Hacettepe University
Graduate School of Social Sciences
Department of English Linguistics

ROLE OF PROPOSITIONS IN COMPREHENSION AND MEMORY FOR TURKISH LANGUAGE

Elif Başıbüyük

Master's Thesis

Ankara, 2008

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KABUL VE ONAY

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ÖZET

BAŞIBÜYÜK, Elif, *Türk Dilinde Önermelerin Anlama ve Hafızadaki Rolü*, Yüksek Lisans Tezi, Ankara, 2008.

Bu psikodilbilimsel çalışmada, dili kavramada ve hafızada önerme kuramının geçerliliğinin belirlenmesi amaç edinilmiştir. Ayrıca, tümceleri kavrama ve belleğe aktarma sürecinde anlambilimsel bilginin sözdizimsel bilgiden daha ön planda olup olmadığı ve bu tür bilgilerin bu süreçteki yeri belirlenmeye çalışılmıştır. Bu belirtilen sorulara yanıt bulmak için iki adet deney yapılmıştır. İlk deneyde birbirinden bağımsız Türkçe cümleler kullanılarak çoktan seçmeli tanıma testi uygulanmıştır. Bu testte deneklerin verdikleri cevaplar nicel olarak incelenmiş, birtakım sayısal verilere ulaşılmıştır. Çalışmada yer alan ikinci deneyde ise ipucuyla hatırlama metodu kullanılmıştır. Birtakım birbirinden bağımsız tümceleri okuyup inceleyen deneklerin daha sonra, verilen ipuçlarının yardımıyla anımsadıkları her şeyi yazmaları istenmiş ve bu verilerin yüzdesi ve sıklığı hesaplanmıştır.

Bu deneylerden elde edilen bilgilere dayanarak şu sonuçlara varılmıştır. Denekler çoğunlukla tümcelerin anlamını ve ana fikrini anımsamış ve (a) basit/ bileşik, etken/edilgen gibi sözdizimsel özelliklere; (b) tümcenin kelimesi kelimesine aynı olan doğrusal sözcük dizimine; (c) tümce içinde kelimelerin birbirine olan yakınlık veya uzaklığına önem vermemiştir. Daha da önemli olarak, deney 2 deki tümceleri okuyan deneklerin, bu Türkçe tümceleri önermeler biçiminde kavrayıp hafızaya aldıkları gözlenmiştir. Böylece önermelerin varlığına dair güçlü kanıtlar bulunmuş ve önerme kuramının Türkçede geçerli olduğu belirlenmiştir.

Anahtar Sözcükler

Psikodilbilim, anlama, uzun süreli bellek, kısa süreli bellek, önermeler

ABSTRACT

BAŞIBÜYÜK, Elif, *Role of Propositions in Comprehension and Memory for Turkish Language*, Master's Thesis, Ankara, 2008.

In this psycholinguistic study it is aimed to identify the validity of propositional theory in language comprehension and memory by studying Turkish sentences. It is also aimed to determine whether semantic information is prior to verbatim and syntactic information in the process of comprehension and memory for sentences and to indicate their role. In order to find answers to these two research questions mentioned above, two experiments are carried out. In the first experiment, a multiple choice recognition task is employed with isolated Turkish sentences. In this task, subjects' answers are analyzed quantitatively. In the second experiment, cued recall task is carried out. Subjects studying a set of isolated sentences were asked to recall what they remember with the help of cue word and the frequency and percentage of the recalls of subjects are calculated.

The results obtained from the experiments indicate that subjects mostly remember the gist of sentences and do not pay much attention to (a) syntactic features such as simple/complex, active/passive, (b) the linear word order, verbatim and (c) linear proximity of words in isolated Turkish sentences. More importantly, it has been observed that subjects studying the sentences in experiment 2 have comprehended and memorized these isolated Turkish sentences in terms of propositions. Thus, strong evidence to the reality of propositions is found and the propositional theory is verified in Turkish language.

Key Words

Psycholinguistics, comprehension, long-term memory, short-term memory, propositions

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1. INTRODUCTION

This section includes the necessary information constructing the background to the study. Firstly, general information related with cognition, cognitive processes, language comprehension and memory which are part of such processes and propositions[1] is given in this chapter. Then, statement of the problem, research questions and methodology of the study are presented. The methodology part deals with the sample, method and the procedure of the study. Finally, organization of the study takes place in this section.

1.1 COGNITION

Cognition has been an important subject matter to many fields in science since the second half of the 20th century and is getting more popular in the new millennium. The word cognition is based on the Latin word 'cognitio'. This word is formed by the combination of words, co + gnoscere, which stand for "together" + "know" (Ashcraft 1998: 4). Accordingly, it could be briefly defined as state of knowing. In a long definition, cognition stands for "the collection of mental processes and activities used in perceiving, learning, remembering, thinking and understanding, and the act of using those processes" (Ashcraft 1998: 5). Thus it is the collection and usage of all processes in the mind.

The studies and attempts to understand human cognition go back to the Ancient Greeks. Philosophical thoughts on the nature of human mind have been carried out by the philosophers such as Plato, Aristotle and Descartes. For instance, these attempts would be understood from the popular utterance of Descartes "I think, therefore I am" (Ashcraft 1998: 23). Then few studies on human cognition have been made under the field of philosophy until the 19th century. The first systematic studies on cognition began in the late of 1800s by the psychologist Wilhelm Wunt. In his laboratory studies, the basic cognitive processes such as memory and attention were investigated (Pollatsek & Rayner 1998: 352). Then during the period when behaviorism movement reached its peak in the first half of the 20th century, studies on cognition came to a halt due to the impossibility of the reliable observation of what happens in mind. After this period, the

[1] Psycholinguistic term for proposition is gist or message.

cognitive revolution began in the beginning of the second half of the 20th century with rationalism and mentalism movements which flourished as a reaction to behaviorism and with the advances in technology. The questions such as "How does human mind work?" and "What is the nature of cognition and cognitive processes?" emerged. Since then studies on cognition is getting more popular in the new century. Cognition has become an important subject matter for many fields of science such as psychology, linguistics, computer science, neuroscience and biology. Also new branches which are only related with cognitive studies under the already available fields have emerged such as cognitive psychology, cognitive linguistics.

Cognitive psychology simply studies the cognitive processes of the mind. It investigates to learn more about the nature of both lower level and higher level cognitive activities. Despite not being related wholly to cognition, one major subject of psycholinguistics is "to understand and explain the cognitive structures and processes involved in the use of language" (Cutler & Klein 2005: 1). Cognitive linguistics which is another branch of linguistics like psycholinguistics deals with the relation between cognition and language.

Another branch of psychology which studies the cognitive processes and gathers information about cognitive function by studying people with brain disorders is cognitive neuropsychology (Rapp ed. 2001: 3).

The field of computer science attempts to simulate the human cognitive processes on computers and make programs which forms the branch study of 'artifical intelligence'.

Unlike the fields above, the main concern of the fields, neuroscience and biology, is to the brain. The cognitive processes of the mind are studied with the aim of identifying the parts and functions of brain.

Finally, the currently established discipline, cognitive science, is a multidisciplinary field that studies cognition from the perspectives of all of the fields and branches discussed above.

Consequently, as it is seen, cognition has been a popular subject studied in a large quantity of fields. In order to analyze cognition thoroughly, the analysis of the representation of knowledge and the analysis of cognitive processes that operate on those representations are required (Singer 1990: 4). Before dealing with cognitive processes, a modeled overview of the cognitive system, which is also called 'human information processing system', has been indicated in Figure 1 (Ellis & Hunt 1993: 9).

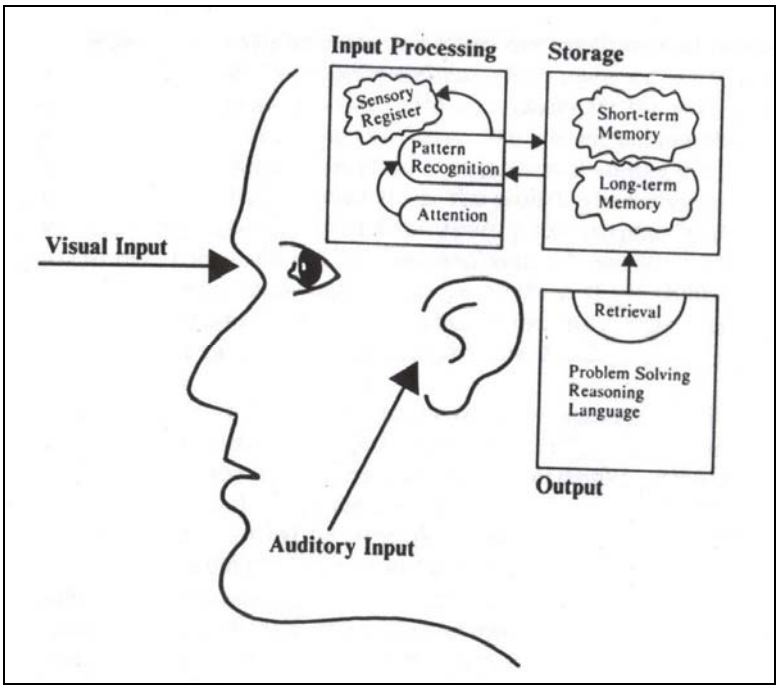


Figure 1. A General Model of Human Information Processing System

Figure 1 provides a framework for understanding human cognition. According to this figure, there are three basic parts; input processing, storage and output. Environmental information accesses to the human mind as visual and auditory input. In the component of input processing, the human mind firstly processes the input selected with attention and transferred into the mind from outside. Then this selected input is recognized and kept in sensory store very briefly and sent to storage component. In the memory part, short term memory keeps and processes the input for a few seconds and sends the necessary information to long term memory where the information would be kept permanently. In the third stage, the information in storage is transformed into output by problem solving, reasoning or language. Briefly human cognition works in the way indicated in Figure 1. Then what are cognitive processes that constitute cognition?

1.1.1 Cognitive Processes

Human cognition consists of a number of cognitive processes. Humankind is able to think, understand and communicate with the help of the cooperative work of cognitive processes. These processes could be divided into two levels for better understanding and analysis. These are lower level and higher level cognitive processes.

Attention, perception and pattern recognition are among lower level cognitive processes demanding less process in the mind. Attention is a cognitive process involving in the input processing component in the human information processing system. It is the ability to focus on certain sensory stimuli coming from sensory register and to disregard others, or the ability to concentrate on a mental event.

Pattern recognition is the ability to match the information received from sensory store or register with the information from long term memory (Carroll 1994: 52). In this process, the gathered information is either integrated into an already structured schema or used to form a new schema in permanent memory.

Perception is the mental process which detects and interprets the sensory stimuli with the cooperation of the mental processes, attention and pattern recognition. How we perceive the information from environment is one of the main concerns in the fields of psychology, linguistics and cognitive science.

Apart from lower cognition processes, there are also several higher level cognitive processes. These are memory, mental imagery, reasoning, decision-making and problem solving. These processes are identified as more complex and need cooperation of two or more cognitive processes.

The first one is memory. It constitutes the storage component of human information processing. That’s one of the most vital processes in human cognition. All of the necessary information, schemas for most of other cognitive processes to work properly are held in memory. Roughly it has two types of memory, short term and long term memories. Short term memory or the recently preferred name, working memory, stores limited information came from input processing component, processes it and sends to

long term memory. Long term memory which is also known as permanent memory holds our knowledge of the world, the information that is gathered from the past and is not active currently (Carroll 1994:51). Memory studies are especially common in the field of psychology. Other fields such as linguistics, neuroscience and cognitive science are also interested in learning the insights of this process.

Mental imagery which is another cognitive process refers to "mental representations of things that are not physically present" (Matlin 1989: 149). With this process, we are able to form the images of 'cognitive maps' which are mental maps representing the world or the environment we live according to our thoughts or beliefs. Mental imagery studies have been mainly the concern of clinical psychology and this process has also been used in cognitive therapy (Matlin 1989: 187).

Reasoning is one of those among higher level cognitive processes. Reasoning is the ability to draw conclusions from known facts. Thus this is a process related with logical thinking and a conscious process like problem solving.

Finally in 'problem solving', individual meets a difficult task or problem whose solution is not known yet, or it is not obvious. Problem solving is a series of activities on a human's mind for him to handle the problem (Ashcraft 1998: 383). This process like reasoning is a different mental process with different methodology and research areas. Firstly Gestalt psychologists have been interested in the nature of problem solving, and then it has been a major concern among computer scientists due to their attempts to make problem solving programs in computer.

The cognitive processes have been discussed above. When we analyze the Figure 1, other activity which takes place in the output component of human information processing apart from reasoning and problem solving is language. It is not among the other cognitive processes but it is constituted from the combination of many cognitive processes such as attention, perception and memory.

As we have limited opportunity to gather adequate information about cognition, studying the output of cognition, namely language would be a great way to reveal the secrets of cognition.

1.2 LANGUAGE

Language is the most common and used knowledge of human kind. Primitive or advanced, in every society the most observable feature is language which is used in both communication and thinking. Consequently, different aspects of language have been studied in different disciplines from linguistics, anthropology to psychology or computer science. Thus, several definitions of language have been made depending on the switch of interests.

According to linguistics, it can be defined as a symbolic system for thinking and communication. According to anthropology or sociology, it is just a tool for communication between people, namely social community. Since language is seen as the output of human cognition in this study, it should be described from a cognitive perspective. Accordingly, "language is the real- time perception and production of a temporal sequence of discrete, structured symbolic units" (Craft & Cruse 2004: 2). Thus, language is an output of the coordinated work of several cognitive processes from the aspect of psycholinguistics, cognitive linguistics, cognitive psychology and cognitive science. Within this point of view, language would be studied within the subfields indicated in Table 1 (Singer 1990: 3).

Table 1 Subfields of the Psychology of Language

Some Subfields of the Psychology of Language

	Information	
Language Function	*Physical*	*Abstract*
Input	Speech Perception	Comprehension
Output	Articulation	Production

According to Table 1, language would be studied from two aspects. In the first aspect, language function would be researched. It includes the input and output of language. Another aspect is related with information's being either physical or abstract. In the physical component, speech perception, which is the input of language, "refers to the process whereby the listener's auditory system translates sound vibrations into a string of sounds, which listener perceives to be speech" (Matlin 1989: 253). Articulation;

however, means the production of speech sounds by speech organs. Thus it is the physical output of language. The reason why they are grouped as physical is that they can be observable processes and they are constituted via the certain organs of human.

Abstract component; however, is related with the mind processes which are not directly observable and contains a much more complicated process. Comprehension refers to the analysis and understanding of messages coming from physical component in the cognitive level. Thus it is related with the input of language. Another abstract part, production is a stage leading to the process of articulating speech. It is a cognitive activity which formulates, conceptualizes the speech in the mind beforehand. Then the prepared speech is transmitted to articulation.

From a cognitive point of view, the main focus in psycholinguistics or cognitive linguistics has been on the abstract component including language comprehension and production.

1.2.1 Language Comprehension and Production

During the first half of the 20th Century, language production was studied by behaviorists while language comprehension studies were put aside. The reason for this was that produced language such as words or sentences was observable products to analyze whereas it was impossible to detect any activity which was observable during language comprehension. Because it is all related to processes in the mind. In this view, scholars generally paid attention to the physical output of production, i.e. articulated material. However, after the cognitive revolution in the 1960's, the direction of studies on language comprehension and production has changed.

From the cognitive point of view, the number of studies on language comprehension has increased rapidly while scholars' approach to language production has changed. Lately the processes on mind during the abstract production of language before the articulation process are studied. In other words, the main goal is "to explain the mechanisms in language production and how they mediate the transition from thought to language" (Betchel & Graham eds. 1998: 228). Since this is a rather difficult task to analyze,

scholars generally try to find answers by focusing on the inappropriate production of language such as slips of the tongue or language breakdown in aphasia (Cutler ed. 2005: 12). Unlike this situation with language production, language comprehension studies continue to increase and many studies have been done. Similar to this trend the focus of our study is on language comprehension.

From the cognitive point of view, it is aimed to find out the representation of knowledge, which is gathered within the comprehension process, in cognition. Moreover, it is tried to reveal cognitive processes which are active during language comprehension. The former aim constitutes the narrow sense of comprehension which is to construct the meaning of speech sounds or written material. Thus this would be called construction process of comprehension. In the broader sense; however, comprehension is related with the further interpretation of the meaning gained in the narrow sense. For instance, if what is comprehended is a question, an answer is looked for automatically. In spoken language, the hearer decides what to do next relate to the knowledge in cognition gathered from speaker. This would be called "utilization process" (Clark & Clark 1977: 43-45).

Language comprehension studies roughly divide into two: spoken and written language comprehension, that is, comprehension during listening and reading. The materials to study comprehension from these aspects are words, sentences or discourse which is either spoken or written. Many studies studying language comprehension with each of these materials have been made.

Our concern in this study is sentence comprehension. The importance of meaning to study comprehension would be understood from what Wittgenstein had said "Understanding a sentence means understanding a language" (Kintsch 1974: 7).

From the cognitive point of view, our concern is related with the narrow sense of comprehension, that is, the representation of comprehended material, language, on cognition. This analysis is mostly related with a cognitive process, memory, since what is comprehended is kept in memory. Memory plays a vital role in language comprehension as well as most of cognitive abilities. Thus when we understand the

representation of knowledge gathered from comprehension, we understand how knowledge is kept in memory.

1.2.2 Memory

Memory is the heart of human cognition and human information processing. Functions of cognition such as understanding, thinking, language comprehension and production depend on memory.

Memory constitutes the storage component of human information processing system. It would be defined as “a complex and fascinating set of abilities which people posses that enables them to learn from experience and retain what they learn” (Betchel & Graham 1998: 250). Briefly it has the function of learning and remembering. Thus it has a very important role in language use.

It can be said that memory has three basic parts: sensory memory, short term memory and long term memory. Sensory memory belongs to the input processing component of cognition whereas short and long term memories constitute the storage component. Sensory memory records the information coming from receptors very briefly. For instance, from the point of view of language studies, speech sounds may be recognized in this part. Then this information is sent to short term memory where limited information is stored for a few seconds. It has a capacity which holds up to 7 unrelated items or words. This is the duty of short term memory. Recently, it is preferred to be called working memory. Apart from storing small amount of information for a short time, it is responsible for processing this information. For instance, the grammatical structure and the overall meaning of gathered language parts would be identified at this stage. Thus the very first information about sentence or words is stored here firstly. Then the information is sent to long term memory.

Long term memory has an unlimited capacity where all of the information transmitted from short term memory, that is, our knowledge about the world is stored. What is kept enables us to use language, remember memories, solve problems and think. The necessary information for human cognitive processes and abilities are kept in long term

memory (Klatzky 1980: 177). From the point of view of language, grammar rules and information about the structure of language, communicative rules in order to use language appropriately as well as all of the meanings of words constituting the language are stored here.
Long term memory divides into two parts: Episodic memory and Semantic memory. Their difference is about the type of information stored.

Semantic memory holds all of our knowledge about world, facts and language. It would be described as our mental dictionary and encyclopedia. Moreover, everything about language which has been mentioned above such as grammar and word meanings are held here.

On the other hand, episodic memory stores a person's personnel events, memories with additional information about when and where those events happened. It is briefly one's autobiography (Ashcraft 1998: 132).

To conclude, memory has been discussed from the parts mentioned above. Since it is indispensable for human cognition, it is also necessary for language comprehension. Thus theories explaining both language comprehension and memory have been done.

The subject of current study is propositional theory in language comprehension and memory.

1.2.3 Propositions

As it has been stated before, the main subject of this research is related with "the construction process" in comprehension. "Construction process is concerned with the way listeners construct an interpretation of a sentence from the speakers' words" (Clark & Clark 1977:45). This initial stage of comprehension involves the construction of the representation of underlying knowledge in the mind, namely long term memory. This representation of verbal or written sentences on the mind is called propositional representation. "A proposition is a set of conceptual nodes connected by labeled pathways, where the entire collection of concepts and relationships express the meaning of a sentence" (Ashcraft 1998: 283). Briefly, it is the semantic unit involving the gist or

overall meaning of a sentence. Proposition is regarded in this sense in cognitive psychology and cognitive linguistics. However, the term proposition has already been used in a different sense in the fields of philosophy and logic such as formal semantics and logical reasoning. In this better known sense, "A proposition is the smallest unit of knowledge that can stand as a separate assertion; that is, the smallest unit about which it makes sense to make the judgment true or false." Thus it is more related with assigning the truth value to sentences by examining propositions. For instance,

(1) All men are human.

(2) John is a man.

(3) Therefore, John is a human.

This is an example of logical reasoning. Here, propositions are simple sentences which are evaluated in terms of truth value.

On the other hand, propositions in this research are assigned different meanings in terms of cognition as it has been mentioned before. Propositions in the sense we mention have some features and rules.

Firstly, propositions are not simple sentences as it is in logic, but they are the abstract idea units constructing these sentences. For example,

(4) Lincoln, who was president during a bitter war, freed the slaves.

This is a complex sentence (Anderson 2005: 148) that can be analyzed by separating it into smaller sentences.

(5) Lincoln was president during a war.

(6) The war was bitter.

(7) Lincoln freed the slaves.

Here sentence is divided into three basic sentences. These are not propositions but they are the proposition-like sentences reflecting the meaning of each of the propositions. So these are simple sentences which are turned into propositions in the following way.

(5a) (president, Lincoln, war)

(6b) (bitter, war)

(7c) (free, Lincoln, slaves)

Now it is necessary to identify the other features of propositions related with how they are constructed.

A proposition consists of the harmony of a predicate and one or more arguments. Predicate is the main constituent which predicates the other entities in proposition. Thus, it is always written first such as (free, Lincoln, slaves), where “free” is the predicate. The predicate of a proposition can be mostly a verb, an adverb or an adjective. For example, in the following sentence

(8) The man drives the expensive car fast.

The verb “drive” is the predicate in (drive, man, car); the adjective “expensive” is predicate in (expensive, car); and “fast”, which is an adverb in this sentence, is the predicate of the proposition (fast, drive).

On the one hand, the arguments in a proposition are the constituents which are related to the predicate (Singer 1990: 5). There can be one or more than one arguments in a proposition. They follow the predicate and they are separated by commas. The arguments generally correspond to the nouns. “Man” and “car” are the arguments which are predicated in the example above.

Another characteristics of propositions is that it reflects the underlying meaning of the sentence and the information related with the surface form such as articles or tense markers omitted. Therefore, the syntactic structure of a sentence such as active / passive voice or simple / inverted does not involve in propositions. Accordingly,

(9) The child broke the window.

(10) It was the child who broke the window.

(11) The window was broken by the child.

All of these three sentences reflect the same meaning. However, they are syntactically different. Sentence (9) is an active and simple sentence. Sentence (10) is a complex sentence with a relative clause and sentence (11) is in passive voice. Despite this difference on surface, they are all represented by the same proposition (break, child, window). According to this theory of propositions, what is comprehended and memorized are the gist of sentences not the syntactic structure.

Lastly, these propositions can be indicated in several ways;

(9a) (break, child, window)

(9b) break (child, window)

(9c) BREAK [child, window]

These differences in writing propositions don't change the meaning or the function of propositions. On the other hand, Kintsch's (1998) modeling of propositions which is BREAK [child, window] is used in this thesis.

Up to now, it has been dealt with propositions adjusted to English language. Propositions in other languages are indicated in the light of the same rules. The main concern in this study is the application of propositions to Turkish language.

If we adapt the propositional theory to Turkish language, it can be said that the number of propositions of a sentence in Turkish is determined according to the number of predicates. While writing propositions, predicate comes first, and the argument(s) follow it in Turkish language. If the following sentence is divided into propositions,

(12) Ünlü ressam önemli ödülü kazandı.
Famous artist important award-Acc win-Past
Famous artist won the important award.

This sentence has three propositions.

(12a) KAZAN [ressam, ödül] WIN [artist, award]

(12b) ÜNLÜ [ressam] FAMOUS [artist]

(12c) ÖNEMLİ [ödül] IMPORTANT [award]

In these three propositions, "kazan", "ünlü" and "önemli" are predicates while "ressam" and "ödül" are arguments. Accusative case marker "-(y)u" and past tense marker "-DI" are omitted while indicating propositions.

(13) Önemli ödülü, ünlü ressam kazandı.
The famous artist won the important award.

(14) Önemli ödül, ünlü ressam tarafından kazanıldı.
The important award was won by famous artist.

(15) Önemli ödülü kazanan, ünlü ressamdı.
It was the famous artist who won the award.

Moreover, sentence (13), (14) and (15) are different variations of the sentence (12). They are all syntactically different. However, the propositional representations of these sentences, which involve (12a), (12b) and (12c), are the same as sentence (12).

To conclude, all of the necessary information including the definition and characteristics of propositional representation and its adaptation to Turkish Language were mentioned in this part.

1.3 BACKGROUND TO THE STUDY

Mind is a term conveying not only man's reasoning faculty including intellect, reason, understanding and judgment but also his feelings, memory, emotions and will (Lyons 1981: 240). Functions and limitations of the mind has been an interest for a long time both to philosophers and psychologists. Gottfried Wilhelm (cited in Kintsch 1998:32) stated that "Les langues sont le meilleur miroir de l'esprit humain" (Languages are the best mirror of the human mind). Because of this reality, the fields of psychology and cognitive science deal with language to learn the secrets of the mind and the relation between language and mind. Moreover, psycholinguists and cognitive linguists try to indicate mental processes of language and find answers to the question "how is language represented in the mind (brain)?". This representation includes thinking, comprehending, perceiving and memorizing both written and spoken language. Among these processes of human mind, language comprehension is of prime interest in psycholinguistics (Cutler ed. 2005:2).

However, in the first stage of the 20th century, the topic of comprehension was not popular due to behaviorist views. Their scope of investigation was related with the observable actions. However, language comprehension was among those hidden cognitive processes that resist systematic measurement and investigation. Thus, behaviorists focused on studies on language production, which is a topic proper to observation and empirical research (Matlin 1989: 253). However, after 1960s, a cognitive revolution emerged as a reaction to behaviorism and behaviorist approaches to the mind gave way to cognitivism. The reason was that behaviorist views were limited

in explaining the mental processes which were not studied in detail. Thus, recently research on language comprehension has become extremely popular.

Language comprehension refers to the ability to understand and interpret spoken and written language. Language comprehension in psycholinguistics is related with the role of cognitive factors (such as memory, attention and perception) in arriving at the interpretation of sentences and discourses (Crystal 2003: 92). Comprehending a sentence involves attention to syntactic, semantic and pragmatic factors. At the syntactic level, constituents and phrases in the sentence are perceived. At the semantic level, semantic roles of the words in the sentence are identified and at the pragmatic level, the knowledge of the sentence and the world knowledge of the reader/speaker are matched (Carroll 1994:128).

Several theories have been made related to the question of which part of sentence is comprehended and memorized. Traditional linguistic theory has focused on grammar as the essential element of linguistic knowledge and has given no attention to semantic and pragmatic features (Plaut 2003: 158). Additionally, according to Chomsky (1981), among the factors described above, the syntactic information of sentence is comprehended first and sentence is kept in memory with its syntactic information (Carroll 1994:128). Thus syntax is prior in comprehension process and we can reach such a conclusion that according to his theory, language is represented in the mind in terms of syntactic relations. Then what about the role of meaning and semantic information in the process of comprehension? Related with this subject a different theory implying the importance of semantics and semantic relations in comprehension process and memory has been developed. This theory is called propositional representation of language. In the thesis, it is aimed to reveal the reality of this theory and the propositional theory is followed.

According to this theory, when people read or hear a sentence, what they comprehend and remember is the idea or overall meaning of sentence. Cognitive psychology has identified this semantic unit as a proposition (Ashcraft 1998: 283). “A proposition is a set of conceptual nodes connected by labeled pathways, where the entire collection of concepts and relationships express the meaning of a sentence” (Ashcraft 1998: 283). In

the current study we will not deal with propositions in the sense that is used in formal semantics. In the sense of formal semantics, "propositions are the smallest units about which it makes sense to decide whether they are true or false" (Ellis and Hunt 1993: 185). Instead, in our study propositions are the idea units which represent the gist of meanings in sentences. For example,

(16) Sam sells fresh vegetables to Guido, who owns a restaurant.

According to propositional theory, this sentence can be divided into three propositions or idea units (Ellis and Hunt 1993: 185):

(17) Sam sells vegetables to Guido.

(18) Vegetables are fresh.

(19) Guido owns a restaurant.

Of course these sentences are not propositions but rather they reflect the underlying propositional units since propositions are the abstract idea units behind each of the sentences (Anderson 1995: 222). These units may be presented below.

(17a) SELL [Sam, vegetables, Guido]

(18a) FRESH [vegetables]

(19a) OWN [Guido, restaurant]

As it is seen each proposition begin with a predicate (relation) – sell, fresh, own-which organizes the proposition and then comes the arguments (Sam vegetables, Guido, restaurant).

Since propositions accurately reflect the meaning of the sentence. It may not include the exact wording and so the syntactic information of the sentence. Thus, it is a meaning based approach and it differs from the syntactic theories such as the transformational generative theory of Chomsky (1965), in which structure is important in the representation of sentences (Caron 1992: 92). According to the propositional theory; however, it is claimed that we lose information concerning the actual, verbatim string of words that we hear (or read), but we store and retain meaning (Ashcraft 1998: 281). Because of these reasons, several studies have been made related with propositional representation of language.

One of the studies employing propositional analysis is that of Anderson and Bower's (1973 quoted in Anderson 1995: 222) study in which subjects are given sentences such as:

(20) The doctor who hated the lawyer liked the captain.

This sentence included two propositions:

(20a) hate [doctor, lawyer]

(20b) like [doctor, captain]

After the study, it has been observed that subjects who could recall the noun *lawyer* more often recalled the verb *hated*, which was in the same proposition, than the verb *liked* which was in another proposition. This study concludes that language is stored in propositional units.

In another study, Kintsch and Glass (Reported in Kintsch 1974) compared memory for sentences consisting of the same number of words but having different numbers of propositions. As a result of their study, they conclude that subjects recalled the sentences with fewer propositions better than those having more propositions.

In other study on propositions, Ratcliff and McKoon (1978) carried out an experiment on recognition priming. In this study, subjects were presented sentences containing one or two propositional elements. Then they were given a recognition test with single words from the sentences and unrelated words. Moreover, the recognition time of the words has been measured. As a result of this study, two words that are in the same sentence and proposition are recognized faster and better than words in the same sentence but in different proposition.

When we examine the studies on language comprehension, it is seen that these studies aim to prove the existence of propositions in English. However, it has not been analyzed in Turkish. As the current study is on the field of psycholinguistics, it is our duty to find out whether this psychological reality i.e. propositions, is also valid for other languages. Thus, this study will make a comparison between/among languages aiming to indicate whether propositional representation of language is a universal aspect and a feature of human cognitive processes.

1.4 STATEMENT OF THE PROBLEM

This study aims to identify the validity of propositional theory in language comprehension and memory by studying Turkish sentences. It also aims to identify whether semantic information is prior to verbatim and syntactic information in the process of comprehension and memory for sentences.

1.5 RESEARCH QUESTIONS

Related with the aims of this study, the following questions will be answered.

1) Is verbatim or meaning of Turkish sentences comprehended and remembered better? Related with verbatim, do surface constituents such as linear distance and syntactic features have a major role in comprehension and memory processes?
2) Are Turkish sentences, as part of language, comprehended and memorized in terms of propositions?

1.6 METHODOLOGY

1.6.1 Sample

The sample of this study consists of sixty subjects who are all undergraduate students in Akdeniz University. Thirty students are preparatory students. Eighteen subjects are second year students studying economics. Finally, twelve students are from nursing school and they are in their first year. These subjects have been selected randomly and variables such as age or socio-cultural level have not been taken into account since the experiments which have been conducted on these subjects were designed to analyze mind processes. Thirty seven of the subjects are male and the number of female subjects is twenty three. Finally, the age range of the subjects varies between 17 and 24-year old.

1.6.2 Method

In this study, two basic methodologies, which are widely used as a data collection tool in psycholinguistics, psychology and cognitive science, have been used in order to answer the research questions. These are recall and recognition tasks which are generally used for testing memory.

1.6.2.1 Recognition Task

Recognition task is used to test memory for images, words, sentences or discourse. In this method, firstly the list of items is presented to the subject(s). Then another list of items including the old ones in the first list and new items as distractors is presented to the subjects and they are asked to judge or decide whether these items have appeared in the first list. Depending on the aim of the study, these items could be words, images, sentences or discourse. What is measured in this method is the percentage of correct and wrong answers (Ashcraft 1998: 150).

In our study; however, a multiple- choice recognition task was employed. Subjects studying the list of unrelated sentences were asked to perform a multiple choice test and to mark the sentence that they had seen in the first list. Meanwhile, subjects are asked to judge the sentences they choose by giving a number from 1 to 5. So their degree of confidence for their answers would be measured. Finally, the results in this task are reached by measuring the percentage and frequency of subjects' responses to sentences.

Similar experiments on multiple choice recognition task have been made by several researchers. Accordingly, our methodology of the first experiment has been based on three studies with modifications. These are Fillenbaum's (1966) classic study; the study of Anderson (1974); and the well known study of Bransford & Frank (1971). The model of the study has been adapted from Fillenbaum's (1966) study. The sentence choices used in multiple choice test were prepared according to the study of Anderson (1974 cited in Anderson 1980: 120-121). Lastly, the second part of the study of Bransford & Frank (1971), who measured the degree of confidence of the subjects', has been adapted to our study.

These three studies mentioned above (See literature review for detailed information) have formed the bases of our methodology for experiment 1, the multiple-choice recognition test.

1.6.2.2 Recall Task

Recall is another methodology used testing memory of items, namely words, images, sentences and discourse. Similar to recognition task, a list of items is presented to subjects. Subjects could either listen or read these items. Then they are asked to recall these items. Depending on the process at this stage, the recall task divides into three: Free recall, serial recall and cued recall (Ashcraft 1998:150). In free recall, subjects are simply asked to write or state as many of the items they can. In serial recall, they are asked to recall list items in the original order of presentation. Finally, in cued recall a hint reminding each of the images or words in the original list or part of the sentences or discourse presented to subjects in the first stage of task is provided. In recall task, the results contain the percentage and the number of items recalled.

In the thesis, the cued recall task has formed the methodology of the second experiment. Subjects are shown nine sentences to study. After two-minute delay, one test sheet including one cue word from each of the sentence were presented to subjects and they are asked to recall the sentences they studied in writing. Finally the percentage and frequency of recalled items are calculated.

When the literature has been reviewed, it has been seen that several experiments in which cued recall method is used have been made. However, our second experiment has been generally based on two studies with modifications. These are the studies of Anderson and Bower (1973 cited in 1995) and Wanner (1975). They aimed to find out what parts of the sentence subjects could recall by looking at cue word. In addition, to these studies, the sentences used in the thesis have been formed according to the study of Ratcliff and McKoon (1978) with several modifications. Their aim was also similar to the other two experiments. In their study, they used five types of sentences (see “Literature Review” for the detailed information of these sentence types). Consequently,

sentences of cued recall task as well as recognition task have been prepared according to these types of sentences.

To conclude, the methodologies of the two experiments which have been made in the thesis have been the modified versions of the several studies that have been mentioned above.

1.6.3 Procedure

Two experiments named as multiple choice recognition task and cued recall task have been made in this study. The necessary information for these tasks is presented in this part, respectively.

1.6.3.1 Multiple-Choice Recognition Task

In this task, firstly subjects were presented an experiment sheet including 12 unrelated sentences (see Appendix 1). These sentences were formed from four types of which are given in Table 2.

Table 2 Sentence types used in Multiple Choice Recognition Task

Type	Number of Propositions	Example, structure, and propositions
1	1	Garson yemeği getirdi. N_1, N_2 acc.V_1 P_1 (Arg_1, Arg_2)
2	2	Beyaz paltoyu doktor giydi. Adj_1, N_1acc. N_2, V_1 P_1 (Arg_1, Arg_2) P_2 (Arg_2)
3	2	Köpek, tavşanı ve sincapı kovaladı. N_1, N_2acc. conj. N_3acc. V_1 P_1 (Arg_1, Arg_2) P_2 (Arg_1, Arg_3)
4	2	Polis dükkanı soyan adamı yakaladı. N_1, (N_2acc. V_1)rel cl. N_3acc. V_2 P_1(Arg_1, Arg_2) P_2 (Arg_2, Arg_3)

N: Noun, V: Verb, Adj: Adjective, P: Predicate, Arg: Argument, acc: accusative, conj: conjunction, rel cl: relative clause

Type 1 sentences were one-proposition sentences while other types were two-proposition sentences. When syntactic features were analyzed, type 2 sentences were

simple, type 3 sentences are compound and type 4 sentences were complex sentences. In type 3 sentences, propositions were connected with conjunctions, and type 4 sentences were subordinative sentences including a relative clause. These sentence types were arranged according to Ratcliff and McKoon's study (1978) and they were adapted into Turkish Language.

The reason why such sentence types have been used in this experiment is that studying one type of sentence would not reflect everyday usage. Should sentences with the same number of propositions and with same syntactic features be studied, the findings gathered from such experiment would not be generalized to whole language. Therefore, the more different type of sentences are studied, the proper generalizations would be reached for natural language.

When these set of sentences were presented to subjects, they were asked to read these sentences slowly and very carefully. During this reading session, no time limit was determined. Moreover, they were not informed about the real aim of the test, i.e. that the test measures the memory of subjects for sentences or about the type of test that would be employed after reading sentences otherwise they would memorize the sentences and experiments would not reach to their aims.

After subjects had comprehended sentences, a two- minute break, which is necessary for the read items to move from working memory to long-term memory, was given. Then in order to collect the required data, subjects were given a multiple choice recognition test consisting of twelve questions. These sentences were tested in the same order as they were studied. The four choices in each of twelve questions were presented in random order. Accordingly participants were asked to decide which of the sentences they had studied. They were also informed that each question included one correct answer. In each question there were four choices containing one identical sentence (sentence that was studied by subjects), one with syntactic change, one with semantic change and one with both syntactic and semantic change. For example,

a) Garsonlar yemeği getirdi. (identical sentence)
   Waiters brought the meal.

b) Yemek garsonlarca getirildi. (syntactic change)
The meal was brought by waiters.

c) Garsonlar tatlıyı getirdi. (semantic change)
Waiters brought the dessert

d) Tatlı garsonlarca getirildi (semantic and syntactic change)
The dessert was brought by waiters.

When the example is analyzed, it has been aimed to identify how sentences are understood and stored in memory. If subjects have remembered the sentence exactly, they, of course, select sentence *a,* which is the identical sentence. But if they have not been able to remember exactly, they would choose the other choices depending on what aspect of the sentence they remember. If what is kept in the mind is meaning or idea units of sentences, then subjects have not been expected to select *c* and *d* as the old sentence since these sentences have different meanings.

Moreover, in this test it has been aimed to measure the degree of confidence of the subjects who answered this test. When subjects chose a sentence which means that they had recognized it from the list of sentences, they were asked to judge their confidence by putting a number from 1 to 5 as indicated in the example below.

	Degree of confidence 1 to 5
a) Garsonlar yemeği getirdi.	____
b) Yemek garsonlarca getirildi.	____
c) Garsonlar tatlıyı getirdi.	____
d) Tatlı garsonlarca getirildi.	____

In this scale, 5 means very high confidence or subject's being very sure, 4 means subject's being confident or sure of themselves. 3 stands for their being undecided. 2 reflects little confidence or little sureness, and lastly 1 means no confidence or sureness at all. Consequently, if subjects were very sure of themselves that they had seen the sentence before, they wrote 5 and in the situation that they were not sure of seeing it before, they wrote 1.

With this confidence test, it has been aimed to find out whether subjects selected the identical and syntactically changed sentences, i.e. sentences preserving the gist of identical sentence easily and with confidence. On the other hand it has been expected that subjects selected sentences with semantic change and sentences with both syntactic and semantic change with less confidence. Because selecting one of those two sentences shows that subjects did not recognize the old sentence. Moreover, the confidence test has also helped to reveal randomly answers of the subjects so that the reliability of the test increased (See Appendix 2).

After multiple- choice recognition test had been employed to subjects, a quantificational analysis which means that certain statistical results were reached was done in order to analyze the findings. During the analysis the frequency and percentage of the answers of the subjects to multiple- choice test were calculated. To conclude, with the results of this experiment it has been expected to answer our first research question, which is whether verbatim or meaning of Turkish sentences is comprehended and remembered better.

1.6.3.2 Cued Recall Task

Start procedure of cued recall task is similar to the first experiment. Again subjects were shown a set of unrelated sentences to read. The examples of nine sentences consisting of three types were indicated in Table 3 (see Appendix 3).

Table 3 Sentence types used in cued recall task, experiment 2

Type	Number of Propositions	Example, structure, and propositions
1	2	Kız mavi elbiseyi giydi. N_1, Adj_1, N_2acc. V_1 P_1 (Arg_1, Arg_2) P_2 (Arg_2)
2	2	Turist müzeyi ve parkı gezdi. N_1, N_2acc., conj. N_3acc. V_1 P_1 (Arg_1, Arg_2) P_2 (Arg_1, Arg_3)
3	2	Seyirci şiiri okuyan kadını alkışladı. N_1, (N_2acc. V_1)rel cl. N_3acc. V_2 P_1 (Arg_1) P_2 (Arg_1) P_3 (Arg_2, Arg_1)

N: Noun, V: Verb, Adj: Adjective, P: Predicate, Arg: Argument, acc: accusative, conj: conjunction, rel cl: relative clause

As indicated in Table 3, type 1, type 2 and type 3 sentences contained two propositions. Syntactically, first type of sentences was simple; second type of sentence was compound and the third type of sentences was complex. While type 2 sentences included a connection with conjunctions, type 3 sentences contained a relative clause.

During the experiment subjects were asked to read these nine sentences very carefully. No time limit was determined and similar to the first experiment, the real aim of the experiment was not told subjects so that they could not try to memorize the sentences that would cause unexpected results. After subjects studied sentences, a two-minute break was given. Then they were presented an experiment sheet including only one cue word for each of nine sentences (See Appendix 4). Afterwards they were asked to recall in writing whatever they remembered by looking at cue words. They were not expected to write all of the sentences and to write full sentences or sentences making sense. They were informed that even if only one word about the sentence is recalled, it should be written.

In this experiment cue words selected from each sentence were not identified randomly. Cue words' linear proximity to words from the same proposition and to those from different proposition(s) had been taken into account. Therefore, cue words

a) either had the same distance to words from the same proposition and to words from other proposition(s) in linear structure

b) or were closer to word(s) from different proposition than words within the same proposition with cue word in linear sentence structure.

Cue words were arranged in this way in order to prevent the possible claim that linear proximity between words in a sentence may affect the comprehension and memorization of those words.

As a result of this experiment, it has been aimed to find out whether subjects more often recalled the word(s) which were in the same proposition with cue word than the words which did not come from the same proposition. For example,

(21) Öğrenci zor sınavı geçti.
student difficult test-Acc pass- Past
Student passed the difficult test.

This sentence contains two propositions:
(21a) GEÇ [öğrenci, sınav] PASS [student, exam]
(21b) ZOR [sınav] DIFFICULT [exam]
Cue word: zor

Accordingly, when *zor* was given as the cue word, it was searched whether subjects more often recalled *sınavı*, which was in the same proposition with *zor*, than *öğrenci or geçti* , which were in different propositions. In this sentence, since cue word had the same distance to word from the same proposition and words from the other proposition, linear distance among words in the sentence would not affect the results.

Finally, the data obtained from this experiment were also analyzed quantitatively. It was calculated which part of sentences subjects recalled more often. Thus the frequency and percentage of the recalled words were calculated. As a result of this experiment it was expected to answer our second research question whether Turkish sentences, as part of language, are comprehended and memorized in terms of propositions.

1.7 Organization of the Study

This study includes four chapters. The first chapter includes a general introduction to the language comprehension, memory and propositions. A brief background to the study follows it. The chapter also includes the statement of the problem; research questions and methodology in which the sample, method and procedure of the two experiments employed in the thesis are indicated.

The second chapter includes the detailed information about studies and researches which constitutes the base of our study. These studies are organized under the subcategories, verbatim vs. meaning and propositional representation of knowledge in which propositional representation in sentence and discourse level is discussed. Additionally, the review of similar studies is provided in the second chapter.

The third chapter includes the data analysis and discussion of the study. It provides the detailed statistical findings gathered from the experiments. The frequency and percentage of subjects' answers and recalls as well as their degree of confidence are

indicated with tables, column and line charts. Then, a discussion part is provided in which the results are discussed with examples.

The final chapter includes the conclusion part. In this chapter, the overall results of the study, the answers of the research questions and possible further studies are presented.

2. LITERATURE REVIEW

In this study, the role of meaning and proposition in comprehension and memory for Turkish language is studied. When literature is reviewed a number of studies related with this topic are found. In this chapter, related works in the subcategories of, related experiment types, verbatim vs. meaning and the propositional representation of knowledge are to be presented.

Language comprehension and memory have been given increased attention during the second half of the 20th Century. Accordingly many studies related to these topics from several aspects have been made. In the thesis, it has been focused on the meaning and proposition in comprehension and memory. Thus, the researches studying memory, comprehension and meaning trio were analyzed and reviewed.

First of all, when the literature is reviewed, it is seen that certain experiment types was used in order to measure and analyze the importance of meaning and propositions in comprehension and memory.

2.1 RELATED EXPERIMENT TYPES

In fields related with cognition such as cognitive linguistics, psycholinguistics and cognitive psychology, several experiment methods have been employed in order to study certain subjects. Those subjects include (a) to measure people's memory for words, sentences or discourse and to learn the representation of knowledge in memory (b) to understand the language comprehension process of human (c) related with these two topics above, to find a representation of meaning such as propositions in comprehension and memory in human mind. These experiment tasks are recognition task, recall task and priming task.

According to the reviewed studies employing recognition task, what is measured is the memory for subjects for words, sentences and discourse. In this task, subjects are given a set of items to study. Then a longer list including new items (distractors) as well as the old items in the previous list is presented to subjects so that they can recognize the old

ones. At the end of the task, the percentage of subjects' answers to correct items and distractors are measured (Ashcraft 1998: 150).

In recall task, similar to recognition task, subjects are presented a set of materials, which are sentences or discourse, to examine carefully. Then, they are asked to recall these materials from certain aspects (Carroll 1993: 274). When the literature was reviewed, it has been found out that two types of recall tasks are available. These are free recall and cued recall. In free recall, subjects are asked to recall the materials they studied in any order by writing or stating. In cued recall, one part of studied sentence or discourse is presented to subjects as a cue which can be a word or an idea. Then, they are again asked to write or state as many items as possible. What is measured in studies including recall task is the frequency and percentage of the recalled items which can be sentences or larger entities depending on the studied materials.

Finally, the last experiment method which was employed in many studies is priming method. This task was generally used to indicate the reality of propositions. The method reveals some similarities with recognition method, but it differs from that task in application and measurement. In priming task, subjects study a set of sentences or discourse audio or visual, similar to other tasks. Afterwards, single words or sentences from studied items and distractors are presented to subjects and they are asked to recognize the items in the studied elements. What is measured here is the recognition time between the old words and distractors.
In the current study, the recognition method and cued recall method was employed.
Now that the basic experiment types were presented, a debate which has been discussed in related researches is to be presented.

2.2 VERBATIM VS. MEANING

The represented topic is a matter of discussion in several studies. Verbatim stands for word by word representation in memory, in the mind. This representation may contain word order, linear structure and syntactic information of a sentence. It was studied to find out the representation of knowledge in memory, verbatim or meaning.

The very first study related with this topic is that of Fillenbaum (1966). In his study, he questioned memory for sentence and aimed to find out whether exact wording or just meaning (gist) of sentence is kept in memory. Accordingly, a multiple- choice recognition test was performed. Firstly, people were presented a long list of unrelated sentences. Then they were given the multiple- choice test of each of sentences. The test was as the following (Clark & Clark 1977: 155)

a) The window is not closed. (correct sentence)
b) The window is closed. (preserves the main proposition)
c) The window is not open. (preserves the negative (syntactic information))
d) The window is open. (preserves the gist) (syntactic change)

The results indicated that most of the people picked the correct sentence. But those, who didn't, picked mostly sentence (d) which keeps the same meaning of correct sentence. And (b) was selected more often than (c) though (c) is more related to correct sentence syntactically. To conclude, Fillenbaum indicated that what is kept in mind is meaning not verbatim.

Another classic study conveying answers to the verbatim vs. meaning debate is Sach's (1967). He reached answers by studying written discourse. In the experiment, subjects heard some passages. During the listening a test sentence was presented to subjects immediately and after a certain amount of time. Then they were asked whether they recognized the sentence. These test sentences had four variations. The first one is the identical sentence; the second one differs semantically from identical sentence. The third and fourth sentence types have syntactic changes such as formal or active/passive change. For example (Singer 1990:29),

a) He sent Galileo, the great Italian scientist, a letter about it. (identical)
b) Galileo, the great Italian scientist, sent him a letter about it. (semantic change)
c) A letter about it was sent to Galileo, the great Italian scientist. (active/passive)
d) He sent a letter about it to Galileo, the great Italian scientist. (formal change)

In the immediate test, subjects remembered the identical sentence and easily identified the changes in sentence. However, in the delayed test, they again identify the test sentence with semantic change correctly, but they failed to judge the test sentences with

syntactic and formal change. Sach's findings indicated that subjects lost the verbatim and syntactic information after an amount of time but kept the meaning.

A more extensive study based on the meaning & memory relation was made by Bransford & Frank (1971). In their study, they performed a recognition test like Fillenbaum (1966) and Sachs (1967) to study the importance of meaning. Unlike them, the meaning units were called propositions in this study. Firstly, they had participants study a set of sentences which was composed of two sets of four propositions. After a five-minute break, participants were given a recognition test. They were asked to decide whether each of the sentences was new or old. In the test, there were three types of sentences: old, new and noncase. The sentences actually studied were old. New sentences were not in the main list, but were a combination of propositions that had been studied. Lastly noncase sentences were composed from the words studied but not from the propositions.

In their study, they also measured participants' degree of confidence about test items' being new or old. In recognition test, they were asked to judge sentences, which they recognized from 1 to 5 (1- no confidence, 5- very high confidence), and those, which they didn't recognize from -1 to -5 (-1 not sure, -5 very sure). This part of experiment has been adapted to our methodology for experiment 1 in the thesis. According to their study, the results indicated that participants could not discriminate the new sentences from old. Moreover, they were highly confident in their judgments on new and old sentences. On the other hand, they easily eliminated noncase sentences which did not include propositions studied. Accordingly, they concluded that individual sentences are not kept in memory. The ideas or propositions expressed by sentences are maintained.

In one study of Anderson (1977), it was aimed to gain more information about verbatim structure. Two experiments, sentence verification tasks related with memory for active and passive sentences were made. According to the research, it was seen that verbatim information decreases as time passes, it does not fall suddenly after a certain amount of time. Moreover, it was claimed that the verbatim structure only contained the information of word order.

Hanson & Bellugi (1982) analyze the verbatim vs. meaning debate from a very different aspect. In their study, American Sign Language (ASL) was used in a recognition task to find out the knowledge represented in memory. Like English, sentences in ASL have the syntactic and lexical information. Accordingly, a number of sentences were presented visually to subjects. Then a test sentence was immediately shown for subjects to judge whether they had seen it before. In this situation, subjects easily recognized the syntactic or semantic changes. However, in a delayed test, subjects could not identify the syntactic or formal changes whereas they were able to identify the changes in meaning. Therefore, a conclusion that only meaning is represented in memory was made.

Finally, in a research which is called "Lexicon and Representations in Sentence Comprehension", Dubois (1982: 88) studied the nature and the structure of representations in memory and aimed to find out the semantic representation of words for French language. Similar to other studies it was found out that meaning is kept memory.

The last study mentioned above discussed verbatim vs. meaning by using French language which is in the same language family with English. When the literature has been reviewed, it has not met with a research or thesis studying Turkish language from this aspect. So, in this thesis, our first concern is to study this debate in terms of Turkish language which is quite different from English.

2.3 PROPOSITIONAL REPRESENTATION OF KNOWLEDGE

When the reviewed studies which were presented under the verbatim vs. meaning subcategory were examined, it was seen that meaning, namely semantic representation, is remembered and represented in memory. This semantic representation of sentences or discourse is thought of the information in abstract form. Among the researchers, especially in the fields of psycholinguistics and cognitive psychology, it is generally assumed that this abstract representation is called propositional representation. Several experiments have been made to indicate the reality of propositions.

In the study of Anderson and Bower (1973 quoted in Anderson 1995:222), subjects studied isolated sentences such as:

(22) The doctor who hated the lawyer liked the captain.

This sentence included two propositions:

(22a) hate (doctor, lawyer)

(22b) like (doctor, captain)

After the study, it has been seen that subjects who could recall the noun *lawyer* more often recalled the verb *hated*, which was in the same proposition, than the verb *liked* which was in another proposition. This study indicated that language is stored in propositional units.

Wanner (1975: 47) used the same technique. He used both free and cued recall in his study. Firstly, he employed the free recall task to create a base in order to choose the most effective cue words for the second task. Then in the second task, which is a cued recall task, subjects studied a set of sentences and then they were presented a single cue word from each sentence and asked to recall the sentences. For instance the following two- proposition sentence was studied by subjects.

(23) The mausoleum that enshrined the tzar overlooked the square.

OVERLOOK [Mausoleum, Square]

ENSHRINE [Mausoleum, Tzar]

Accordingly, the word ‘overlooked’ was presented as a recall cue and then it was seen that subjects recalled ‘square’ more often than ‘tzar’ in spite of the fact that ‘tzar’ is closer to the recall cue ‘overlooked’ in the surface structure than ‘square’. Here the point is that ‘square’ is the argument of the same proposition whereas ‘tzar’ is located on different proposition. It was concluded that words within the same proposition are stored together in memory.

The reviewed studies above aimed to reveal the reality of propositions. However, many studies were also made to indicate the representation of propositions in sentence level and discourse level.

2.3.1 Propositional Representation on Sentence Level

One study made by Kintsch & Glass (reported in Kintsch 1974) is about the importance of propositional structure in sentence recall. In their study, a free recall task was performed. Accordingly, participants listened several unrelated sentences. After a two-minute break, they recalled in writing what they remember. What is significant in this experiment is that the number of propositions of sentences was different but the number of content words constructing these sentences was the same. The results indicated that sentences with two or three propositions are recalled less as a unit than sentences consisting of only one propositions. In other words, single-proposition sentences are recalled more than multi-proposition sentences even if the number of content words is same.

In another study of Anderson (1974) called "Verbatim and Propositional Representation of Sentences in Immediate and Long-Term Memory", he aimed to reveal the representation of information in long term memory and claimed that while verbatim structure is stored in short term memory, all information in the long term memory is propositional. Thus, he held two experiments. In the former, subjects listened to several paragraphs, then they were shown parts from paragraphs and asked to verify them in immediate and delayed tasks. In the second experiment, the same process was done with isolated sentences instead of cohesive paragraphs. The results of these experiments were that subjects responded fast and correctly in the immediate condition whereas in the delayed condition they verified the sentences slower and tended to verify the gist of sentences, i.e. propositions. In the research it was concluded that verbatim structure takes place in short term memory whereas long term memory consists of both verbatim and propositional information.

Other important study related with the topic of proposition in sentence level was that of Ratcliff & McKoon (1978). They hypothesized that "If sentences are stored propositionally, then priming should be greater between words within a proposition than between words in different propositions in the same structure" (Ratcliff and McKoon 1978: 403). As it is understood, they used the priming method. In their experiment, five types of sentences were used. They were formed as indicated in Table 4*.

Table 4 Sentence types used in Experiment 1

Type	Number of propositions	Structure[a], propositional structure, and example
1	1	$N_1 V_1 N_2$ $(N_1 V_1 N_2)$ The colonel sucked a lollipop.
2	2	$N_1 V_1 N_2$ conj $N_3 V_2 N_4$ $(N_1 V_1 N_2)$ $(N_3 V_2 N_4)$ Geese crossed the horizon as wind shuffled the clouds.
3	2	$N_1 V_1 N_2$ conj $V_2 N_3$ $(N_1 V_1 N_2)$ $(N_1 V_2 N_3)$ The pauper chopped wood and lugged water.
4	2	$N_1 V_1 N_2$ conj pron $V_2 N_3$ $(N_1 V_1 N_2)$ $(N_1 V_2 N_3)$ The chauffeur jammed the clutch when he parked the truck.
5	2	N_1 rel pron $V_1 N_2 V_2 N_3$ $(N_1 V_1 N_2)$ $(N_1 V_2 N_3)$ The mausoleum that enshrined the tzar overlooked the square.

*Taken from the article "Priming in Item Recognition: Evidence for the Propositional Structure of Sentences" of Ratcliff and McKoon (1978: 406)

According to this table, first type consists of simple sentences with one proposition. Second and third types of sentences are coordinated two-proposition sentences connected with conjunction. Type 4 again contains two proposition sentences connected with conjunction pronoun. 5th type is subordinate sentence including relative clause and consisting of two propositions. Accordingly, the priming method was used, and the findings gained from their experiment supported their hypothesis, i.e. the propositional representation of sentences.

The significance of this study is that the sentence types discussed above have been adapted to the thesis, and the sentences which constitute the experiments were constructed from these sentence types.

In a more recent study, Caplan & Waters (1999) dealed with sentence comprehension and working memory. They aimed to reveal the role of verbal working memory in sentence comprehension. In the several experiments which they carried out in the study, subjects studied simple sentences with one proposition and complex sentences with two or more propositions. As a result, they found out that the number of propositions not the syntactic form creates the complexity of sentences. In addition, they revealed the

important role of working memory in determining the syntactic and semantic information of sentences in sentence comprehension.

To conclude, the several researchers mentioned above carried out studies about propositions in sentence level and they indicated the role of proposition on this level.

2.3.2 Propositional Representation on Discourse Level

Studying propositions in sentence level, some researchers aimed to reveal the reality and the usage of propositions in discourse level.
Firstly, Kintsch & Keenan (1973) aimed to answer the question whether paragraphs are represented as a hierarchy of propositions. Subjects are asked to read groups of paragraphs containing the same number of content words and different number of propositions. What was measured was the reading time of subjects. They found out that the more propositions a paragraph include, the more time it takes to read and understand. Because, the increase in the number of propositions in a reading passage creates a burden in memory and increases the processes in mind. Additionally, it was stated that propositions are grouped in a paragraph hierarchically where higher and lower levels of propositions involve.

Another research about propositions in discourse was made by McKoon & Ratcliff (1980). Stating that texts were organized in the form of propositions in reading, they predicted that these propositions in a text are connected to each other with argument repetition. In their research, it was focused on different distances among the connected propositions. Thus, the priming effects in item recognition were measured. Accordingly, Subjects studied complex, everyday life texts as well as simple texts and their judgment time was measured. To conclude, McKoon and Ratcliff (1980) found out that the items closer in meaning structures have larger priming effects while those which are closer in surface structure have less priming effects. This topic which is the importance of the distance among meaning or the distance among linear structure has also been discussed in the current study.

Other study concerning propositions in text level was made by Ehrlich (1980). In the study, it was aimed to reveal the relationship between comprehension and memory of texts. Among the several experiments, a recall test, in which subjects were asked to recall certain propositions from text, was also made. In the light of this experiment, it was found that comprehension and memory processes in both immediate and delayed recall were similar.

One different study in which propositions are used to explain the discourse comprehension level is the study of Irwin (1988). She stated that propositions are responsible from constructing the micro- structure level of texts. She employed a recall task in which subjects studied text passages either low or high in imagery and recalled what they remember. It was found out that subjects recalled more propositions from passages with high level of imagery in macro level, and more propositions from the normal text with no imagery on micro level. Briefly, propositions were used to find answers to the structure and comprehension of texts with imagery.

In the last and more recent study, Budiu (2001) aimed to describe sentence comprehension process in semantic level. Thus, propositions were studied on both sentence and discourse level. In the study, it was stated that the comprehension of isolated sentences as well as sentences in context is based on propositions.

To conclude, when the literature has been reviewed, it has been seen that several studies studied propositions in discourse as well as isolated sentences from different aspects. With the help of propositions, researchers aimed to find more about language comprehension process, and the representation of language in memory. However, when the studies in Turkey, has been reviewed, it could not found a study which is directly related with the topic of the current study. Among the few studies involving propositions, the main concern is quite different from that of our study. Thus, they are not included here.

3. DATA ANALYSIS AND DISCUSSION

In this section, the findings obtained from the two experiments which were held in this thesis were analyzed and the discussions were presented. Firstly, the findings gathered from experiment 1 were analyzed. The results of this experiment, which was performed by recognition method, were analyzed through a quantitative analysis. Several tables and figures displaying the percentage and frequency of the subjects' answers were presented. Lastly, the results were discussed. Then, the findings of experiment 2 were analyzed. The second experiment, which is a recall task, again analyzed quantitatively. The percentage and frequency of recalled words were indicated with tables and figures. Finally a discussion was held related with the results of experiment two.

3.1 EXPERIMENT 1

In the scope of experiment 1, a multiple-choice recognition test was employed. The findings gathered from this test were analyzed quantitatively. Firstly, the frequency and the percentage of the sentences that were recognized by subjects were calculated in Ms Excel. Then the degree of confidence of the subjects on their answers was presented. These results were indicated with tables, column charts and line charts. Finally, the findings were discussed.

Before the results of the analysis were displayed, distribution of sentence types used in experiment 1 was indicated. As it was mentioned before, the experiment sheet for experiment 1 included a set of twelve sentences with four types of sentences. Type 1 sentences included one proposition while other three types of sentences contained two propositions. Type 1 and 2 sentences were syntactically simple whereas Type 3 sentences were compound and Type 4 sentences were complex sentences. The distribution of the sentences in experiment 1 is indicated in Table 3.1 in the next page.

According to Table 5, the frequencies of all types of sentences which were used in the experiment are 3 and their percentages are 25% each. After subjects studied these sentences in the experiment, four different sentence choices including the identical one were represented to subjects to choose the one they remember.

Table 5 Distribution of types of sentences used in experiment 1

	Frequency	Percentage
Type 1	3	25 %
Type 2	3	25 %
Type 3	3	25 %
Type 4	3	25 %
Total	12	100 %

Firstly, the frequency and percentage of subjects' answers to type 1 sentences were calculated. Type 1 sentences are syntactically simple sentences with one proposition. For example,

(24) Garson yemeği getirdi.
Waiter meal-Acc bring-Past
The waiter brought the meal.

Each experiment sheet included three type-1 sentences as in the example. Accordingly, the frequencies of subjects' answers to these three type 1 sentences are indicated in Table 6.

Table 6 The frequencies of answers in Type 1 sentences (n=60)

Type 1 Sentences	1	2	3
Identical Sentence	41	30	35
Syntactic Change	14	17	16
Semantic Change	3	8	6
Syntactic and Semantic Change	2	5	3

Table 6 indicates that subjects mostly selected identical sentence though its frequency differs among the three sentences. In sentence 1, it is seen that 41 out of 60 subjects chose the correct (identical) sentence. Then approximately one fourth of subjects selected the sentence with syntactic change. When the results related with semantically changed and syntactically and semantically changed sentences are analyzed,

semantically changed sentences in sentence 1 and 3 were chosen more than the sentence choice with syntactic and semantic change and it is vice versa in sentence 2.

Analyzing the detailed frequencies of type 1 sentences, we need to see the overall percentage of responses given to type 1 sentences. The result was shown in Figure 2.

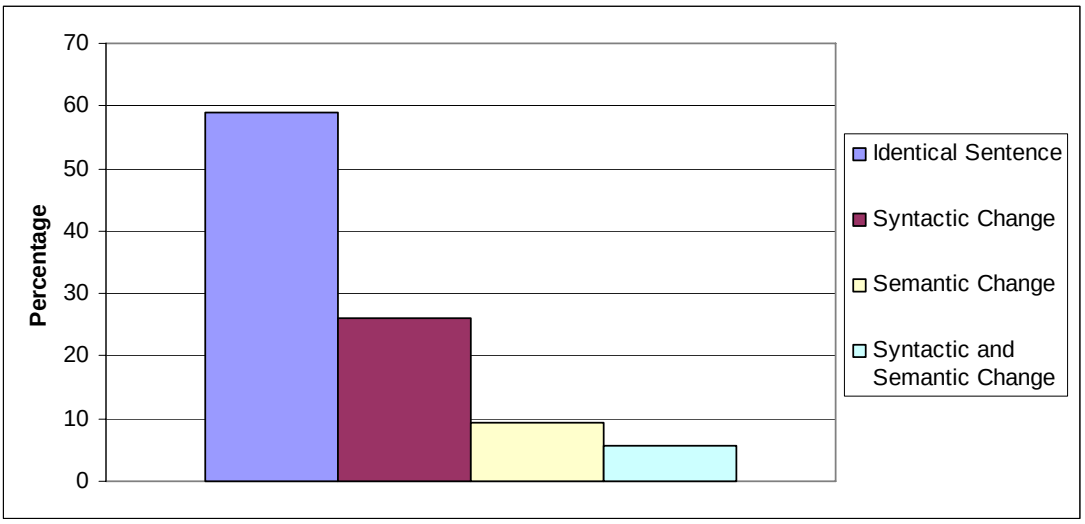


Figure 2 Overall percentages of responses to Type 1 sentences

As Figure 2 shows, the average percentage of identical sentence which was chosen by subjects is 58.85%. Then, the percentage of chosen sentences with syntactic change is 26.11%. In the third row, semantically changed sentences were chosen with a percentage, 9.44%. Finally, the ratio of selected sentences with syntactic change is 5.56%.

These results indicate that more than half of the subjects remembered the type 1 sentences in the test exactly. Among the subjects who did not remember old sentences, syntactically changed sentences were selected more than semantically changed sentences. Lastly, few subjects chose type 1 sentences with syntactic and semantic change. Consequently, when the result of chosen identical sentence is put aside, subjects tended to choose the sentence carrying the same meaning or gist of old sentence more than sentences with different meaning.

Secondly, subjects' answers to three type 2 sentences in the experiment were calculated. Type 2 sentences are simple sentences with two propositions as in the example.

(25) Yaşlı ağacı oduncu kesti
Old tree-Acc chopper cut-Past
The chopper cut the old tree.

The detailed frequencies of chosen type 2 sentences are represented in Table 7.

Table 7 The frequencies of answers in Type 2 sentences (n=60)

Type 2 Sentences	1	2	3
Identical Sentence	37	29	25
Syntactic Change	19	24	25
Semantic Change	2	3	4
Syntactic and Semantic Change	2	4	6

According to Table 7, subjects chose identical sentence, syntactically changed sentence, sentence having syntactic and semantic change and semantically changed sentence, respectively. In sentence 2 and 3, the number of selected sentences which are identical and syntactically changed is close to each other. However, in sentence 1, the difference between these sentences declines. Lastly, few subjects chose the last two types of sentences.

When the average percentage of the results related with type 2 sentences which is shown in Table 7 is calculated, the results are represented as a column chart in Figure 3.

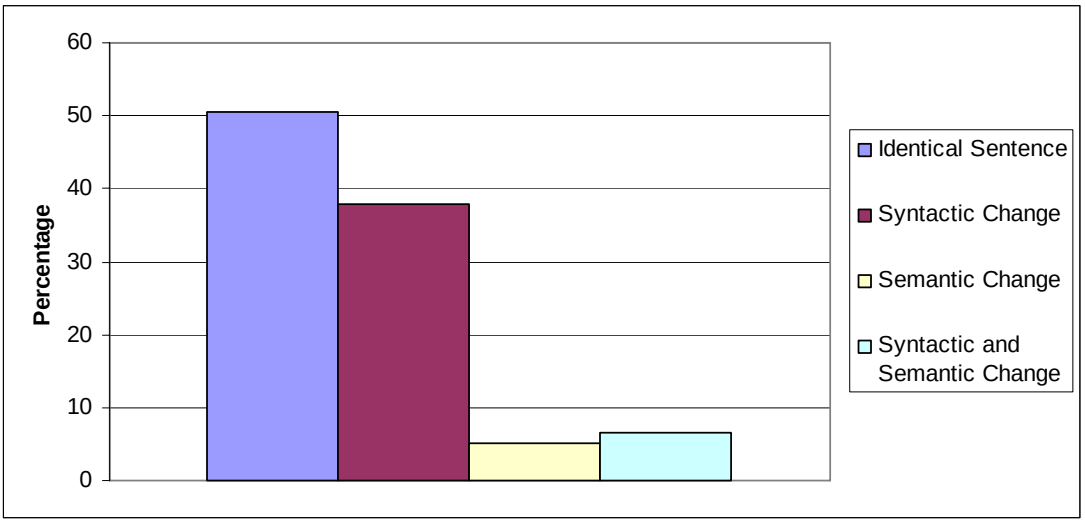


Figure 3 Overall percentages of responses to Type 2 sentences

Figure 3 indicates that the percentage of identical sentences chosen by subjects is 50.56%. Then the ratio of the selected syntactically changed sentences is 37.78%. Semantically changed sentences were picked with the percentage of 5.00% and finally the percentage of chosen sentences with syntactic and semantic change is 6.67%.

These results indicate that half of the subjects picked identical sentences. Then, almost two third of subjects chose type 2 sentences conveying the same meaning but different syntactic structure with identical sentence. Finally, it is seen from the results that few subjects selected the sentences with semantic change and those with both semantic and syntactic change because of their carrying different meaning from identical sentence.

Thirdly, subjects' responses given to type 3 sentences were calculated. These sentences are compound sentences with two propositions. For instance,

(26) Köpek tavşanı ve sincabı kovaladı.
Dog rabbit-Acc and squirrel-Acc chase-Past
The dog chased the rabbit and the squirrel.

The results of subjects' responses to type 3 sentences are indicated in Table 8.

Table 8 The frequencies of answers in Type 3 sentences (n=60)

Type 3 Sentences	1	2	3
Identical Sentence	41	40	32
Syntactic Change	16	14	20
Semantic Change	2	4	4
Syntactic and Semantic Change	1	2	4

As it is seen in Table 8, subjects mostly chose the original sentence similar to other results. When the sentence 3 is compared with sentence 1 and 2, it seen that the frequency of chosen identical sentence in sentence 3 while the frequency of selected sentence with syntactic and semantic change increases sentence 3 decreases. Finally, the frequencies of the choices with semantic change and with syntactic and semantic change remain low.

As the frequencies have been analyzed, the overall percentage of type 3 sentence choices selected by subjects is calculated. The results are shown in Figure 4.

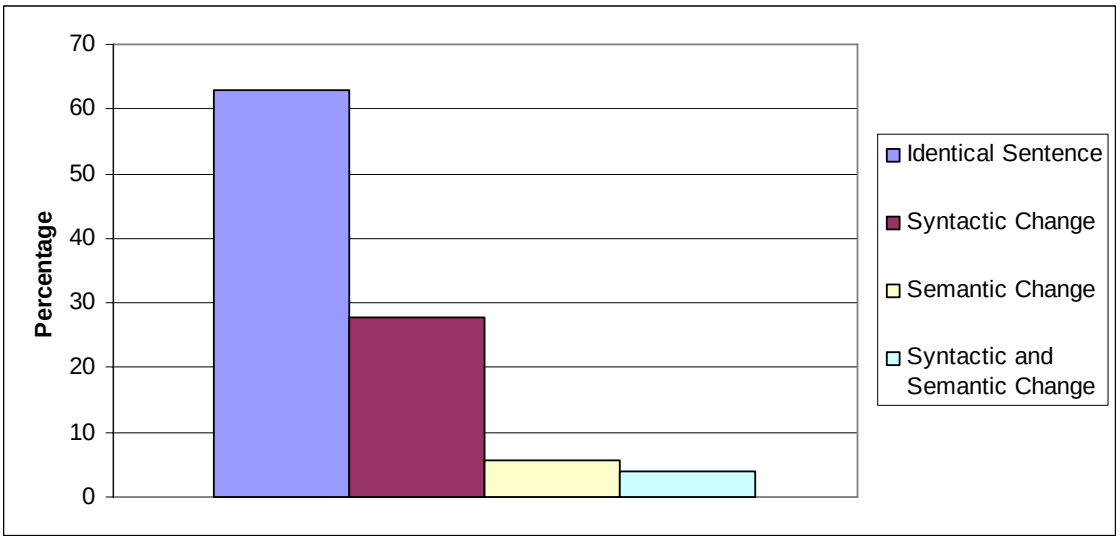


Figure 4 Overall percentages of responses to Type 3 sentences

Figure 4 presents that the identical type 3 sentences were chosen with the percentage of 62.78%. Secondly, the ratio of syntactically different type 3 sentences, which were selected, is 27.78%. Thirdly, 5.56% is the ratio of picked sentences with semantic change. Finally, the sentences with syntactic and semantic change were selected with the percentage of 3.89.

These results indicate that subjects who remembered type 3 sentences in the list selected identical sentences. Those who did not remember chose sentences with syntactic change in spite of the fact that the frequency is not high. Then, few subjects picked semantically different type 3 sentences. Also the frequency of syntactically and semantically different sentences that were selected is less. To sum up, almost all of the subjects have selected type 3 sentences preserving the same meaning without paying attention to syntactic properties.

Lastly, the frequency and percentage of the answers given to type 4 sentences by subjects were calculated. Type 4 sentences contain two propositions and are syntactically complex including a relative clause, as in the example below.

(27) Polis dükkanı soyan adamı yakaladı.
Police (store-Acc rob-Rel.) man catch-Past
The police caught the man who robbed the store.

As the frequencies have been analyzed, the overall percentage of answers in type 4 sentences is indicated in Figure 9.

Table 9 The frequencies of answers in Type 4 sentences (n=60)

Type 4 Sentences	1	2	3
Identical Sentence	34	32	33
Syntactic Change	14	19	20
Semantic Change	7	4	3
Syntactic and Semantic Change	5	5	4

According to Table 9, the frequency results of type 4 sentence choices are similar to the results reached in other types. It is seen that half of the subjects managed to choose the identical type 4 sentence. When the frequency of syntactically and semantically changed sentences with semantically changed sentence is compared, it is seen that the number of sentences with syntactic and semantic change in sentence 1 is lower and those with semantic change is higher than the frequencies in sentence 2 and 3.

As the frequencies have been analyzed, the overall percentage of answers in type 4 sentences is indicated in Figure 5 in the next page.

As it is understood from Figure 5, the original type 4 sentences were selected with the percentage of 55.00%. Then the ratio of chosen sentences with syntactic change is 29.44. Finally, both semantically changed sentences and sentences with syntactic and semantic change were chosen by subjects with the percentage of 7.78%.

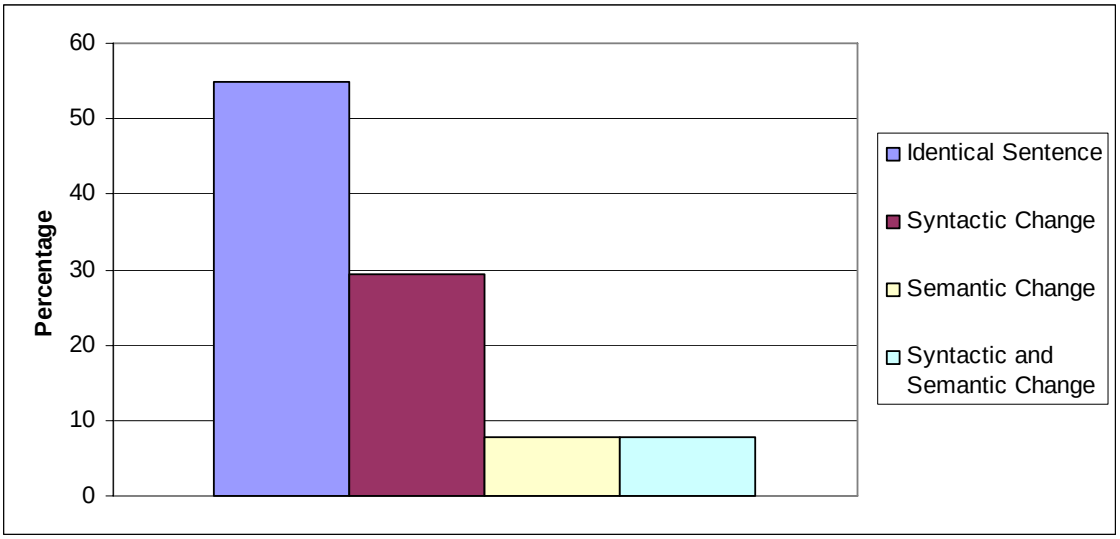


Figure 5 Overall percentages of responses to Type 4 sentences

Similar to other results, more than half of the subjects chose identical sentences. Sentences with syntactic change were selected by one third of the subjects. When compared to the two sentences above, the percentage of sentences with semantic change and syntactically and semantically different sentences that were selected is less.

Up to now, the findings obtained from the answers of the subjects to the four types of sentences have been calculated and the results for each of the sentence types have been indicated with the help of tables and column charts above. The real aim of this experiment; however, is to indicate differences not between four types of sentences but between the multiple choices, namely identical sentences, sentences with syntactic change, those with semantic change and sentences with syntactic and semantic change, for each question in experiment 1. Therefore, a line chart displaying the overall results, i.e. differences among the choices that subjects have recognized is useful. The reason why a line chart is used is to display the differences between sentence choices more clearly. Therefore, Figure 6 indicates the overall results.

Figure 6 indicates that the overall percentage of chosen original sentences in experiment 1 is 56.81%. Then, sentences with a syntactic change were selected by subjects with a percentage of 30.28%. Semantically different sentence choices in multiple-choice recognition test were selected by subjects with the ratio of 6.94%. Finally the percentage of picked sentences with syntactic and semantic change is 5.97%.

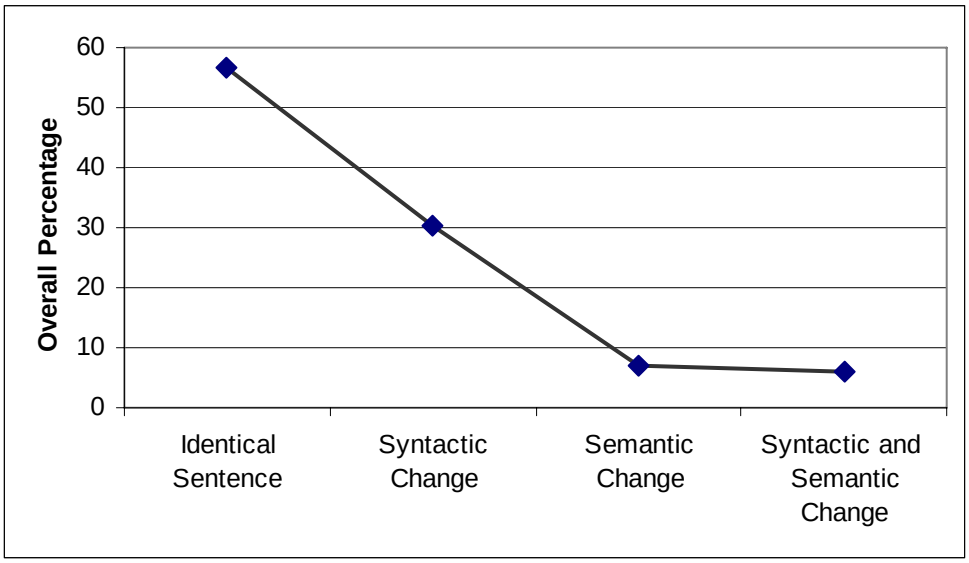


Figure 6 The overall results of answers to all types of sentences

These overall results of experiment 1, which is displayed in Figure 6, indicate that subjects who were able to remember the sentences chose identical sentence in the experiment sheet. In the second rank, one third of the subjects tended to choose the sentence choice preserving the gist, proposition of the identical sentence, but having a different syntactic structure from identical sentence. Thirdly, fewer subjects tended to select sentences which are semantically different, but syntactically same with identical sentence. Lastly, similar to the results of semantically changed sentences, few subjects chose sentences which are different both semantically and syntactically from identical sentence.

3.1.1. Degree of Confidence of Subjects

The other part of analysis of experiment 1 consists of measuring the confidence rate of subjects on their answers. During the experiment, subjects were asked to judge their confidence, sureness on the sentences they recognized. They numbered all of their answers from 1 to 5 (1- not sure; 2- less sure; 3- indecisive; 4- sure; 5- very sure). Those answers given to all types of sentences, namely type 1, type 2, type 3 and type 4, were calculated, respectively. Instead of displaying detailed results, it seemed proper to indicate the overall confidence rating of subjects in each sentence types. Therefore, the

average results of all of the answers grouped according to all four types of sentences are indicated in Table 10.

Table 10 The detailed degree of confidence of subjects in experiment 1

	Type 1	Type 2	Type 3	Type 4
Identical Sentence	4,62	4,68	4,65	4,68
Syntactic Change	4,36	4,29	4,38	4,28
Semantic Change	2,65	2,00	2,60	2,64
Syntactic and Semantic Change	2,30	2,08	2,14	2,43

When the results represented by Table 10 are analyzed, it is seen that the confidence ratings represent similar results among sentence choices in four types of sentences. In other words, subjects' selecting the identical sentence had the similar confidence on their answers in all four types of sentences. This situation is also seen in other sentence choices, which are syntactically different sentences, semantically changed sentences and those both syntactically and semantically changed. When the results are examined, subjects selecting the original sentence were highly confident of themselves. The ratings in all four types of sentences were between "sure" and "very sure" scale and closer to "very sure". Then, similar to the results in identical sentence, the confidence ratings gathered from the syntactically changed sentences are almost the same in the four types. Thirdly, when the ratings of semantically changed sentences are analyzed, it seems that ratings are a bit fluctuated. When the rating of type 2 is 2.00 which mean "less sure", other types have the degree of confidence about 2.60 which is closer to "indecisive". Finally, the degree of confidence of subjects for syntactically and semantically changed sentences alters between the scale of "less sure" and "indecisive". For instance, type 2 has the rating of 2.08 and type 4 has the confidence rating of 2.43.

Now that the average confidence rating of sentence choices in all four types of sentences were analyzed, a line chart displaying the overall ratings in sentence choices without considering different sentence types is represented in Figure 7.

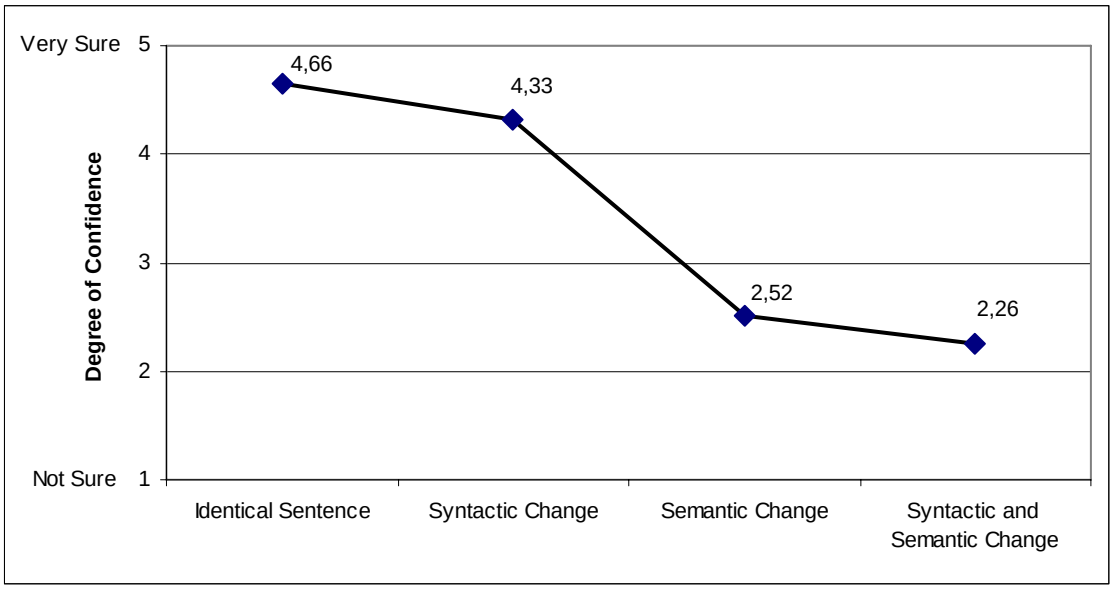


Figure 7 The overall degree of confidence of subjects in Experiment 1

Figure 7 indicated the confidence rating for subjects' judgments for old sentences in a multiple choice recognition task. According to the scale in the chart, 5 mean "very sure" and 1 stands for "not sure". When the ratings in Figure 7 are arranged in the order of sureness, it is clearly seen that subjects choosing the identical sentence had the highest confidence on their answers, which is 4.66. The confidence rating, which is 4.33, for syntactically changed sentence follows it though the difference is little. In the third row, the degree of confidence of subjects for semantically different sentences, which is 2.52, comes. The sharp decline between the sentences with syntactic change and those with semantic change can be seen clearly in the line chart. Finally, the sentence choice which is both syntactically and semantically changed has the least confidence value, 2.26, which is not very different from the results of sentences with semantic change.

When the confidence value of each sentence choice is interpreted, it can be stated that subjects recognizing the identical sentence were highly confident of themselves. Their judgments on these sentences (identical sentences of all types) show that they are between "sure" and "very sure". Then, subjects were again sure in their judgments on syntactically changed sentences in all types. They were sure that they had studied that type of sentences in the first list consisting of a set of twelve sentences. However, subjects picking sentences with semantic change were undecided and the result is in the scale between not sure and undecided. Finally, few subjects who chose sentences with

syntactic and semantic change in all types were not sure of themselves and the result is closer to the scale “less sure”.

These results indicate that subjects who chose syntactically changed sentences were confident of themselves that they had recognized the original sentence. This result would be commented in a way that mind does not pay much attention to syntactic properties of sentences, but it comprehends and keeps meaning. This is also understood from the result that subjects who select sentences with semantic change and sentences with syntactic and semantic change were either undecided or were not sure of themselves about their decisions. This situation makes their decisions as scientifically unreliable and invalid.

3.1.2. Discussion of the Findings from Experiment 1

In experiment 1, it has been aimed to reveal the main constituent of representation of knowledge in memory, which is verbatim or meaning, by studying isolated Turkish sentences. Consequently, a multiple choice recognition task was employed. Subjects tried to choose the old sentence they studied and judged their confidence on answer. The findings were reached by calculating the frequency and percentage of subjects’ answers and the results were indicated with several tables and figures. Table 6, 7, 8 and 9 displayed the detailed frequencies of answers in type 1, type 2, type 3 and type 4 sentences, respectively. In other words, subjects’ choices among the four types of sentence choices, which are identical sentence, syntactically changed sentence, semantically changed sentence and both syntactically and semantically changed sentence, were indicated. Moreover, percentages as well as frequencies of responses were calculated. Figure 2, 3, 4 and 5, which are column charts, showed the overall percentage of subjects’ responses to type 1, type 2, type 3 and type 4 sentences, respectively. Finally, subjects’ confidence ratings for their answers were calculated under the subcategory “degree of confidence”. The degrees of confidence of subjects’ answers for four types of sentence choices in four types of sentences were indicated in Table 10 and in Figure 7.

The results gathered from the tables and figures indicate that almost half of the subjects who were still able to remember the original sentence after two minutes chose the identical sentence. As they remembered the sentence, they were very sure of their answers. In the second row, the sentences with syntactic change which are active/passive change or the change in word order were selected by subjects. Since these sentences preserve the meaning, subjects were sure of themselves that they chose the correct sentence. Then, few subjects tended to choose sentences displaying different meaning and sentences with both syntactic and semantic change as the original sentence (see Figure 7 to see this rank more clearly). Those subjects selecting the last two types of sentences were either less sure or indecisive in their answers. These results are understood better by analyzing the following example which is one of the multiple choice questions.

a) Garsonlar yemeği getirdi. (identical sentence)

b) Yemek garsonlarca getirildi. (syntactic change)

c) Garsonlar tatlıyı getirdi. (semantic change)

d) Tatlı garsonlarca getirildi (semantic and syntactic change)

The results of experiment 1 indicated that subjects who could remember the sentence above exactly during experiment 1 selected the identical sentence (sentence a). Apart from the answers including the identical sentence, most of the subjects chose sentence *b* which has the same meaning with sentence *a*, original sentence. The only difference between these two sentences is their syntactic structure. The original sentence is in active voice whereas sentence *b* is passive. Despite the difference, results show that subjects chose sentence *b* much more often than sentence *c* and *d*. Sentence *c* has a difference in meaning from identical sentence but preserves the syntactic knowledge of original sentence and sentence *d* does not preserve both syntactic and semantic information. This result briefly represents that participants paid little attention to different syntactic or semantic properties of sentences that they read on experiment sheet.

Consequently, the results obtained from the frequency and percentage of selected sentences, indicated that subjects tended to recognize sentences keeping the gist or proposition of the old sentences in the list. It has been seen that subjects did not pay

attention to syntactic properties of sentences. These results show the importance of meaning in the process of comprehending sentences and preserving them in memory. So, our first research question “whether verbatim or meaning of Turkish sentences is comprehended and remembered better” has been answered.

Another result derived from these findings is that the results among the four types of sentences were quite similar. However, these sentences reveal different syntactic features such as simple, compound and complex. Then, such an inference can be deduced that syntactic constituents of sentences are not taken into account in memory process. They are not represented in memory at least in the scope of this experiment which involves a recognition task. This inference can answer the research question “whether surface constituents such as linear distance and syntactic features have a major role in comprehension and memory processes”. Of course these surface features may have some role in understanding and constructing sentences; however, when these findings are examined, a major role of verbatim or syntactic features has not been found out.

To sum up, the result of the first experiment which is a multiple-choice recognition task indicates that semantic knowledge takes priority in the initial stage of comprehension process, because the sentence has been put in mind in terms of its meaning, and syntactic information such as active/passive, word order and verbatim have not been taken into account by subjects and so by mind.

3.2. EXPERIMENT 2

In experiment 2 forming the last part of analysis of thesis, a cued recall test was performed. The findings obtained from this test were analyzed statistically. In other words, a quantitative analysis was done. Accordingly the frequency and percentage of items (words) which were recalled by subject were calculated in Ms Excel and the results were shown in line charts and tables. Lastly, a discussion of the results was done.

As it has been mentioned before, nine sentences in experiment sheet for experiment 2 was formed of three types of sentences. All of the three types of sentences consisted of

two propositions. Type 1 sentences are syntactically simple, type 2 sentences are compound and type 3 sentences are complex sentences including a relative clause. Consequently, the distribution of sentence types in the experiment sheet of experiment 2 is indicated in Table 11.

Table 11 Distribution of types of sentences used in experiment 2

	Frequency	Percentage
Type 1	3	33.33 %
Type 2	3	33.33 %
Type 3	3	33.33 %
Total	9	100 %

As shown in Table 11, the frequency of each type of sentences is 3 and they have a percentage of 33.33% for each.

While findings were being analyzed, the frequency and percentage of the recall words in each of these three types of sentences were calculated separately. In this experiment, while the recalled items in each of the sentences were analyzed, the frequency and percentage of the recalled words belonging to the same proposition with cue words and words belonging to different proposition were also calculated. It was checked whether there was a difference between the results of two groups, one consisting of recalled words within the same proposition with cue word and the other containing items coming from different proposition from cue word. While the results from these two groups have been compared, it would be wise to state one point. As it was mentioned before, cue words of each of nine sentences were not selected randomly. Firstly the word having the same distance in linear structure to words from the same proposition and to those from different proposition(s) have been selected as cue word. Alternatively, the word which is only adjacent or close to words from different proposition(s) and is not close to those sharing same proposition has also been chosen as cue word. This was done so in order to prevent the claims derived from the characteristic of verbatim which means that words in a sentence are grouped in mind and kept in memory according to each other's proximity in linear structure, namely, word order. According to this view, it would be said that what are remembered and understood mostly from the nine sentences in the

experiment are the words which are the most proximate to cue words in linear sentence structure. For example,

(28) Dadı (duvarı çizen) çocuğu uyardı..
P1 P2 P2 P1-P2 P1
Nanny wall-Acc draw-Rel. kid warn-Past
Nany warned the kid who drew on the wall.

This sentence contains two propositions:

(28a) UYAR [dadı, çocuk] WARN [nany, kid]

(28b) ÇİZ [çocuk, duvar] DRAW [kid, wall]

Cue word: dadı

In linear structure, cue word *dadı* is close to words, *duvarı* and *çizen* which are from other propositions. However, words from the same proposition with the cue word are distant to cue word. Therefore, while the results were analyzed, it was taken into account whether the words closer to cue word in linear structure or those belonging to same proposition were recalled more by subjects. In other words, whether distance among meaning or distance among linear structure which is part of verbatim is important was also studied.

In the analysis of experiment 2, firstly the detailed frequencies of subjects' recall in type 1 sentences were calculated. Type 1 sentences are syntactically simple sentences containing two propositions and each experiment sheet included three type-1 sentences. The verbatim presentation of type 1 sentences is indicated below.

N_1 Adj_1 N_2acc. V_1

(29) Kız mavi elbiseyi giydi.
Girl blue dress-Acc wear-Past
The girl wore the blue dress.

(29a) GİY [elbise, kız] WEAR [girl, dress]

(29b) MAVİ [elbise] BLUE [dress]

cue word: mavi

In this sentence, N_2 elbiseyi shares the same proposition with cue word whereas N_1 and V_1 are from different proposition from cue word.

Thus, frequency of complete sentence recall, which means subjects recalling the whole sentence, the frequency of not recalled sentences, the frequency of recalled words belonging to the same proposition with cue word and those from another proposition in type 1 sentences are indicated in Table 12.

Table 12 Detailed frequencies of subjects' recall of Type 1 sentences in experiment 2 (n=60)

Type 1 Sentences		1	2	3
Complete sentence recall		32	29	24
Not recalled		5	9	6
Recalled word(s) within the same proposition with cue word	N_2	22	21	29
Recalled word(s) from different proposition from cue word	V_1	7	5	9
	N_1	2	4	7

Table 12 indicates that subjects' recall frequencies are similar among the three sentences. It is seen that nearly half of the subjects recalled the whole sentence. Secondly, few subjects were not able to recall anything from type 1 sentences. Then, the frequencies of recalled words within the same or from different proposition from cue word come. When their frequencies are calculated, the partial recalled sentences were taken into account. The results in complete sentence recall were not included to the result. Accordingly, the table shows that the word, N_2 belonging to the same proposition with cue word were highly recalled in partial recall when this result is compared with that of V_1 and N_1 which are from different proposition.

According to these results, it is seen that items belonging to same proposition with cue words in Type 1 sentences were remembered or recalled more than the items belonging to different proposition from cue words in Type 1 sentences.

After the detailed frequencies have been examined, a line chart displaying a word by word analysis of recalled words in type 1 sentences is presented. It indicates the recall percentage of content words in linear structure so that the difference between recall of words in the proposition with cue word and the content words from different

proposition from cue word can be seen clearly. In this point, it should be noted that while the percentage was calculating, the results of complete sentence recall were added to the results of partial recall. Thus, a more general result was reached. Accordingly, the overall percentage of subjects' recall for type 1 sentences is indicated in Figure 8.

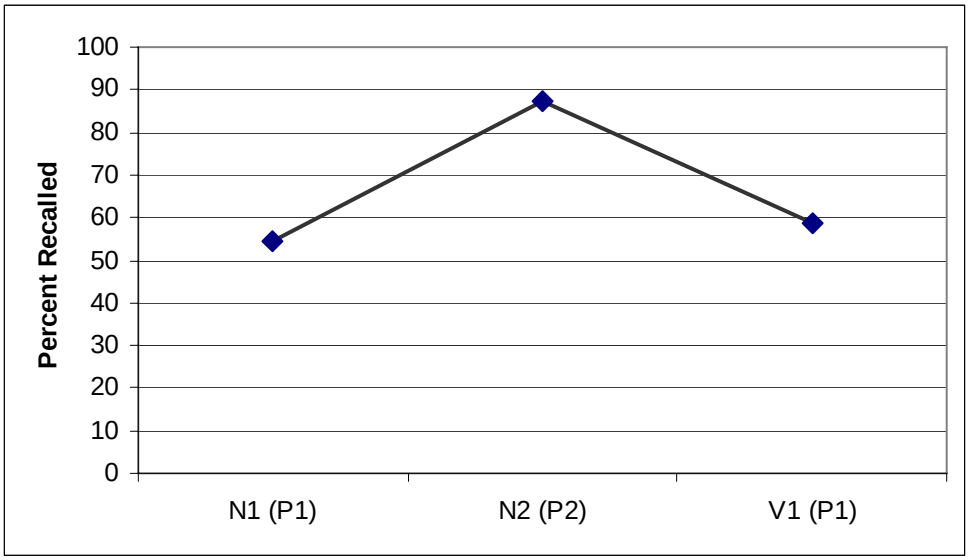


Figure 8 Percentage of subjects' recalls for Type 1 sentences

Figure 8 shows recall percentage of content words of type 1 sentences in linear word order. The percentage of recall of N_1 is 54.44% while the percentage of recall of N_2 is 87.22%. Finally, V_1 was recalled with the ratio of 58.89%. In type 1 sentences, the cue word takes place between N_1 and N_2. N_2 shares the same proposition with cue word, while N_1 and V_1 construct a second proposition which is not related to cue word (See sentence 29). Cue word has the same distance to these two groups of words in linear structure. According to Figure 8, the content word belonging to the same proposition with cue word was recalled more than the words from different proposition from cue word in type 1 sentences which are syntactically simple.

Dealing with Type 1 sentences, the findings gathered from the recalls of subjects from type 2 sentences were also analyzed. Type 2 sentences are compound sentences containing two propositions. An example of type 2 sentence is given below.

(30)	N_1	N_2acc.	conj.	N_3acc.	V_1
	Turist	müzeyi	ve	parkı	gezdi.
	Tourist	museum	and	park-Acc	see-Past

Tourist saw the museum and the park.

(30a) GEZ [turist, müze] SEE [tourist, museum]

(30b) GEZ [turist, park] SEE [tourist, park]

cue word: müze

In this sentence, N_1, *turist* and V_1, *gezdi* are in the same proposition with cue word while N3 belongs to a different proposition from cue word. Then, a detailed representation of subjects' recalls is shown in Table 13.

Table 13 Detailed frequencies of subjects' recall of Type 2 sentences in experiment 2 (n=60)

Type 2 Sentences		1	2	3
Complete sentence recall		22	18	13
Not recalled		2	9	12
Recalled word(s) within the same proposition with cue word	N_1	34	30	28
	V_1	34	24	26
Recalled word(s) from different proposition from cue word	N_3	1	8	6

In Table 13, it is seen that approximately one third of subjects recalled the whole sentence though the frequencies in sentence 1 and 3 have some difference. Then, almost all of the subjects have recalled sentence 1 in type 2 either wholly or partially whereas some subjects did not recall second and third sentences. Moreover, in partial recall, most of the subjects were able to recall words within the same proposition with cue word in all three sentences. Finally, almost none of the subjects recalled N_3, which is from a different proposition from cue word, in sentence 1 and few subjects remember N_3 in other two sentences, namely, sentence 2 and 3. In the light of the results gathered from Table 13, it is seen that the recall rate of the two groups of words are quite different. Subjects participating to experiment 2 recalled the words within the same proposition with cue words much more often than words belonging to another proposition in Type 2 sentences.

Now that the frequencies were indicated, the overall percentage of recalled words in type 2 sentences in linear structure was also calculated. The results are indicated in Figure 9.

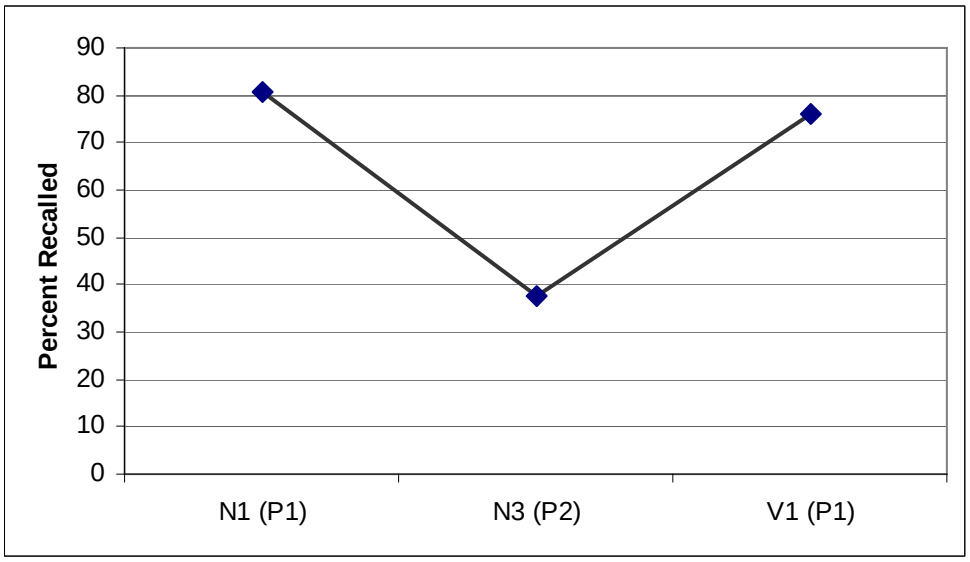


Figure 9 Percentage of subjects' recalls for Type 2 sentences

As shown in Figure 9, the recall percentages of content words of type 2 sentences in verbatim are represented. The percentage of N_1 is 80.56% and the ratio of V_1 is 76.11%. However, 37.78% is the recall percentage of N_3. In the figure, cue word given for type 2 sentences is between N_1 and N_3. N_1 and V_1 belong to the same proposition with cue word whereas N_3 is from different proposition from cue word. In linear structure, cue word has the same proximity to the word from different proposition and word within the same proposition (See example 30). What can be interpreted from this figure is that the difference in the recall percentage between the two groups of words is really high. It is seen that words from the same proposition with cue word were recalled by subjects much more than those in a different proposition from cue word.

Thirdly, the detailed frequency results of subjects' recalls in type 3 sentences were calculated. Those sentences are syntactically complex sentences containing two propositions. The example of detailed representation of type 3 sentences is indicated below.

	N_1	(N_2acc.	V_1)rel cl.	N_3acc.	V_2
(31)	Dadı	(duvarı	çizen)	çocuğu	uyardı..

Nanny wall-Acc draw-Rel. kid warn-Past

Nany warned the kid who drew on the wall.

(31a) UYAR [dadı, çocuk] WARN [nany, kid]

(31b) ÇİZ [çocuk, duvar] DRAW [kid, wall]

Cue word: dadı

The recall results of subjects taking part in experiment 2 are shown in Table 14.

Table 14 Detailed frequencies of subjects' recall of Type 3 sentences in experiment 2 (n=60)

Type 3 Sentences		1	2	3
Complete sentence recall		17	9	21
Not recalled		5	11	9
Recalled word(s) within the same proposition with cue word	N_3	36	35	16
	V_2	26	32	26
Recalled word(s) from different proposition from cue word	N_2	13	13	5
	V_1	6	12	3

Table 14 indicates that one third of subjects recalled the Type 3 sentences completely. However, this result is low in sentence 2. Then few subjects were not able to remember the Type 3 sentences. When the partial recall results are examined, it is seen that words within the same proposition with cue word were recalled more than the other group of words from another proposition, though it should be noted that the result of sentence three is a bit different than the others. Its results in both groups are lower than those of sentence 1 and 2. Lastly, the frequencies of recalled words from other proposition in type 3 are a bit more than those in type 1 and type 2.

Seeing the detailed frequencies, we now should see the overall recall percentages in type 3 sentences in linear order. The results are indicated in Figure 10.

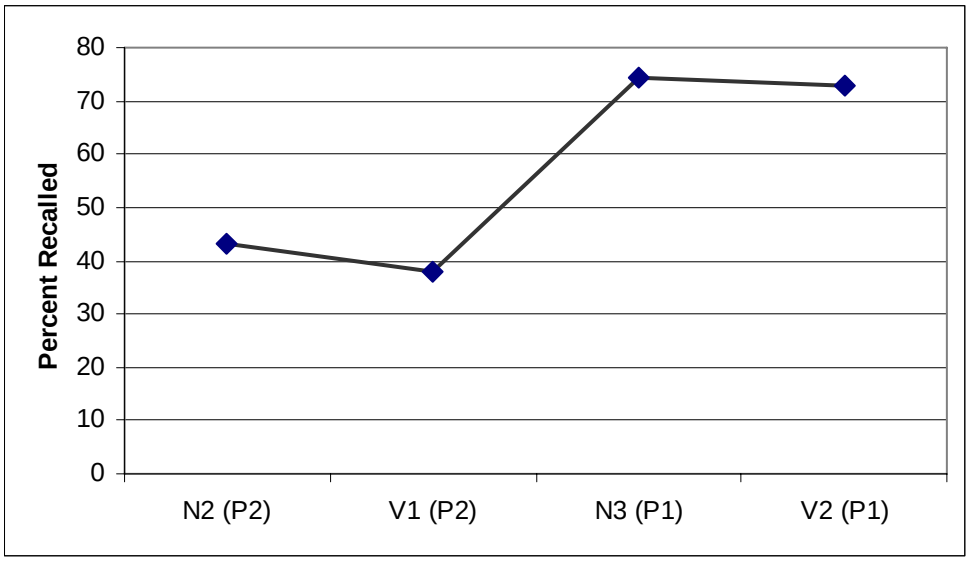


Figure 10 Percentage of subjects' recalls for Type 3 sentences

Figure 10 represents the percentage of four content words constructing type 3 sentences. The percentage of N_2 is 43.33% and the ratio of V_1 is 37.78%. Then 74.44% is the recall percentage of N_3 and V_1 was recalled with the ratio of 72.78%. In type 3 sentences, cue word precedes N_2, so it is the first word of the sentence. N_2 and V_1 do not belong to the proposition within cue word but N_3 and V_2 which are distant to cue word in linear order share the same proposition with it (see example 31). When Figure 10 is examined, the recall difference between words in the same proposition with cue word and those from another is clearly seen from the sharp increase. Therefore, it can be said that words sharing the same proposition with cue word were remembered twice more than the words belonging to other proposition without cue word by subjects participating to experiment 2.

After the results of recalled words among the three types of sentences have been analyzed, it would be wise to see the general framework of results. Accordingly the overall percentage of the recalled words within the same proposition with cue words and those from different proposition in all types of sentences were calculated. Then the results are indicated in Table 15.

According to Table 15, subjects recalled words belonging to the same proposition with cue words in all of the sentences with a percentage of 78.22%. However, the words

belonging to different propositions from cue words in all of the sentences in experiment 2 were recalled by subjects with the percentage of 46.44%.

Table 15 Overall results of experiment 2

Overall	%
Recalled word(s) within the same proposition with cue word	78,22
Recalled word(s) from different proposition from cue word	46,44

It should be kept in mind that exact recall results, which were displayed in the detailed frequency table, were added to this overall result, otherwise the percentage of partial recall would be lower especially in the group of words from different proposition from cue word. Yet, the result for the words sharing the same proposition with cue word in partial recall probably stays similar.

The overall results indicate that word(s) or items within the same proposition with cue word in a sentence were recalled more often than the items which do not belong to the proposition with cue word in a sentence.

3.2.1. Discussion of the Findings from Experiment 2

In experiment 2, it was aimed to prove the reality of proposition in sentence comprehension and memory and to reveal that verbatim consisting of linear word order and syntactic constituents and so on does not have much role in this process. So, a cued recall test was employed. The results were shown by several tables and charts. Table 12, 13 and 14 indicated the detailed frequencies of subjects' recalls in Type 1, Type 2 and Type 3 sentences, respectively. In these tables, the frequency of complete sentence recall, the number of sentences not recalled by subjects and the frequencies of words sharing the same proposition with cue word and words belonging to a different proposition from cue word were indicated.

Firstly, it can be said that approximately one third of subjects remembered and recalled the sentences in all types exactly. Such a result was also seen in Experiment 1. There were some subjects who were able to keep verbatim of sentences they studied after two minutes in both experiment 1 and 2. This result shows that verbatim may still have some role in memory and cannot be wholly rejected. However, since two third of subjects recalled the sentences partially, it cannot be said that exact wording is remembered and kept in memory better.

Our concern in experiment 2; however, is the results gathered from the two third of subjects. The tables mentioned above indicated that subjects mostly remembered the content words within the same proposition rather than the words from different proposition from cue word in all three types of sentences. The overall percentage of these two groups of words can be seen in Table 15. An example will explain the mentioned result better.

(32) Müşteri (tabloyu yapan) ressamı aradı.
Customer painting-Acc do-Rel. artist call-Past
Customer called the artist who did the painting.

(32a) ARA [müşteri, ressam] CALL [customer, artist]

(32b) YAP [ressam, tablo] DO [artist, painting]
cue word: customer

This sentence is a complex sentence with two propositions. In cued recall task *customer* was determined as cue word. According to the findings we mentioned, the words *ressamı* and *aradı* which belong to the first proposition including the cue word were recalled much more often than words *tabloyu* or *yapan* which belong to the second proposition, which is different from cue word.

Apart from the detailed frequencies of recalls, the overall percentages of the recall of content words constructing the sentences in Type 1, Type 2 and Type 3 were indicated in Figure 8, 9 and 10, respectively. In these Figures, it has been aimed to show the percentage differences in recall between the two groups of words in linear order so that the linear distance between cue word and other content words in sentence can be seen clearly. In the beginning section of Experiment 2, it has been stated that cue words for

each of the sentence was not selected randomly. Two types of cue words were determined in terms of its linear distance. In type 1 and type 2 sentences, the cue word has the same proximity to both of the words within the same proposition with cue word and the words from different proposition from cue word. In type 3 sentences; however, cue word is adjacent to the words from different proposition from cue word and distant to the words sharing the same proposition, which can be a disadvantage from the point of verbatim representation of knowledge in which such features as linear distance and syntactic information of sentences are believed to have a major role.

Keeping this situation in mind, the three figures we mentioned indicated that words sharing the same proposition with cue word recalled much more often than the words from other group (Examining the Figures, line charts, in the previous pages, you can see the sharp declines and increases). This situation is explained best with several examples.

(33) Dadı (duvarı çizen) çocuğu uyardı..
P1 P2 P2 P1-P2 P1
Nanny wall-Acc draw-Rel. kid warn-Past
Nany warned the kid who drew on the wall.

(33a) UYAR [dadı, çocuk] WARN [nany, kid]

(33b) ÇİZ [çocuk, duvar] DRAW [kid, wall]

Cue word: dadı

This sentence is a complex sentence with 2 propositions. In cued recall task, *dadı* was determined as cue word. The results of experiment 2 indicated that the words *çocuğu, uyardı* which belong to Proposition 1 including the cue word *dadı* were recalled more often than words, *duvarı* or *çizen* which belong to Proposition 2 which is a different proposition from cue word. Moreover, it has been seen that the proximity between words in linear structure did not play an important role in comprehending and memorizing sentence. When we look at the sentence above, *duvarı* and *çizen* belonging to different proposition from cue word *dadı* are closer to *dadı* in linear structure. However, words *çocuğu* and *uyardı* which are from the same proposition with cue word are quite distant to the cue word. Despite this situation, *çocuğu* and *uyardı* were recalled more.

Another example would also be given among the sentences studied in experiment 2.

(34) Avukat önemli davayı kazandı.

P1 P2 P1-P2 P1
lawyer important trial-Acc win-Past

Lawyer won the important trial.

(34a) KAZAN [avukat, dava] WIN [lawyer, trial]

(34b) ÖNEMLI [dava] IMPORTANT [trial]

Cue word: önemli

The sentence above is a type 1 simple sentence with two propositions and the cue word determined from this sentence is *önemli*. Despite the fact that *avukat* which is from the different proposition from cue word, *önemli* and *dava* which is within the same proposition with cue word have had the same distance to *önemli* in linear sentence structure. *Davayı* was recalled more since it belongs to same proposition with cue word.

The situation discussed in the two examples above can be interpreted in the way that linear order and distance among words which are parts of verbatim do not have a role or at least a major role in comprehending and memorizing sentences.

One last thing to mention is that in experiment 2 as well as experiment 1, the sentence types have different syntactic features, namely, simple, compound and complex, but the same number of propositions, i.e. two propositions. The results among the sentence types never indicated huge differences. They always displayed similar results in both experiment 1 and 2. It can be inferred from this situation that syntactic features which are again related with verbatim which is the surface structure do not have a major role in comprehension and memory process.

These results mentioned above represent evidence to our first research question, "whether surface constituents such as linear distance and syntactic features have a major role in comprehension and memory processes". On the other hand, the main aim of employing cued recall task in Experiment 2 was to find evidence to our second research question, whether Turkish sentences, as part of language, are comprehended and memorized in terms of propositions. Accordingly, the second research question has been answered in the light of the results in Experiment 2. It is seen that words belonging

to the same proposition with cue word were recalled much more often than the words from other proposition without considering the syntactic features and the distance among sentences in Turkish language. This result supports the view that sentences are grouped in mind in the form of propositions, and they are comprehended and memorized in the same form.

4. CONCLUSION

The aim of the study has been to reveal the reality of propositions and their role in comprehension and memory processes in mind by studying isolated sentences in Turkish language. Besides, whether meaning or verbatim and other surface aspects lead a major role in the comprehension and memory processes in mind has been questioned. Accordingly, two experiment types which are well-known in psycholinguistics, cognitive psychology and cognitive science have been used with several modifications. These are recognition and recall tasks. Both of these tasks have been analyzed quantitatively, the frequency and percentage of subjects' answers were calculated.

First of all, a multiple choice recognition task was employed. Subjects read several isolated sentences and a delayed test including four different sentence choices for each of the studied sentences were presented to subjects. Subjects chose the sentence which they believed as old and they indicated the rate of their confidence on the answer in the test. At the end of the experiment, the frequency and percentage of subjects' answers and their confidence rating have been calculated and indicated in tables, column and line charts. The result of the first experiment shows that subjects mostly chose the identical sentence and then the syntactically changed sentence keeping the gist of the original sentence was chosen. Afterwards, few subjects selected the semantically changed sentences and sentences with syntactic and semantic change. Confidence ratings also show that subjects who were able to keep the meaning of sentences, namely the first two sentences above, were sure in their judgments. On the other hand, subjects who selected the last two types of sentences i.e. semantically different sentences and sentences with semantic and syntactic change were less sure of themselves or indecisive.

Another experiment which forms the second part of the thesis was the cued recall task. Similar to the recognition task, several isolated sentences were presented to subjects. Then, in the delayed test an experiment sheet in which one cue word for each of the studied sentence takes place was given to subjects, and they were asked to recall the sentences. Then the frequency and percentage of subjects' recalls have been calculated and displayed in several tables and line charts. According to the findings, some of the

subjects who were still able to remember after two minute break recalled the whole sentence. Few subjects could not recall some of the sentences. Most of the subjects; however, recalled the sentences partially. When word by word analysis in linear sentence order has been done, it has been seen that subjects tended to the recall the words sharing the same proposition with cue word much more than the words from the different proposition from cue word.

In the light of these results gathered from the two experiments, several conclusions would be reached.

First of all, our first research question has been fully answered. The first part of the first research question has been "whether verbatim or meaning of Turkish sentences is comprehended and remembered better". It has been seen that the verbatim is kept in memory to some extent. Because some of the subjects who have participated to both experiment 1 and 2 were able to remember the exact wording of isolated sentences in the delayed tests. However, the results indicated that rest of the subjects in experiment 1 tended to chose sentence choice keeping the gist of the sentence with a high rate of confidence. Only few subjects who were distracted chose the other two choices having different meaning with no confidence. Consequently, it can be said that verbatim representation of sentences does not have a major role in comprehension and memory processes. Meaning of Turkish sentences are comprehended and remembered better. In other words, when we read a sentence what we understand, comprehend with the help of mind processes and keep in the long term memory is the meaning of that sentence.

In addition, the second part of the first research question of the study has been "whether surface constituents such as linear distance and syntactic features have a major role in comprehension and memory processes". In both of the experiments there were different types of sentences such as simple, compound and complex. However, the results were almost the same in each type of sentences. The differences in sentence structure such as active/passive, simple, compound or complex have not affect the frequency and ratio of subjects' recall or recognition. Moreover, the results of experiment 2 have indicated that words' linear proximity in a sentence is not important in comprehension and memory process. Words which are distant to cue word in linear order have been remembered

much more than those which are adjacent to cue word. These results have determined that syntactic structure of sentences and the linear order of sentences which is a surface aspect are not important and do not have a major role in comprehension and memory process. While reading a sentence, mind does not pay attention to linear order of words and the syntactic features of the sentence.

Moreover, it has been seen that our second research question, whether Turkish sentences, as part of language, are comprehended and memorized in terms of propositions, has been answered successfully. As the importance and priority of meaning have been mentioned above, it has been seen that meaning is understood and stored in memory in the form of propositions. This result has been reached with the following finding from experiment 2: Words within the same proposition with cue words have been recalled with a high percentage whereas the percentage and frequency of the words from different proposition from cue word were lower. Thus, the reality of propositions has been supported by the results of experiments. It has been seen that Turkish sentences are grouped as propositions and represented in memory in that way. So it could be said that propositions are vital in the process of comprehension.

One last point on the reality of propositions is that unlike other studies on propositions, we have identified the validity of propositional theory in comprehension and memory in Turkish language, which is quite different from English language from many aspects. The results of this study have contributed to the universality of propositional theory in sentence comprehension.

In the current study, the role of meaning and propositions has been indicated by studying isolated Turkish sentences. However, several further studies would be done. Firstly, the very same experiments would be carried out with text or discourse instead of isolated sentences. Subjects could either read or listen to simple, academic or everyday discourse and subjects' recognition and recall rate could be measured. Moreover, different methods to discuss the same topics would be used. Priming method, which is popular in memory studies, measuring reading speed in discourse comprehension are some examples. Thirdly, the role of syntactic features, meaning and propositions in the production process of language as well as the comprehension process may be defined.

Measuring the stage of language production requires different methodology since it is a more different, active mental process than language comprehension, and memorization which are passive mental processes. Lastly, the propositions which are the representation of knowledge would be transferred and used in different studies made in other fields such as cognitive science and computer science. Using propositions in neural networks in computer intelligence and in artificial intelligence, which are current popular topics in interdisciplinary fields, could be quite helpful to create a model of human thinking system and language. To conclude, several studies from different aspects would be made in the light of the results of the current study.

To sum up, the findings gathered from these two experiments, multiple-choice recognition test and cued recall task have successfully answered our research questions; lead us to further studies and; the aims of the thesis have been achieved.

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APPENDIX 1

Experiment 1: the list of sentences

TYPE 1 (Simple sentence, one proposition)

[1]N_1, N_2 acc.V_1 P_1 (Arg_1, Arg_2)

Garson yemeği getirdi.

Gazeteci makaleyi okudu.

Çırak dükkanı açtı.

TYPE 2 (Simple sentence, two propositions)

Adj_1, N_1acc. N_2, V_1 P_1 (Arg_1, Arg_2) P_2 (Arg_2)

Yaşlı ağacı oduncu kesti.

Beyaz paltoyu doktor giydi.

Değerli mücevheri hırsız çaldı.

TYPE 3 (Compound sentence, two propositions)

N_1, N_2acc., conj. N_3acc. V_1 P_1 (Arg_1, Arg_2) P_2 (Arg_1, Arg_3)

Köpek, tavşanı ve sincabı kovaladı.

Çocuk, şekeri ve çikolatayı yedi.

Komşu mektubu ve paketi postaladı.

TYPE 4 (Complex sentence, two propositions)

N_1, (N_2acc. V_1)rel cl. N_3acc. V_2 P_1(Arg_1, Arg_2) P_2 (Arg_2, Arg_3)

Polis dükkanı soyan adamı yakaladı.

Başkan yarışmayı kazanan sporcuyu kutladı.

Berber camı kıran oğlanı gördü.

[1] N: Noun, V: Verb, Adj: Adjective, P: Predicate, Arg: Argument, conj: Conjunction, rel cl: Relative Clause, acc: Accusative Case

APPENDIX 2

Original experiment sheets of experiment 1

DENEY 1:

Aşağıda verilen tümceleri dikkatlice okuyunuz.

1) Garsonlar yemeği getirdi.

2) Polis dükkanı soyan adamı yakaladı.

3) Komşu mektubu ve paketi postaladı.

4) Gazeteci makaleyi okudu.

5) Yaşlı ağacı oduncu kesti.

6) Köpek, tavşanı ve sincabı kovaladı.

7) Başkan yarışmayı kazanan sporcuyu kutladı.

8) Çırak dükkanı açtı.

9) Çocuk şekeri ve çikolatayı yedi.

10) Beyaz paltoyu doktor giydi.

11) Berber camı kıran oğlanı gördü.

12) Değerli mücevheri hırsız çaldı.

Yaş:

DENEY 1:

- Aşağıda verilen seçenekler arasından daha önce okuduğunuz tümceleri işaretleyiniz. Her soruda bir eski, üç yeni tümce vardır.
- Eski tümceyi seçtikten sonra her tümcenin yanına verdiğiniz cevaptan ne kadar emin olduğunuzu 1'den 5' e numara vererek belirtiniz.

  1= hiç emin değilim

  2= emin değilim

  3= kararsızım

  4= eminim

  5= tamamen eminim

		eminlik derecesi (1-2-3-4-5)
1)	a) Tatlı garsonlarca getirildi.	____
	b) Garsonlar tatlıyı getirdi.	____
	c) Garsonlar yemeği getirdi.	____
	d) Yemek garsonlarca getirildi.	____
2)	a) Dükkanı soyan adam polis tarafından yakalandı.	____
	b) Polis bankayı soyan adamı yakaladı.	____
	c) Bankayı soyan adam polis tarafından yakalandı.	____
	d) Polis dükkanı soyan adamı yakaladı.	____
3)	a) Mektubu ve paketi komşu yırttı.	____
	b) Komşu mektubu ve paketi postaladı.	____
	c) Komşu mektubu ve paketi yırttı.	____
	d) Mektubu ve paketi komşu postaladı.	____

4) a) Gazeteci makaleyi yazdı. ____
b) Makaleyi gazeteci okudu. ____
c) Makaleyi gazeteci yazdı. ____
d) Gazeteci makaleyi okudu. ____

5) a) Yaşlı ağacı oduncu kesti. ____
b) Oduncu yaşlı ağacı budadı. ____
c) Yaşlı ağacı oduncu budadı. ____
d) Oduncu yaşlı ağacı kesti. ____

6) a) Tavşan ve sincap köpek tarafından kovalandı. ____
b) Köpek tavşanı ve kediyi kovaladı. ____
c) Köpek, tavşanı ve sincabı kovaladı. ____
d) Tavşan ve kedi köpek tarafından kovalandı. ____

7) a) Yarışmayı kazanan sporcuyu başkan kutladı. ____
b) Başkan yarışmayı kazanan sporcuyu kutladı. ____
c) Yarışmayı kazanan sporcuyla başkan konuştu. ____
d) Başkan yarışmayı kazanan sporcuyla konuştu. ____

8) a) Dükkanı çırak kapattı. ____
b) Çırak dükkanı açtı. ____
c) Dükkanı çırak açtı. ____
d) Çırak dükkanı kapattı. ____

9) a) Şekeri ve çikolatayı çocuk sakladı. ____
b) Şekeri ve çikolatayı çocuk yedi. ____
c) Çocuk şekeri ve çikolatayı sakladı. ____
d) Çocuk şekeri ve çikolatayı yedi. ____

10) a) Beyaz paltoyu doktor giydi. ____
b) Beyaz kazağı doktor giydi. ____
c) Doktor beyaz paltoyu giydi. ____
d) Doktor beyaz kazağı giydi. ____

11) a) Camı kıran oğlanı berber gördü. ____
b) Berber camı kıran oğlanı dövdü. ____
c) Berber camı kıran oğlanı gördü. ____
d) Camı kıran oğlanı berber dövdü. ____

12) a) Değerli mücevher hırsız tarafından çalındı. ____
b) Değerli kolyeyi hırsız çaldı. ____
c) Değerli kolye hırsız tarafından çalındı. ____
d) Değerli mücevheri hırsız çaldı. ____

APPENDIX 3

Experiment 2: the list of sentences

TYPE 1 (Simple sentence, two propositions)

[1]N_1, Adj_1, N_2acc. V_1 P_1 (Arg_1, Arg_2) P_2 (Arg_2)

Kız mavi elbiseyi giydi.

Öğrenci zor sınavı geçti.

Avukat önemli davayı kazandı.

TYPE 2 (Compound sentence, two propositions)

N_1, N_2acc., conj. N_3acc. V_1 P_1 (Arg_1, Arg_2) P_2 (Arg_1, Arg_3)

Turist müzeyi ve parkı gezdi.

Hizmetçi yeri ve camı sildi.

Bahçıvan ağacı ve çiçeği suladı.

TYPE 3 (Complex sentence, two propositions)

N_1, (N_2acc. V_1)rel cl. N_3acc. V_2 P_1(Arg_1, Arg_2) P_2 (Arg_2, Arg_3)

Dadı duvarı çizen çocuğu uyardı.

Seyirci şiiri okuyan kadını alkışladı.

Müşteri tabloyu yapan ressamı aradı.

[1] N: Noun, V: Verb, Adj: Adjective, P: Predicate, Arg: Argument, conj: Conjunction, rel cl: Relative Clause, acc: Accusative Case

APPENDIX 4

Original experiment sheets of experiment 2

DENEY 2:

Aşağıda verilen tümceleri dikkatlice okuyunuz.

1) Turist müzeyi ve parkı gezdi.

2) Kız mavi elbiseyi giydi.

3) Dadı duvarı çizen çocuğu uyardı.

4) Avukat önemli davayı kazandı.

5) Müşteri tabloyu yapan ressamı aradı.

6) Bahçıvan ağacı ve çiçeği suladı.

7) Öğrenci zor sınavı geçti.

8) Seyirci şiiri okuyan kadını alkışladı.

9) Hizmetçi yeri ve camı sildi.

Yaş:

DENEY 2:

- Aşağıda verilen kelimeler, daha önce okumuş olduğunuz dokuz tümcenin içinden seçilmiş kelimelerdir. Bu kelimelerden yararlanarak tümcenin tamamını hatırladığınız kadarıyla yazınız.

1) müzeyi :_____ .

2) mavi :_____ .

3) dadı :_____ .

4) önemli :_____ .

5) müşteri :_____ .

6) ağacı :_____ .

7) zor :_____ .

8) seyirci :_____ .

9) yeri :_____ .

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