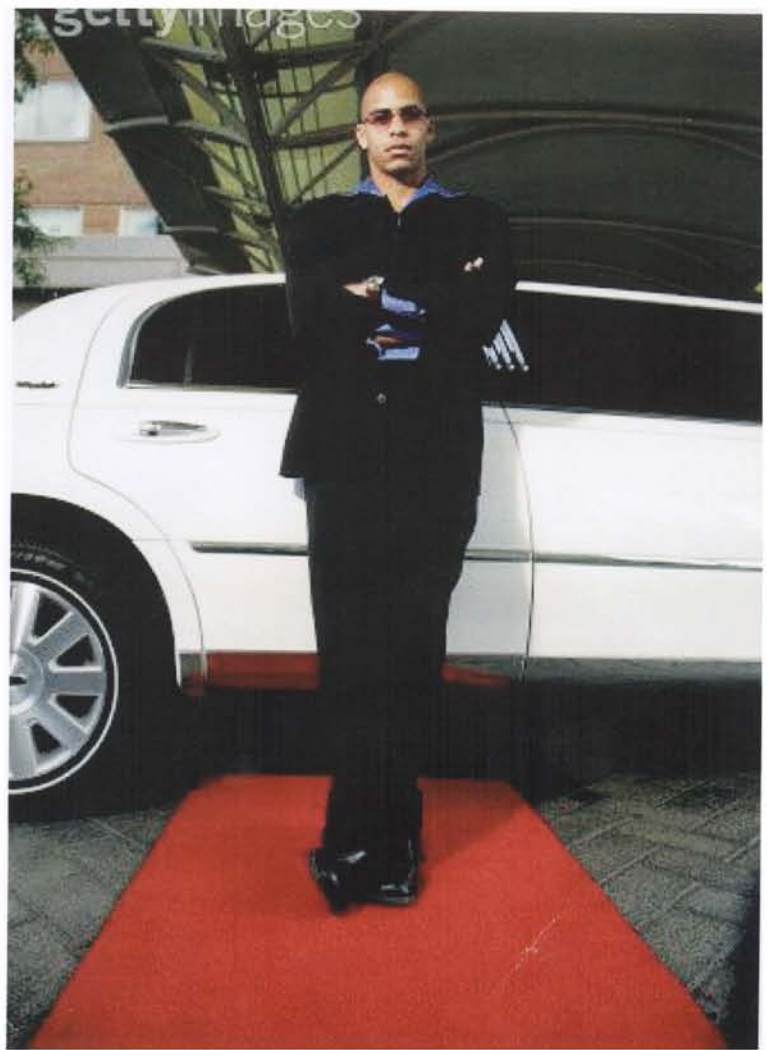
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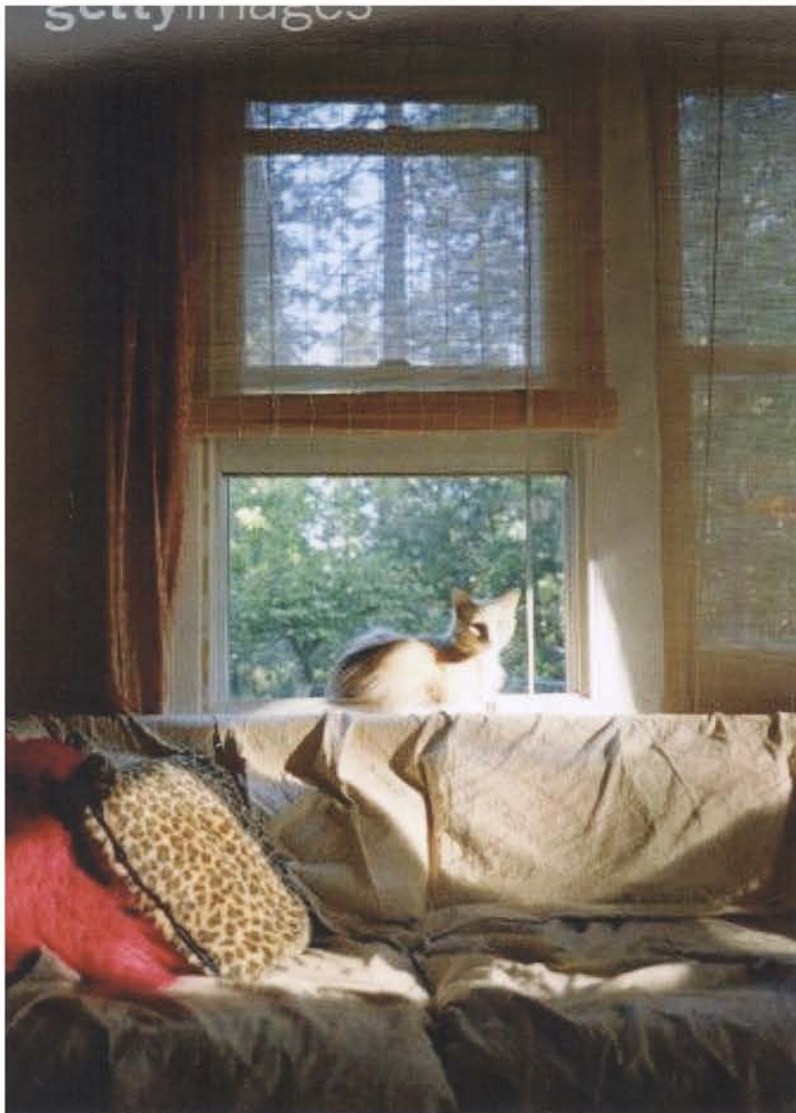


Appendix A: Test Pictures for Postpositions









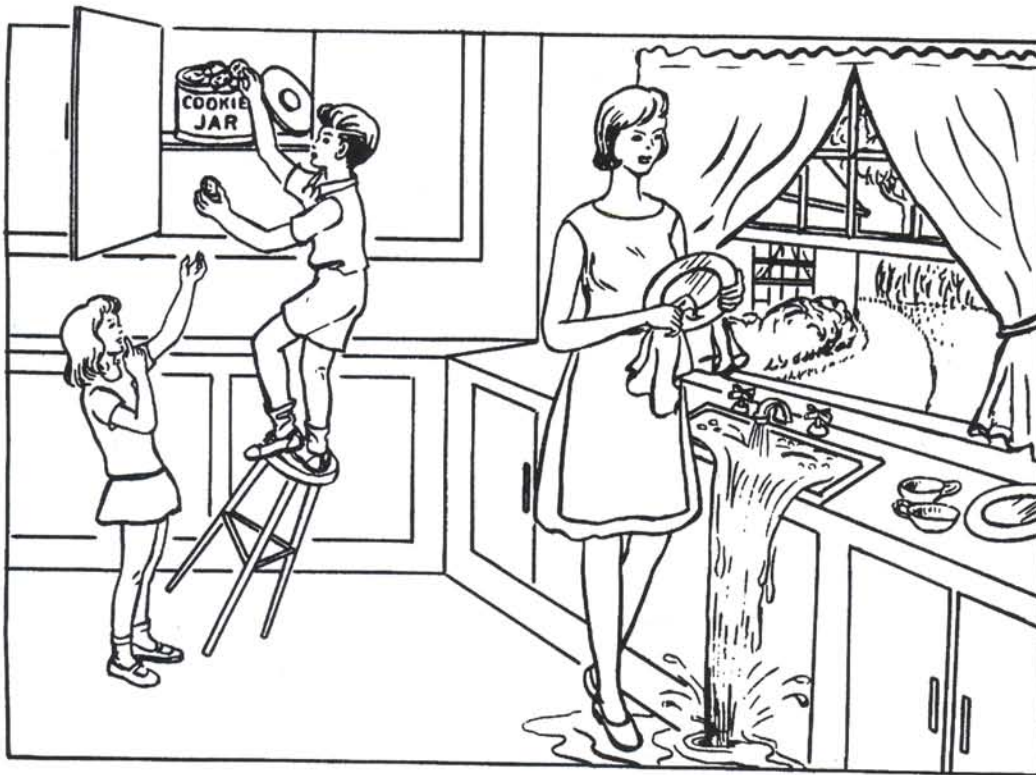
Appendix B: Interview Questions

Interview

1. Adınız nedir?
2. Hangi yılda doğdunuz? past
3. Eğitim durumunuz nedir?
 - Hangi okuldan mezun oldunuz? past
 - İlkokulu nerde okudunuz? past
4. Çalışıyor musunuz?
 - Ne zaman emekli olacaksınız? future
 - Ne zaman emekli oldunuz? past
5. Aslen nerelisiniz?
 - Ankarada mı yaşıyorsunuz?
 - Ne zamandır Ankara'da yaşıyorsunuz?
 - Memleketi ziyarete gidiyormusunuz?
 - En son ne zaman gittiniz? Past
 - Tekrar ne zaman gideceksiniz? future
6. Evli misiniz?
 - Çocuklarınız var mı?
 - Kaç yaşındalar?
 - Çocuklarınız okuyor mu?
 - Kaçınıcı sınıfa gidiyorlar?
 - Hangi okula gidiyorlar?
 - Ne zaman karne alacaklar?
 - Eşiniz ne iş yapıyor? /eşiniz güzel yemek yapıyor mu?
7. Anne-babanız hayattalar mı? / nerede yaşıyorlar?/ Sağlıkları yerinde mi?
8. Hangi nedenle rahatsızlandınız? past
9. Ne zamandır tedavi görüyorsunuz?
10. Hastanede mi kalıyorsunuz?
11. Ne kadar kalacaksınız hastanede? Future
12. Ne zaman taburcu olacaksınız? Future
 - taburcu olduktan sonra işe başlayacak mısınız tekrar?
13. Genelde boş vakitlerinizi nasıl değerlendirirsiniz?
14. Bu gün neler yapacaksınız mesela? future
15. Tv dizilerini takip ediyor musunuz?
 - Hangilerini en çok beyniyorsunuz?
 - Bu akşam ne seyredeceksiniz tv'de? future
16. Yazın ne yapmayı planlıyorsunuz? future

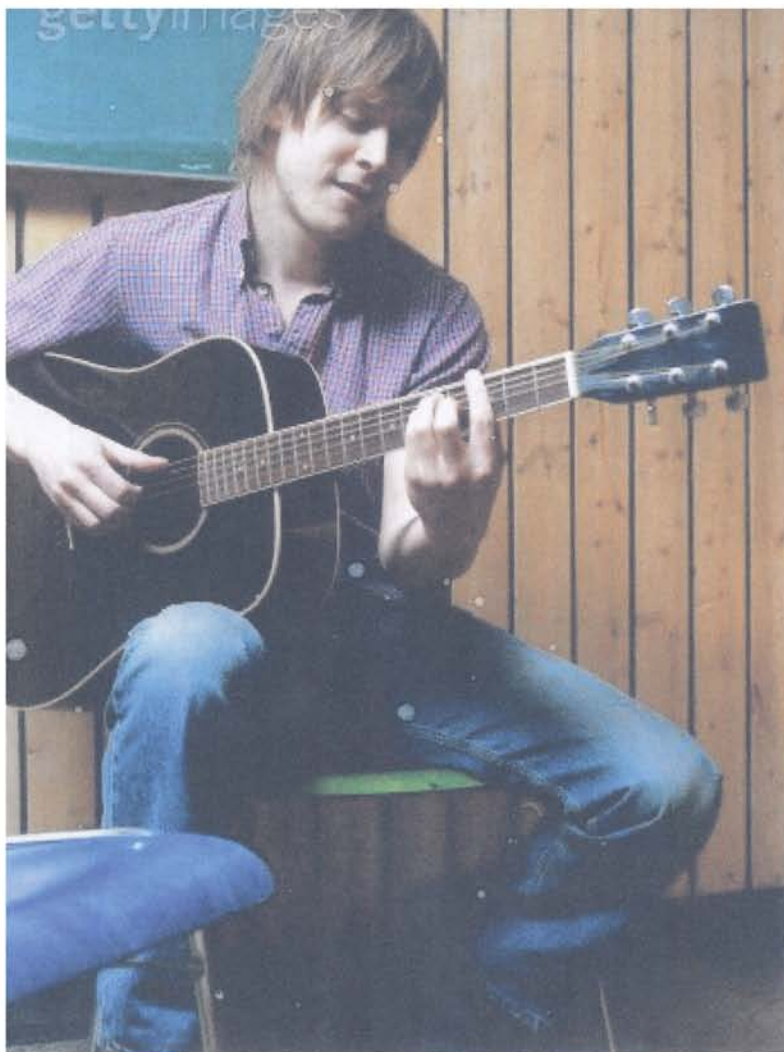
Appendix C: Cookie Theft Picture for Free Narrations

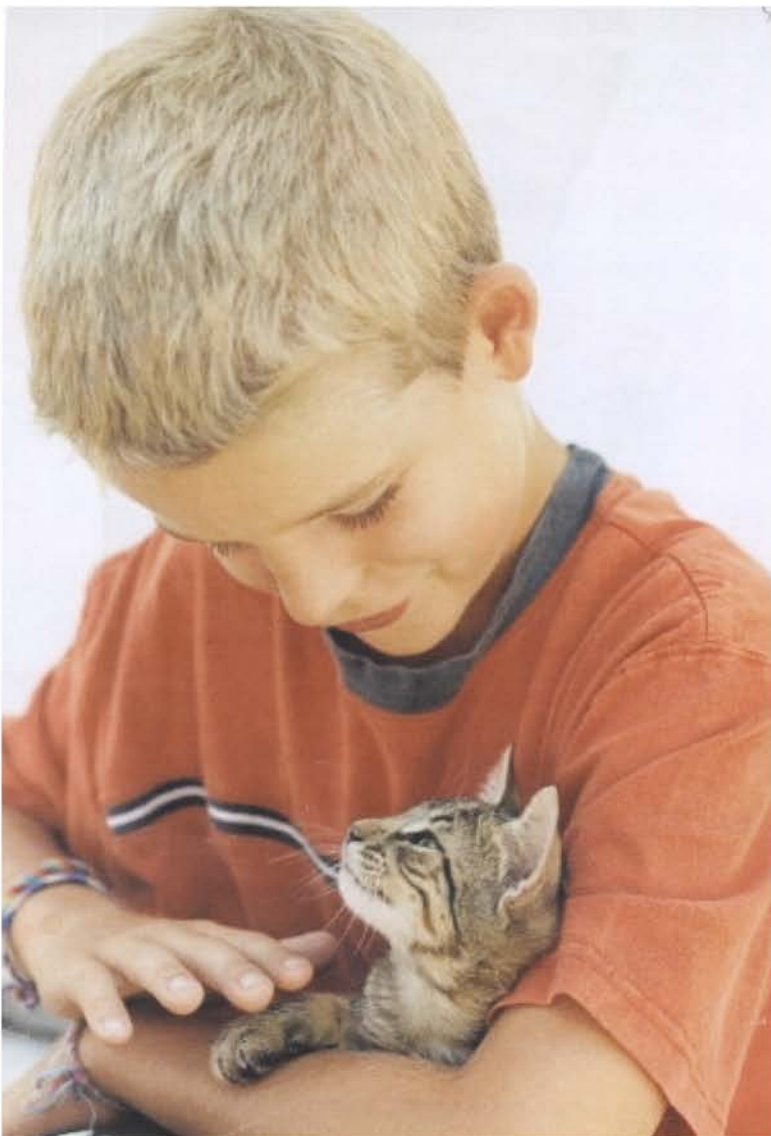
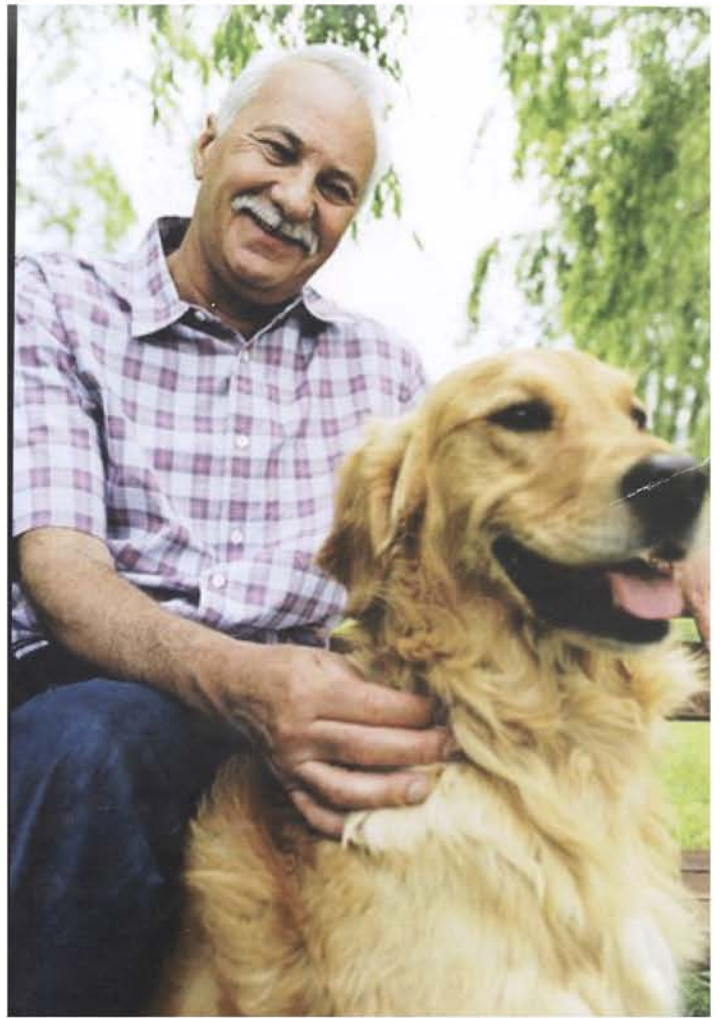
Cookie Theft picture





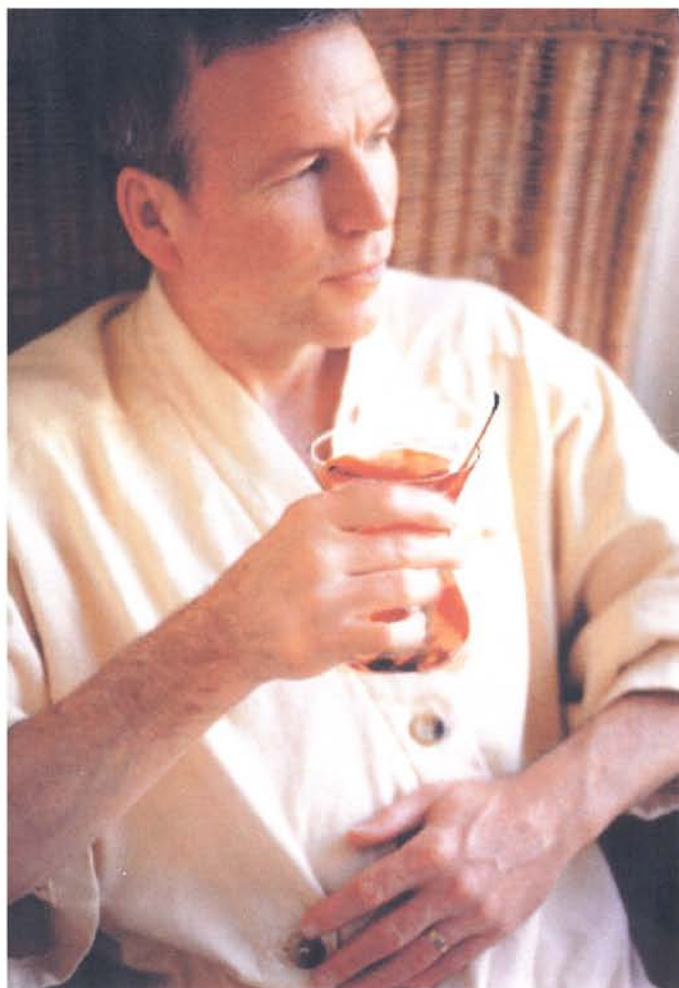
Appendix D: Test Pictures for word order variations and Movement Operations

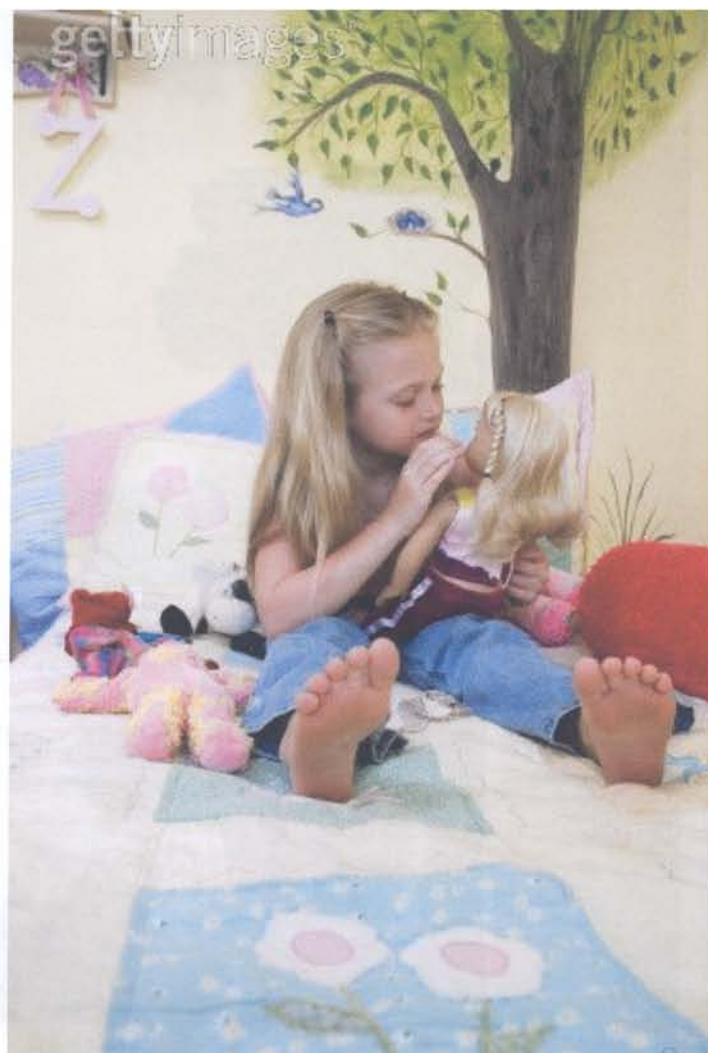






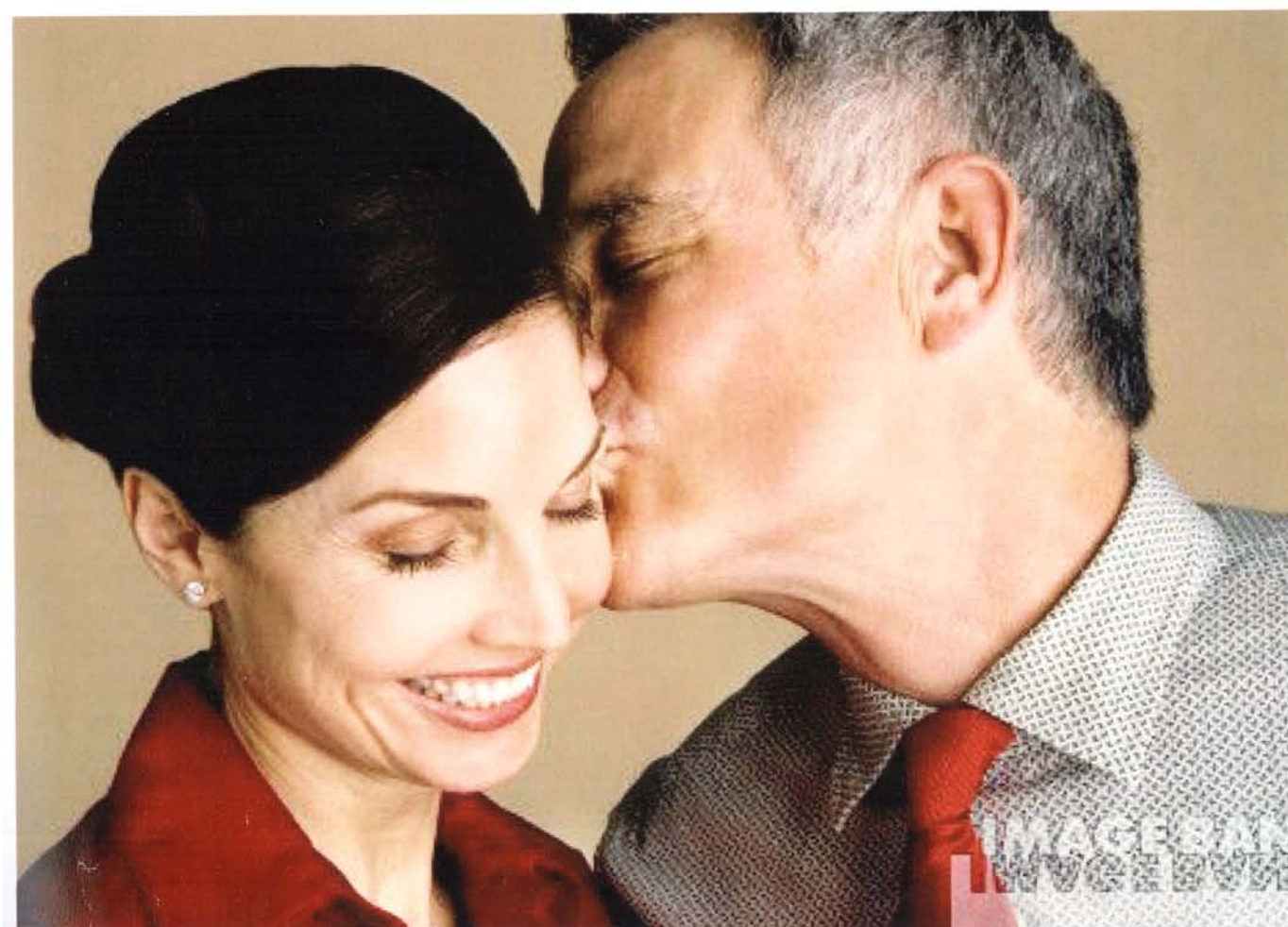


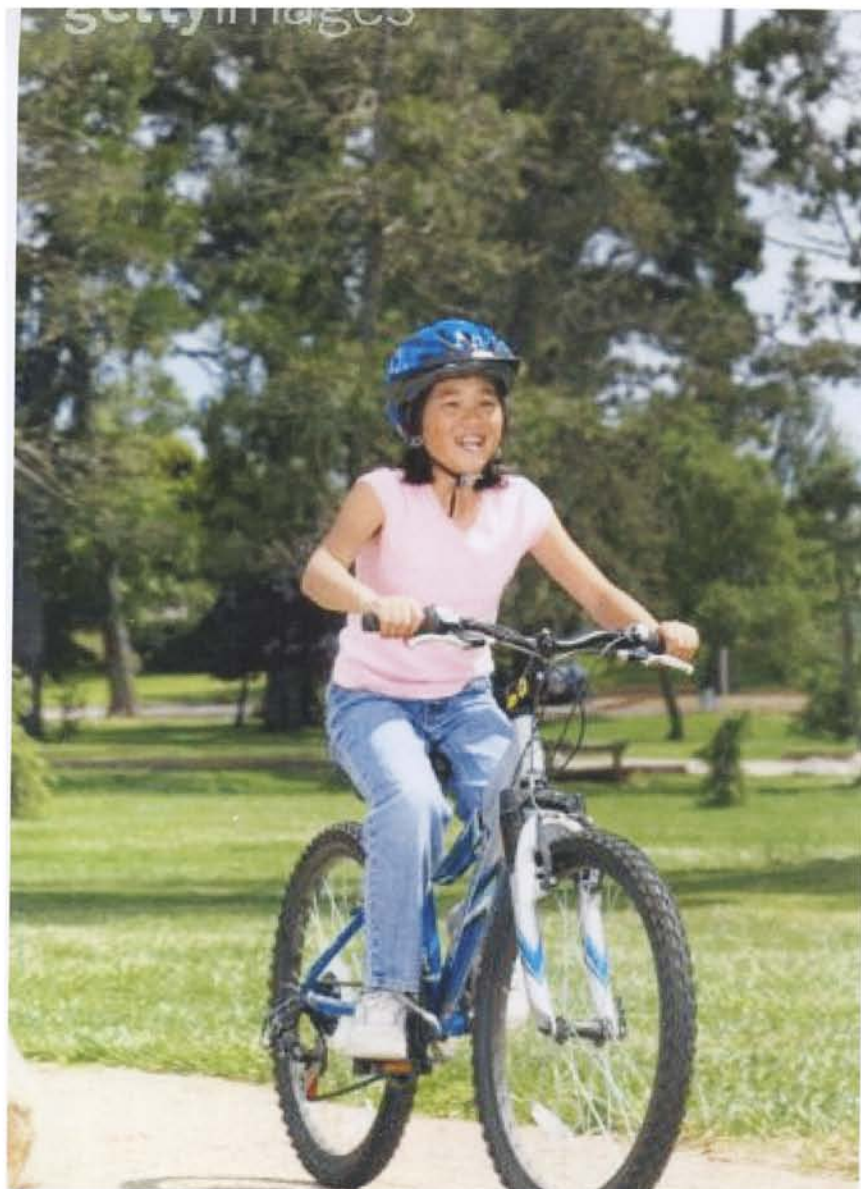






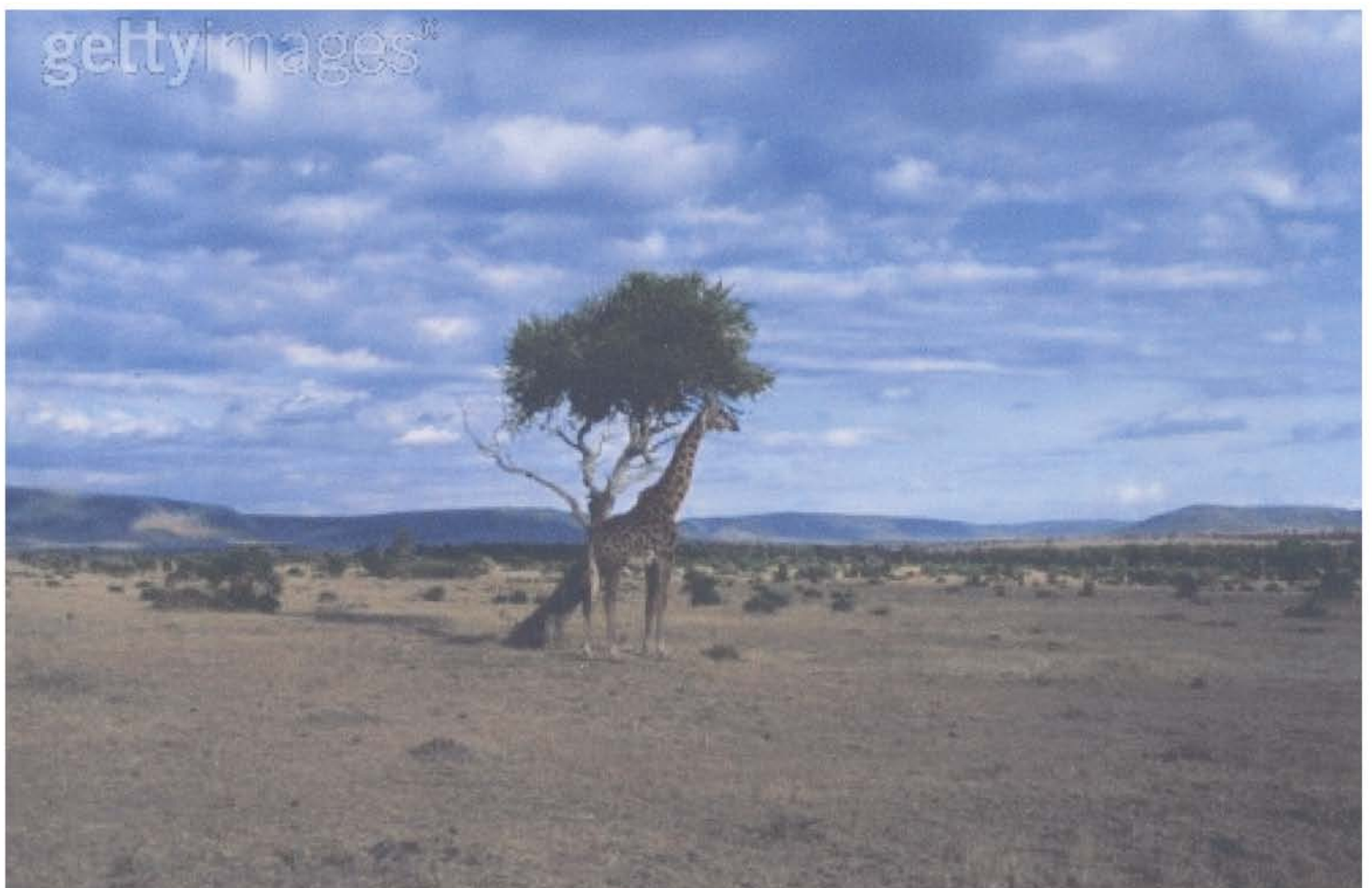




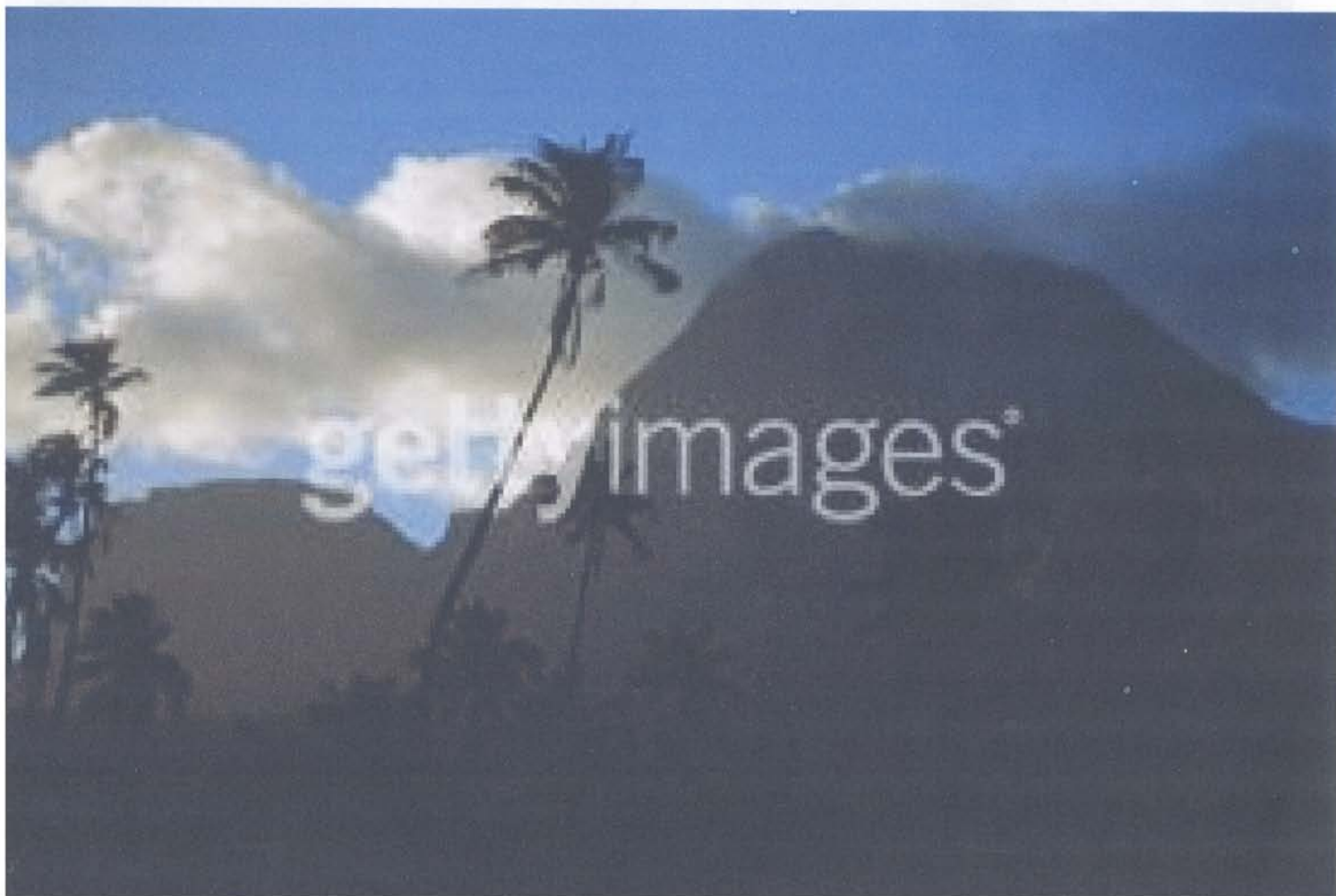














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