

FROM LEXICAL AND CONJUNCTIVE COHESION TO COHERENCE: READING,
RECALLING AND COMPREHENDING HIGH COHESIVE AND LOW COHESIVE
CLAUSES

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ABSTRACT

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CLAUSES

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The aim of this thesis was to investigate the connection between cohesion, coherence and comprehension, and to understand the role of lexical cohesion and conjunctive cohesion in two-clausal sentences. On the basis of these aims, four groups of were constituted. The first group of sentences was constituted with lexical cohesion and the contrastive conjunctive marker *ama* or *fakat* (*but*), the second group had lexically cohesive clauses without the contrastive marker, the third group had disrupted lexical association with the contrastive marker, and the fourth group had disrupted lexical association without the contrastive marker. The first two groups were labeled the *high cohesion* group, the third and fourth groups were the *low cohesion* group. Though the sentences could be low or high cohesive, all of them were coherent (their coherence were evaluated by two linguists). These four different groups of sentences were presented to four groups of participants. For off-line measurement, acceptability judgment questions, free recall (for text-based comprehension) and response time results were used; in addition, eye tracking results were used. While reading the sentences, participants repeated the [b] sound unceasingly for articulatory suppression. Results showed the facilitative role of cohesion in recall. The high cohesion group had better recall results than the low cohesion group. It was hypothesized that the cohesiveness of clauses decreased linearly from group one to group four. The results of the acceptability judgments (which intended a question which provided participants to evaluate the understandability of a clause from a scale) supported the assumption. Moreover, as it was expected, the facilitative role of some lexical cohesion items (synonymy and antonymy) was more powerful, than others (meronymy and hyponymy) in recall. Lexical cohesion had a more facilitative role than conjunctive cohesion in recall. Eye tracking results also indicate the facilitative role of cohesion, the more the sentence was cohesive the less the mean of the fixation count of per word in a clause was. To sum up, as McNamara and Kintsch (1996) also emphasized, cohesion facilitated text-based comprehension in two-clausal sentences.

The results also indicated the fact that some cohesion devices had more powerful effect on text-based comprehension than others didn't.

Key words: Cohesion, coherence, comprehension, lexical cohesion, conjunctive cohesion, contrastive marker, text-based comprehension, synonymy, meronymy, antonymy, hyponymy, free recall, articulatory suppression, eye-tracking, reading.

ÖZ

SÖZCÜKSEL VE BİRLEŞTİRİCİ BAĞINTILILIKTAN BAĞLANTILILIĞA: YÜKSEK BAĞINTILI VE DÜŞÜK BAĞINTILI CÜMLECİKLERİ OKUMA, HATIRLAMA VE KAVRAMA

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Bu tezin amacı, bağlantılılık, bağıntılılık ve kavrama arasındaki ilişkinin araştırılması, bunun yanında iki cümlecikli cümlelerde sözcüksel bağıntılılığın ve birleştirici bağıntılılığın rolünün anlaşılmasıydı. Bu amaç bağlamında, dört cümle grubu oluşturuldu. İlk cümle grubu, sözcüksel bağıntılılık ve karşıtlık birleştiricisi olarak kullanılan *ama* veya *fakat* içererek oluşturuldu, ikinci grupta sözcüksel bağıntılılık korunurken, karşıtlık sağlayıcı bağlaç cümleden çıkarıldı, üçüncü grupta cümle içerisindeki sözcüksel bağlantı bozuldu fakat cümleler arasında karşıtlık bağlacı kullanıldı, dördüncü grupta hem sözcüksel bağlantı bozuldu hem de karşıtlık sağlayıcı bağlaç çıkarıldı. İlk iki grup yüksek bağıntılı grup olarak adlandırılırken, üçüncü ve dördüncü grup düşük bağıntılı grup olarak adlandırıldı. Cümleler düşük ya da yüksek bağıntılı olabiliyorken, hepsi de kendi içinde bağlantılı cümlelerdir (cümlelerin bağlantılılığı iki dilbilim uzmanı tarafından onaylanmıştır). Bu dört farklı cümle grubu, dört farklı katılımcı grubuna gösterilmiştir. Çevrim-dışı ölçüm olarak, kabul edilebilirlik sorusu, serbest hatırlama (metne bağlı kavrama için), ve tepki zamanı sonuçları kullanılmıştır; bunun yanında, çevrim-dışı ölçüm olarak göz izleme sonuçları kullanılmıştır. Sonuçlar, hatırlamada bağıntılılığın kolaylaştırıcı rolünü göstermiştir. Yüksek bağıntılı grup, düşük bağıntılı gruptan daha iyi hatırlama sonuçları almıştır. Bu çalışmanın varsayımlarından biri, birinci gruptan dördüncü gruba doğru cümleciklerin bağıntılılığının azalacağı yönündeydi. Kabul edilebilirlik sorusunun (katılımcılara cümlelerin ne kadar anlaşılır olduğunu bir skalada değerlendirme şansı veren bir soru) yanıtları bu varsayımı desteklemiştir. Ayrıca, beklendiği şekilde bazı sözcüksel bağıntılılık araçlarının (eş

anlamlılık, zıt anlamlılık) etkisinin diğlerlerinden (parça-bütün ilişkisi ve alt-anlamlılık) daha güçlü olduđu hatırlama sonuçlarında görölmüştür. Hatırlama sonuçlarında, sözcüksel bağıntılılığın, birleştirici bağıntılıktan daha kolaylaştırıcı bir etkiye sahip olduđu görölmüştür. Göz izleme sonuçları da bağıntılılığın kolaylaştırıcı etkisine işaret etmiştir, bir cümledeki cümlecikler birbirleriyle ne kadar bağıntılıysa, kelime başına düşen odaklanma sayısının o kadar az olduđu görölmüştür. Özetle, McNamara ve Kintsch'in (1996) de vurguladığı gibi, bağıntılılık metne dayalı kavramayı kolaylaştırır. Bununla birlikte bu sonuçlar, bazı bağıntılılık araçlarının metin temelli kavramaya büyük bir etkisi olduğunu gösterirken, bazılarının aynı etkiyi göstermediği gerçeğine vurgu yapmıştır.

Anahtar kelimeler: Bağıntılılık, bağlantılılık, sözcüksel bağıntılılık, birleştirici bağıntılılık, karşıtlık bağlacı, metin-temelli kavrama, eş anlamlılık, parça-bütün ilişkisi, zıt anlamlılık, alt anlamlılık, serbest hatırlama, sese yönelik bastırma, göz izleme, okuma.

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To my mother and father.

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LIST OF ABBREVIATIONS

CM: Contrastive marker (*ama, fakat*)

RST: Rhetorical structural theory

RSS: Rhetorical structural schemas

CHAPTER 1

INTRODUCTION

Humans have complex high level mental abilities, and one of them is their communication system. Language as a complex communication system has been investigated by researchers from various fields such as psychology, linguistics, cognitive science, anthropology, biology, and neuroscience.

Both the production and understanding processes of a grammatical language is unique to the human species, and this is the crucial property that separates human species from other animals in terms of communication (Johansson, 2005). Beyond spoken language, humans have the ability to write and read meaningful signs. Linguists, psychologist, and cognitive scientist continue to struggle to understand and explain both written and spoken language and their cognitive background. Research about discourse and discourse processes can be seen as part of this endeavor.

One of the aims of discourse processing studies is to understand the meaningful connections in the texts. de Beaugrande (1981) considers that there are the following six conditions for a comprehensible text: cohesion, coherence, intentionality and acceptability, informativity, situationality, and intertextuality. Among these, as stated by de Beaugrande (1981) the process of discourse is an interactive process which requires complex sub-processes cohesion and coherence make a text to a whole.

The connectivity of text can be achieved by overt linguistic markers in texts, and this is called cohesion (Halliday and Hasan, 1979).As Sanders, Spooren and Noordman (1992) and many others argue, "the meaning of two discourse segments is more than the sum of the parts". However, overt linguistic markers are not sufficient for a text to be coherent. Then what is coherence? While cohesion is related to the overt markers in the text, coherence is two-sided mental process. Firstly, the writer or speaker constitutes a text with the aim of being understood by the hearer or reader. Secondly, the hearer or reader tries to understand the text, making sense of the cohesive relationships within it (See 2.1.2 for details).

Based on these basic notions, this thesis utilizes Halliday and Hasan's(1976) views on cohesion. The thesis is also inspired by the experimental methods of the Construction-Integration model (Kintsch & van Dijk,1978; Kintsch 1988) in terms of which the effect of cohesion and coherence on comprehension are studied.

This thesis provides an experimental study using linguistics and psychology. An experimental study about the connection between cohesion, coherence and comprehension haven't been conducted in Turkish so far. In the literature there are limited experimental studies on the topic of cohesion and coherence. Moreover, this thesis provides a clause level explanation of cohesion, and this makes it possible to compare the role of lexical cohesion and conjunctive cohesion in clauses on experimental basis.

In the remainder of this chapter, the aim of the study, and the hypotheses are outlined.

There are basic issues regarding the experiments:

i) Only coherent sentences are used as experimental data in this thesis. The coherence of these clauses was evaluated by two linguistic experts .

ii) The cohesion of the sentences is provided by lexical and conjunctive cohesion. Lexical cohesion is accomplished by the antonymic, synonymic, meronymic and hyponymic relations in clauses; and conjunctive cohesion is achieved by the contrastive marker (CM) *ama* and *fakat* (in English *but*).

iii) The cohesiveness of the clauses are evaluated by acceptability judgments obtained from the participants. These judgments are ascertained from the response to a question that asks the participants to evaluate the acceptability of the clause using a scale of six options (1 being totally understandable, 6 being totally vague).

iv) To measure comprehension, tests for response time (reading time of one clause) and free recall (recalling the sentences) are used.

v) High cohesion is provided by lexically cohesive clauses, and low cohesion is provided by the clauses where the lexical cohesion is disrupted (see Chapter 3 for details of method).

1.1 Aims of the study

This thesis has three aims;

- 1) To understand the relation between high or low cohesive sentences
- 2) To compare the role of lexical cohesion and conjunctive cohesion in comprehension.
- 3) To investigate the role of different lexical cohesion items (synonymy, antonymy, meronymy and hyponymy) incomprehension.

To achieve the aims of the study four groups of sentences were formed:

Group 1: Sentences with lexical cohesive devices and the CM (High Cohesion Group)

Group 2: Sentences with lexical cohesive devices without the CM (High Cohesion Group)

Group 3: Sentences with disrupted lexical cohesion with the CM (Low Cohesion Group)

Group 4: sentences with disrupted lexical cohesion with no CM (Low Cohesion Group)

(See Table 1).

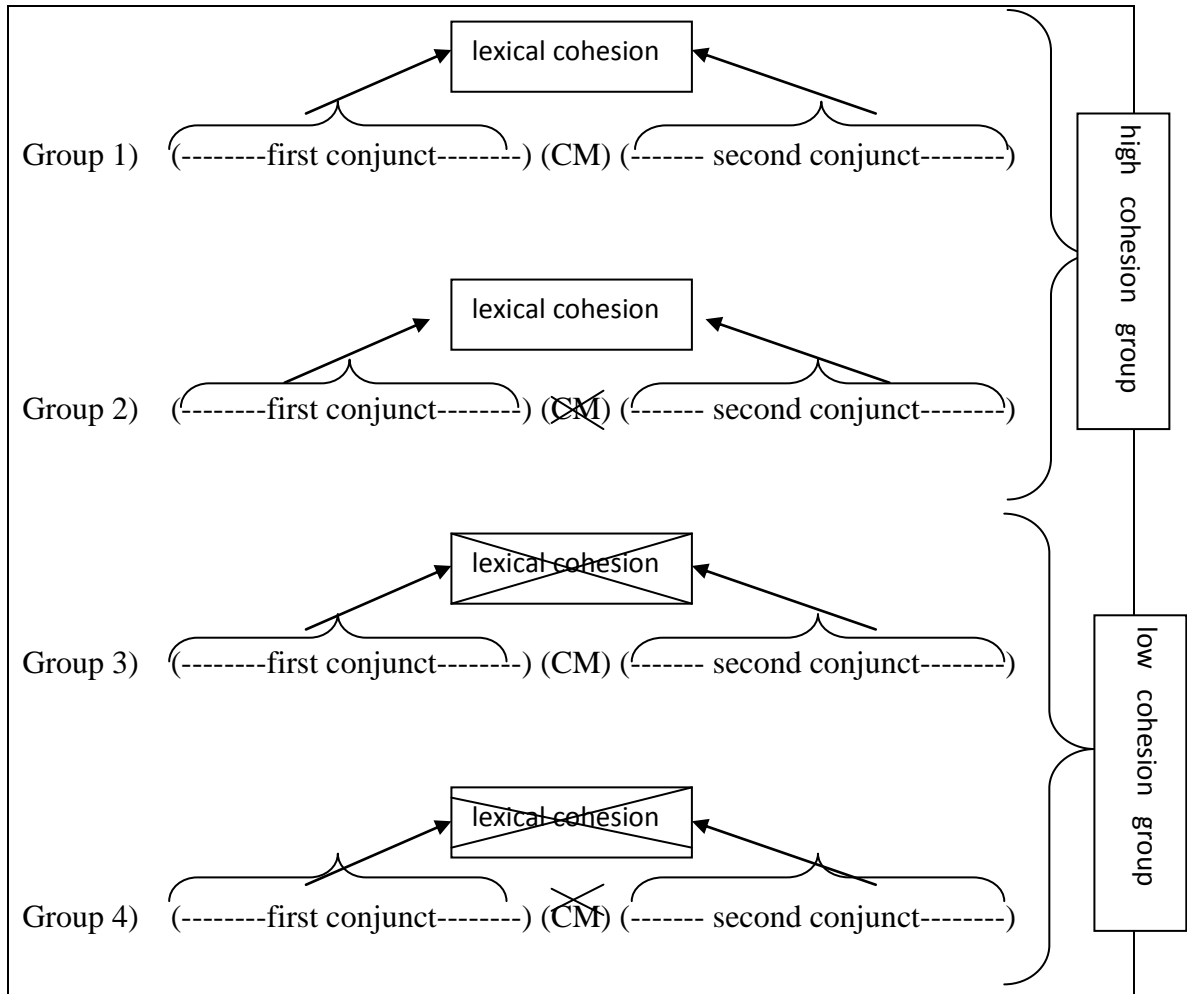


Table 1: Diagrammatic representation of experimental data used in the thesis

Regarding the first aim given above, in order to see the relation between cohesion, coherence and comprehension, the results from participants who recognized high cohesion and low cohesion of sentences are compared in terms of free recall, response times and acceptability judgment.

Regarding the second aim, the results of groups (1, 2, 3, and 4) are compared in order to observe the effect of lexical cohesion and/or conjunctive cohesion.

In terms of the third aim, the role of different lexical cohesion items are compared in high cohesion, because only the high cohesion group saw lexical cohesion.

1.2 Hypothesis

On the ground of these three aims, the hypotheses of this thesis are:

For the first aim we hypothesize that:

- 1) Reading times increase when the text is low-cohesive and decreases when the text is high cohesive.
- 2) Acceptability judgment results are lower for low cohesion and higher for high cohesion texts.
- 3) The high cohesive clauses are better recalled than low cohesive clauses.

For the second aim we hypothesize that:

- 1) If the clause has the lexical cohesion relation, high cohesiveness of the clause is accomplished by lexical cohesion regardless of the CM.
- 2) The CM is recalled better if the sentence has lexical cohesion.
- 3) Acceptability judgment results decrease from group 1 to group 4 linearly.

For the third aim we hypothesize that :

- 1) Synonymy and antonymy ties and are better recalled than hyponymy and meronymy ties.
- 2) If the lexical cohesion in a sentence is accomplished by synonymy and antonymy, the sentences are better recalled than the sentences where lexical cohesion is accomplished by hyponymy and meronymy.

CHAPTER 2

REVIEW OF LITERATURE

How is communication achieved? This is one of the most common questions in linguistics, cognitive science and other various scientific branches. Jakobson (1960) explains communication as a process from addressor to addressee (Figure 1).

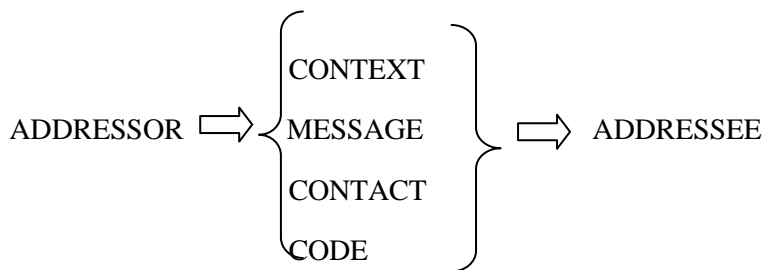


Figure 1: The process of communication (Jakobson, 1960; p. 3)

However, there are sub-processes between addressor and addressee. Jakobson points out these interval processes as follows:

"The ADDRESSER sends a MESSAGE to the ADDRESSEE. To be operative the message requires a CONTEXT referred to (the "referent" in another, somewhat ambiguous, nomenclature), graspable by the addressee, and either verbal or capable of being verbalized; a CODE fully, or at least partially, common to the addresser and addressee (or in other words, to the encoder and decoder of the message); and, finally, a CONTACT, a physical channel and psychological connection between the addresser and the addressee, enabling both of them to enter and stay in communication" (Jakobson, 1960; p. 3).

As one of the most powerful communicative process, language has a complex cognitive system which contains specific processes for different modalities which has been shown by experimental and linguistic studies (Perlovsky, 2009). In 1976, Halliday and Hasan wrote 'Cohesion in English' which continues to be the most comprehensive and detailed book about cohesion. In this book they attempt to explain the complex structure of language with three coding systems:

"Language can be explained as a multiple coding system comprising three levels of coding or 'strata': the semantic (meanings), the lexicogrammatical (forms) and the phonological and orthographic (expressions). Meanings are realized (coded) as forms, and forms are realized in turn (recoded) as

expressions. To put this in everyday terminology, meaning is put into wording, and wording into sound or writing:

→ Meaning (the semantic system)

→ Wording (the lexicogrammatical system, grammar and vocabulary)

→ 'Sounding', writing (the phonological and orthographic systems)

The popular term 'wording' refers to lexicogrammatical form, the choice of words and grammatical structures. Within this stratum, there is no hard-and-fast division between vocabulary and grammar; the guiding principle in language is that the more general meanings are expressed through the grammar, and the more specific meanings through the vocabulary" (Halliday & Hasan, 1976; p.5).

These three processes also confirm Jakobson's (1960) suggestion concerning the definition of the communication activity. It may be argued that the studies about language comprehension and reading processes that have been conducted over many years constitute the empirical part of Jakobson's (1960) communication process and the multiple coding system determined by Halliday and Hasan. For example, research about reading texts may give some concrete explanations regarding the convoluted process of language in a visual modality. The eyes jump with saccades through the text and unconsciously fixate on some points in this text in an instant, and only the fixated words or phrases are processed consciously with their inner sounds and meanings. This process begins with the recognition of letters and continues to combine them into the meaningful words. Then, eventually these words are juxtaposed in order to comprehend sentences and texts (Dehaene, 2009).

In addition to reading a text, discourse studies attempt to discover the connectedness of discourse. However, these processes are not easy to describe in only a few stages, because both the mind and the organization of the text are decisive in these complex processes. Before detailing these processes, it is necessary to explain the key terms, because in both experimental and computational studies, and linguistic studies of cohesion and coherence these basic terms are used.

2.1 Key terms

In this section, some key terms of discourse and discourse processing will be explained. Throughout the thesis, the words text and discourse are used interchangeable, without making a distinction between them.

2.1.1 Text and text processing

Text, or discourse, is described as a unit larger than a sentence (Malmkjær, 2004). However, a text should not only be defined as a unit which has intra-sentential connections. Halliday & Hasan, (1976;p.1) state that "the word TEXT is used in linguistics to refer to any passage, spoken or written, of whatever length, that does form a unified whole' and also 'it is not a grammatical unit, such as a clause or a sentence". They add that a text is a semantic unit that is connected to a sentence or a clause, but it does not mean that a text is only based on size or sentential level.

Discourse, or text analysis, is generally known as the study of conversation (Beaugrande and Dressier, 1981). Hobbs briefly points out that 'discourse has structure' (1976; p.83) as do Halliday and Hasan (1976). Text analysis embodies texts within their social and environmental context (Martin, 2003).

The organization of the discourse is not contingent on combined utterances, and traditional linguists have rarely attempted to resolve this connectedness. The main features of texts are

explained linguistically, most frequently with some kinds of textual analyses techniques (Carrell, 1982). Morris, Beghtol and Hirst (2003) emphasize that meaningful connections between words is required in order to understand the structure of texts. Even though this is clear, it is difficult to clarify the process of connectedness.

Bublitz (2011) says that these connected relations within a text can be grammatical or semantic. Both the grammatical and semantic relations are indispensable for a text both on the global level, which provides a coherent text in order to make the whole text meaningful, and on the local level that makes cohesiveness possible in the text between sentences, clauses, or paragraphs.

This raises the question about these local and global relations in texts and how they constitute text connectedness. Text "is realized by, or encoded in sentences" (Martin, 2003: p.2). The relations in a text such as elaborations, explanations, parallelisms, contrasts, temporal sequencing, show the fact that texts has relations with its elements that constitute global structure of the text (Martin, 2003). Martin explains the global structure of text in terms of textual relations, however Sanders, Spooren and Noordman (2006) state that structure of the cognitive operations of discourse that is represented by a reader could be used for the better understanding of the structure of the discourse, but how should we begin to see these "cognitive operations"? Halliday and Hasan (1976) investigate the role of ties in local levels in order to determine the process of discourse on a global level.

De Beaugrande and Dressler (1981) insist on the communicative principles in texts. It consists of seven factors and also includes *cohesion* and *coherence*. The term of *cohesion* is used by Halliday and Hasan (1976) with reference to the ties that constitute texture, namely the text. Ties in the text provide texture for an understandable text, a process called *cohesion* by Halliday and Hasan (1976). Ties are the minimal connected units independent from sentence grammar, and these ties provide for the connectedness of text.

2.1.2 Cohesion and Coherence

The cohesion of the text is constituted by meaningful elements that have semantic and grammatical relations. Bublitz (1999; p.38) claims that while cohesion can explain the forms and "context-independent property of a piece of discourse or text...", "coherence, on the other hand, is a cognitive category that depends on the language user's interpretation and is not an invariant property of discourse or text". The intra-sentential connections of elements in texts and discourses have one of the main roles in the global level connectedness text; since for a text to be understandable only considering the intra-sentential connections is not sufficient. In addition, social contexts and the aim of the reader or listener also play another main role. Thus, it is necessary to review the importance of comprehension processes.

2.2 History of Cohesion Studies

In this thesis the role of cohesion on readers' recall, response times, self-evaluations and eye movements is investigated in order to see how reader's comprehension of coherence interpretations is constituted. Though experimental methods are used in this thesis to see the interaction between cohesion and coherence, the linguistic structure of clauses is based on the studies concerning cohesion and coherence. Therefore, this chapter will review the milestones of cohesion studies; from Jakobson's (1960) explanations about textual relations; the immense contributions to cohesion studies of Halliday and Hasan; Martin's (2003)

semantic perspective, and finally the work of Hoey (2005) which refers to lexical priming in order to explain the relations in texts rather than the term *cohesion*. This will be followed by an outline of the general ideas about coherence emphasizing the cognitive- or reader-based perspective of coherence.

2.2.1 Jakobson (1960)

In fifties and sixties, there were a multitude of studies concerning text linguistics, discourse and cohesion. The behavioral trend and/or movement in the humanitarian sciences also had an impact on language studies producing the term; *verbal behavioral studies*. Nevertheless, Jakobson(1960) produced one of the salient studies that evaluated *relations* in poetic language in a semantic manner.

It is not surprising that in those days that some of these kinds of studies used poetical literature that could not be explained by syntactic explanations. Jakobson (1960) asserts that relations may play a specific role in explaining written and verbal discourse. More specifically, the main point he attempted to emphasize was that "language must be investigated in all variety of its functions" (Jakobson, 1960; p.3).

As stated at the beginning of chapter 2, Jakobson (1960) defines communication as a process that reaches out from the *addresser*, in other words, from the creator or initiator of the communication process to the *addressee* (receiver). In this process there are other factors: *context* (environment of the communication process), *message* (the statement itself), *code* (encoder or decoder of message), and *contact* (physical and psychological connection). Jakobson focuses on the functions of all these hierarchical stages in the verbal structure of language. His emphasis seems to be directed selectively toward functional roles of all these stages and he examines the characteristics of these functions.

There are six kinds of functions that provide for the relations in all discourses: *referential*, *emotive*, *conative*, *phatic*, *poetic*, and *metalingual* functions. First the *emotive* function allows the expression of the attitudes of a speaker; and it concentrates on *addresser*. Second the *referential* function has *denotative* role providing a *cognitive* function. The third function is *poetic* function which has a concrete role; it refers to the concrete signs of language (like orthography) in the message. Fourth, the *phatic* function (referring to *contact*), has the role of checking whether the channels work. Fifth, the *metalingual* channel is responsible for determining "whether the *addresser* and/or *addressee* need to check whether they are using the same *code*, " (Jakobson, 1960: p.4) and last, the *conative* function refers to the functions of *addressee* providing the grammatical expressions to be syntactically, morphologically, and phonemically proper(see Table 2).

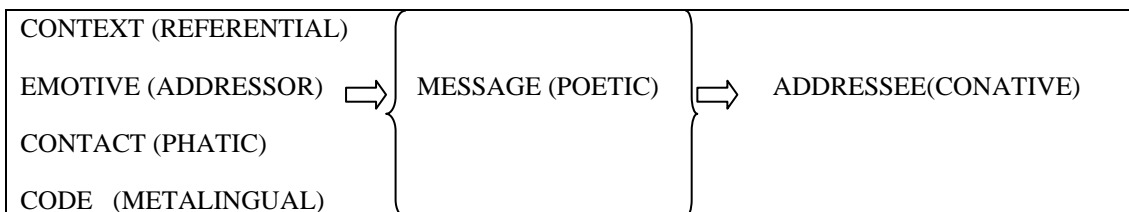


Table 2: Functions of communicative processes (Jakobson, 1960; p. 3)

The prominent idea in his functional view is that he focuses on the relations in poetry with the aim of the *poetic* function. According to Traugott and Pratt (1980), he provided the first study of cohesion in analyzing the syntactic structure and parallelism in poetry (in Xi, 2010; p.139).

Jakobson's (1960) views on relations are very rigorous, and these views are one of the first attempts encompassing the role of a text and a participant together. Most importantly, his comprehensive explanations incorporate the contribution of *expressions, cognition, message, grammatical and metalingual processes*. However, the kinds of relations in text are not explained in detail. M.A.K Halliday and R. Hasan investigate text cohesion focusing on the type of relations which contribute text cohesion.

2.2.2 The contributions of M. A. K. Halliday and R. Hasan to Cohesion Studies

As stated above, Jakobson (1960) takes a functionalistic approach to explain the relations in poetics and the complex structure of the language and discourse. Another prominent linguistic theories in cohesion studies is Halliday (1962, 1966, 1967, 1968, 1969, 1970, 1994) and Hasan (1989) who adopts the functional linguistic perspective in order to clarify discourse processes, communicative processes and cohesion.

2.2.2.1 M. A. K. Halliday: Structural and Non-structural (Cohesion) Relations

The section explains the ideas of Halliday in terms of structural and non-structural relations in a text.

2.2.2.1.1 Linguistic Structures: Transitivity, Mood, Theme, and Logical Structure

Halliday (1969) considers that the linguistic structure of discourse is comprised of three main sets: transitivity, mood and theme. These three linguistic structures are responsible for clause systems and, in addition, they are components governed by grammar. Halliday (1966) states that the first system, *transitivity*, is a kind of network system comprising extra-linguistic structures, and "types of process expressed in the clause" (Halliday, 1969; p.38); in addition, it incorporates cognitive interpretations such as; "linguistic representation of experiences, whether the phenomena of external world or feelings, thoughts and perceptions" (1967, p.119). The second set (*mood*) represents speech function, speech situation, speech rules, speaker's attitudes. It is outside grammar and refers to kinds of paralinguistic signals. The last set is *theme*, which refers to informative structures of message components. In other words, it is the interior occurrence of a discourse framework and/or distribution and organization of informative units (1967, 1969). Thus, *transitivity* refers to the experiential phenomena of communicative acts or discourse processes, *mood* functions within interpersonal situations and *theme* encompasses the intratextual processes. Hence, these three sets of linguistic structures of clauses define continuity and organization of discourse process.

Halliday separates lexical items from this feature with the claim of not being attainable as a syntactic resource. He states that "other syntactic recourses are available, quite apart from the selection of lexical items" (1969, p.82). The fourth component is a *logical* component having a cognitive function that includes structural resources that are also grammatical which embellishes the language with *and(s)*, *or(s)* and *if(s)*. Halliday emphasizes this as a separate function. To summarize, these four components and their functions can be schematized as below:

- Transitivity → Experiential (extra linguistic experiences)
- Mood → Intrapersonal (speech function)
- Theme → Intratextual (discourse organization)
- Logical → Logical structure (logical cognitive function of language)

2.2.2.1.2 Structural Relations and Cohesion

In his later work, Halliday (1989;p.38) refers to *structural relations* (relations beyond grammar, but with structural relations in texts comprising; transitivity, mood, theme and logical) as "the four components in the semantics of every language ". He believes that the relations providing the connections between *text* and *context* are *experiential*, *interpersonal*, *intratextual* and *logical*. Although the role of cohesion in this complex viewpoints not explained in detail in his early work, he places cohesive relations under the *Theme* structure. The subsets of the clause in a discourse is shown in Fig 2.

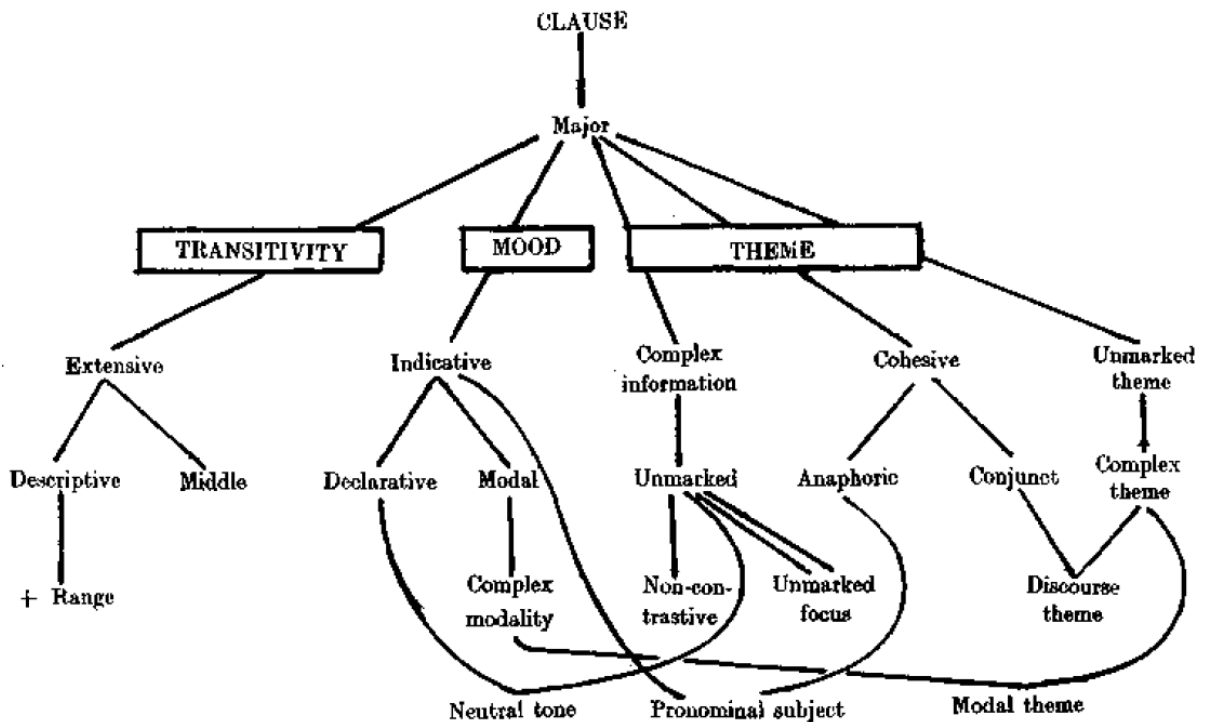


Figure 2: Classification for text relations taken from Halliday (1969; p.83)

2.2.2.1.3 From clause complexes to cohesive relations

Clause complexes are "structural relationships between clauses" (Halliday, 1994; p.309). In written English, *clause complexes* are similar to sentences. The *clause complex* codifies semantic relations in their structures, and in order to construct discourse structures (from word relations over the whole text), the clause needs to be constructed. Halliday (1994) argues that it is not a process that can be accomplished by grammatical structure calling these *non-structural* and above-the-clause structure relations; *cohesion*.

Halliday (1970) separates *cohesion* from the other textual units and divides it into the following four sub-relations: *reference*, *substitution* and *ellipsis*, *conjunction* and, *lexical cohesion*. This thesis uses lexical cohesion and conjunctive cohesion to find answers to achieve aims of this thesis. Halliday's (1994) separation of *cohesion devices* into its sub-types originates from the separation proposed by Halliday and Hasan (1976). Although only *lexical cohesion* and *conjunctive cohesion* are used in this thesis, the other cohesive devices are clarified in the next section for the sake of completeness.

2.2.2.1.3.1 Reference, and substitution and ellipsis

Reference: One element or person (participant) is stated at one point and this element or person would be referred to again by different linguistic types such as pronouns or the subject (Halliday, 1994). For example:

(1) *John* is quite smart but sometimes *he* does some stupid things.

In example (1), the participant (John) first appears at the beginning of the sentence and after is referred to as 'he'.

Ellipsis and Substitution: Halliday (1994) argues that the processes of ellipsis and substitution are similar types of cohesion relations, but they correspond to different concepts in some aspects. Halliday states that "a clause, or a part of clause, or a part of verbal or nominal group, may be presupposed at a subsequent place in the text by the device of positive omission"(1994, p. 316). A very short conversation is given as an instance:

(2)-A: I made coffee ten minutes ago, who finished it?

-B: I did.

In example(2), participant A asks a question to participant B and B responds it as 'I did'. The verb 'finished' is presupposed with another verb 'did'.

Halliday and Hasan (1976; p.112) give an example of substitution:

(3)i... the words did not come the same as they used to do.

- ii. I don't know the meaning of half those long words, and, what's more, I don't believe you do either.

In example (3), they explain that 'in 3(i)do substitutes for *come*; and in 3(ii) do substitutes for *know the meaning of half those long words*.

2.2.2.1.3.2 Conjunction and Lexical Cohesion

Conjunction: Halliday (1994; p.316) explains a conjunction as "a clause or clause complex, or some larger stretch of text, may be related to what follows it by one or other of a specific set of semantic relations". Conjunctive cohesion can be accomplished by; *elaboration* (e.g., in other words, for instance, at least, by the way, in any case, in particular, to resume, actually...); *enhancement* (e.g., then, before then, in the end, next time, meanwhile, next, up to now, likewise, in a different way, thus, so, in consequence, on account of this, otherwise, yet, still, in that respect, elsewhere...); or *extension* which involves *addition* (e.g., and, or, nor) variation (on the contrary, instead, apart from that, alternatively), and *adversative* (e.g. but, yet, on the other hand, however).

Lexical Cohesion: Halliday (1985) also developed a general category to classify lexical cohesion items. The general categories are *repetition*, *synonymy* and *collocation*. Repetition refers to the use of the same word; but synonymy includes synonymy, hyponymy, meronymy, co-hyponymy, co-meronymy, and antonymy. Finally, Halliday explains collocation as a co-occurrence tendency.

Reiteration means iterating the same word, group of words, phrase or phrases in order to recall the first usage of the element or elements; collocation is the relations of lexically connected word, group of words, phrase or phrases through the text. Lexical cohesion, in particular, provides the 'continuity of words' with the repetition of lexically related words or phrases. This process develops through the choice of word or phrase that is lexically related to the previous word, words or phrases (Halliday,1994).

Discourse is a process and so is cohesion. Text is the product of this process which can be written or verbal. Whenever the text is analyzed, this is the analysis of the discourse. In this process, cohesion is 'the relation between entities' and an 'ongoing process of meaning' (Halliday, 1994).

To conclude, Halliday (1994) proposed a model for the creation of texture which is provided by both structural and non-structural units. While structural relations include thematic structure (theme and rheme) and information structure (given and new), non-structural relations that encompass cohesion relations (reference, ellipsis and substitution, conjunction and lexical cohesion). These structural and non-structural resources constitute a text and provide a text with texture.

2.2.2.2Halliday & Hasan (1976): 'Cohesion in English'

As mentioned above, Halliday and Hasan (1976) suggested that "cohesion is part of the language system" (p.5). On the other hand, cohesion can be considered as the unity of

semantic relations. It is formed by interpretations of presuppositions where one unit is presupposed by another in order to constitute cohesive ties. Text is created by the cohesion ties in the text by means of presupposition. These cohesive ties can be collected under five different main headings: reference, substitution, ellipsis, conjunction, lexical cohesion. These relations are constituted by both grammar and vocabulary. While reference, substitution, ellipsis can be seen as grammatical cohesion, lexical cohesion is another unit that is created mostly by vocabulary. In addition, conjunction is predominantly grammatical.

All texts include unifying relations, i.e. linked sentences or clauses. Texts are structural and 'structure is one means of expressing texture'. Then, it may be deduced that 'all grammatical units - sentences, clauses, groups, of words - are internally cohesive, simply because they are structured'. Although texts not only consist of structural units, it means that a text has cohesive semantic relations which are over and above structural relations thus cohesion is beyond structure. It refers to non-structural and semantic 'text-forming relations' (Halliday & Hasan, 1976; p.7).

It is clear that the views held by Halliday & Hasan (1976) on cohesion changed after they published *Cohesion in English* however, although some notions have changed, their separation of grammatical and lexical cohesion remains the same (See Appendix 1 containing the Cohesion Relations from Halliday & Hasan, 1976).

Below, a synopsis of lexical cohesive devices is provided. Although only the lexical cohesive and conjunctive cohesive ties will be used systematically in this thesis, lexical cohesion deserves a full treatment for the sake of completeness.

2.2.2.3.1 Reference

All languages have certain types of items that allow them to refer to something for successful interpretation. Reference is a kind of information unit for recalling the referred meaning and maintaining of the continuity of referred item: the referred item can be one thing or a set of things (Halliday & Hasan, 1976). Consider this example:

(4) There were two wrens upon a tree. Another came, and there were three (Halliday & Hasan, 1976: p.31)

In example (4), *another* refers to *wrens*. Halliday and Hasan (1976: p.32) consider this as a "reference has the semantic property of definiteness, or specificity" and this specificity is acquired by the situational context. Hence, it can be seen that reference is mostly directed by semantic relations, if it is compared with substitution, which is strictly governed by grammatical conditions. Reference provides cohesion in a continuative way ;it connects some items in texts and this connectivity provides referential cohesion.

2.2.2.3.2 Substitution and Ellipsis

While reference provides the meaning relation between reference items; substitution and ellipsis are not semantic relations, they are mostly governed by grammatical items.

Both substitution and ellipsis can be seen as a process performed with text dynamics. The different mechanisms separate these two processes based on the replacement or omission of an item or items. However, ellipsis is more complex than substitution (Halliday & Hasan, 1976).

Substitution: Substitution is a type of relation that occurs at the lexico-grammatical level; i.e. the grammatical principles take place at the vocabulary level.

(5) I shoot the hippopotamus

With the bullets made of platinum

Because if I use leaden ones

His hide is sure to flatten 'em' (Halliday & Hasan, 1976: p. 91)

In example (5) *ones* is substituted for *bullets made of platinum*. The examples about *so* and *the same* or 'do/be/say the same' are also governed by the same kinds of rules, as seen in (6).

(6) -John felt it was disappointing.

-Mary felt so too (Halliday & Hasan, 1976: p.111).

In example (6), *so* is the substitution of *it was disappointing*. In addition, it also should be emphasized and that their roles are most frequently anaphoric, which is a relation type that contributes to cohesion (Halliday & Hasan, 1976).

Ellipsis: The similarity between substitution and ellipsis has already been mentioned. However, these two processes should not be confused with reference. While reference relates to the meaning of relations, substitution and ellipsis connect clauses or words. On the other hand, the presupposition source of reference in a situation, whose meaning is presupposed, but the text is the main presupposition process of substitution and ellipsis. Ellipsis is created by the removing of the presupposed items, and the item reversion is processed by quite small units (Halliday & Hasan, 1976).

(7) Which **hat** will you wear? This is **the best**. (Halliday & Hasan, 1976; p.149)

In example (20), the noun *hat* is a presupposition of the nominal group *the best*, where *the* is the modifier, and *best* is the head of the nominal group.

(8)- Who taught you to spell?

-Grandfather did. (Halliday & Hasan, 1976: p.169)

In example (8) the lexical elliptical item *did* is the contracted form of *my grandfather taught me to spell*.

As in reference and substitution, ellipsis is a grammatical cohesion element. The characteristic way of expressing cohesion as *ellipsis* is *cohesion by presupposition* and *cohesion by leaving out*. These *leaving out* structures and presuppositions require two part structures commonly (e.g. two clauses, question-answer, intra sentential connection etc.). Generally, the connection between these two parts creates an elliptical cohesion in a text (Halliday & Hasan, 1976; p. 117-196).

2.2.2.3.3 Conjunction

Conjunction is the other cohesion device, partly based on lexico-grammatical devices but mostly based on grammar. Conjunction differs from substitution, ellipsis and reference, because its nature does not come from basic anaphoric relations. Conjunctive elements obtain their cohesive relations indirectly because they do not specify precise components. Their cohesive nature derives from the meaning relations and supposition relations between the conjoined clauses. While it is quite easy to show or identify elliptical, substituted and

referred elements contributing to text cohesion, clauses linked with a conjunction are not connected to each other sequentially and therefore, it is not easy to precisely select just two or more words or ties. Conjunctive relations 'constitute a highly generalized component within the semantic system, with reflexes spread through the language, taking various forms; and their cohesive potential derives from this source', in addition conjunctive relations "have a highly cohesive effect" (Halliday & Hasan, 1976; p.227). Conjunctive relations are generated by expressions like *and*, *but*, *yet*, *in spite of*, *as a result* etc. (Halliday & Hasan, 1976) and such devices exist in all languages.

2.2.2.3.3.1 Types of conjunction

There are four types of cohesion relations in conjunctives: additive, adversative, causal, and temporal. In this section, additive conjunction will be discussed first, followed by the adversative, causal and temporal conjunction types.

According to Halliday & Hasan (1976), all types of conjunctions can have an external or internal relation. From a theoretical perspective, the external conjunction has to do with the relationship between external phenomena; an internal conjunction refers to the relationship inherent in the communication process. The examples given below are from (Halliday & Hasan, 1976: p 241) in example(9a) there is an *external* process, i.e., there is no need to infer the relation between two clauses because a real-world causal relationship between two eventualities is expressed. However, in (9b) there is dynamic and *internal* process, which means that the relation must be inferred from the preceding structure (Halliday & Hasan, 1976).

(9) a. She was never really happy here. So she's leaving.

b. She will be better off in a new place. - So she's leaving (Halliday & Hasan, 1976: p.241).

Additive: Additive conjunctive relations may have various roles. Their meaning relations can be external (e.g. *and*, *nor*, *or* etc.) or internal (e.g. *furthermore*, *alternatively*, *by the way*, *in other words*, *thus*, *likewise*, *by contrast* etc.).

(10) "My client says he does not know this witness. Further, he denies ever having seen her or spoken to her (Halliday & Hasan, 1976)".

As in example (10), the role of *further* is to add another point to the first sentence.

Adversative: Adversatives are the relations which can be summarized as 'contrary to expectation'. The differences between internal and external contents are also valid in adversatives. Considering the *contrary to expectation* view, Halliday & Hasan argue: "...the expectation may be derived from the content of what is being said, or from the communication process, the speaker-hearer situation, so that here too, as in additive, we find cohesion on both the external and internal planes" (Halliday & Hasan, 1976: p. 250).

Adversatives have four main categories: *adversative proper*, *contrastive*, *correction*, and *dismissal*. The *adversative 'proper'* category includes *contrastive*, *correction*, and *dismissal* subcategories. The examples like *yet*, *though*, *but*, are simple adversative 'proper's. The other contrastive category has two main groups: *avowal* (e.g. *in fact*, *actually* etc.) and *external contrastive*, which has *simple* (e.g. *but*, *and*) and *emphatic* (e.g. *however*, *at the same time* etc.) units. *Adversative 'proper'* and *external contrastive* categories are *external adversative conjunction*, whereas *avowal contrastive*, *correction* (*instead*, *at least*) and *dismissal* (like *in*

any case, any rate) adversative conjunctions are *internal*. Although this is an important distinction and deserves further research, in this study, only simple external contrastive adversatives are used. Example (11).shows that the first conjunct and second conjunct are linked by the external contrastive adversative *but* (*ama* in Turkish).

(11) Kıyafetlerimi getirmişsin *ama* şortumu unutmuşsun.

You have taken my clothes *but* forgotten my shorts.

(first conjunct -external contrastive adversative- second conjunct)

Causal and temporal: These adversative conjunctions are widespread in texts, and there are many instances of them. Basically, *causal relations* are created by; *so, therefore, because of that, accordingly* etc. *Temporal adversative conjunctions* are also quite common for example; *then, previously, finally, at once, until then, up to now, from now on, to sum up* etc. The classification of *causal and temporal adversative conjunctions* are listed by Halliday and Hasan (1976: p. 243) as shown in Table 3. Furthermore, an example of conjunction cohesion analyses is given in Figure 3.

2.2.2.3.3.2 Conjunction and cohesion

Halliday and Hasan (1976) argue that when conjunction is taken into consideration, not only grammatical, but also semantic and sometimes lexico-grammatical and lexical elements are involved in this process. Conjunctions are referred to as devices between grammar and semantics, but they are dominantly grammatical devices. On the other hand, the topic of lexical cohesion explored in the next section, is an issue of the lexicon.

	External/internal	Internal (unless otherwise specified)		
Causal	<p>Causal, general: Simple <i>so, then, hence, therefore</i> Emphatic <i>consequently, because of this</i></p> <p>Causal, specific: Reason <i>for this reason, on</i> Result <i>as a result, in consequence</i> Purpose <i>for this purpose, with this in mind</i></p>	<p>Reversed causal: Simple <i>for, because</i></p> <p>Causal, specific: Reason <i>it follows, on this basis</i> Result <i>arising out of this</i> Purpose <i>to this end</i></p>	<p>Conditional (also external): Simple <i>then</i> Emphatic <i>in that case, in such an event, that</i> Generalized <i>being so under the circumstances</i> Reversed <i>otherwise, under other circumstances</i></p>	<p>Respective: Direct <i>in this respect, in this regard, with reference to this</i> Reversed polarity <i>otherwise, in other respects, aside from this</i></p>
Temporal	<p>Temporal, simple (external only): Sequential <i>then, next, after that</i> Simultaneous <i>just then, at the same time</i> Preceding <i>previously, before that</i></p> <p>Conclusive: Simple <i>finally, at last</i></p> <p>Correlative forms: Sequential <i>first... then</i> Conclusive <i>at first... in the end</i></p>	<p>Complex (external only): Immediate <i>at once, thereupon</i> Interrupted <i>soon, after a time</i> Repetitive <i>next time, on another occasion</i> Specific <i>next day, an hour later</i> Durative <i>meanwhile</i> Terminal <i>until then</i> Punctiliar <i>at this moment</i></p>	<p>Internal temporal: Sequential <i>then, next, secondly</i> Conclusive <i>finally, in conclusion</i></p> <p>Correlative forms: Sequential <i>first... next</i> Conclusive <i>... finally</i></p>	<p>'Here and now': Past <i>up to now, hitherto</i> Present <i>at this point, here</i> Future <i>from now on, henceforward</i></p> <p>Summary: Summarizing <i>to sum up, in short, briefly</i> Resumptive <i>to resume, to return to the point</i></p>

Table 3: Causal and temporal conjuncts (Halliday & Hasan, 1976: p. 243)

"Heat is only the motion of the atoms I told you about "
 "Then what is cold?"
 C.cond
 "Cold is only absence of heat "
 "Then if anything is cold it means that its atoms are not moving "
 C cond
 "Only in the most extreme case. There are different degrees of cold Ø A piece of ice is cold
 C ap
 compared with warm water. But the atoms of a piece of ice are moving – they are moving
 C:conc
 quite fast. as a matter of fact But they are not moving as fast as the atoms of warm water
 C ap C conc
 So that compared with the water, the ice is cold But even the water would seem cold, if
 C caus C ad
 compared with a red-hot poker Now I'll tell you an experiment you ought to try one day "
 C.temp

C ad = additive C.caus = causal C:cond = conditional
 C.ap = appositive C conc = concessive C temp = temporal
 Ø = implicit conjunction

Figure 3: Text analysis for conjunction (Halliday, 1994; p.330)

2.2.2.3.4 Lexical Cohesion

The role of reference, substitution and ellipsis, and lastly conjunction have been discussed above largely on the basis of the work of Halliday and Hasan (1976); thus all the grammatical cohesion devices have been mentioned. The remaining device which creates cohesion is lexical cohesion, which is provided by vocabulary choice.

There are two different types of cohesiveness by lexical cohesion; reiteration and collocation. Reiteration is the *repetition* of lexical items and repetition can be created by the same lexical element in text.

The cohesive connection between two lexical items may have a *synonymic* or *near synonymic* relation. Additionally, the relation may have a *superordinate* relation or a relation where general nouns came into prominence.

- (11) There is a **boy** climbing that tree.
- The **boy** is going to fall if he doesn't take care. (repetition)
 - The **lad's** going to fall if he doesn't take care.(synonymy)
 - The **child's** going to fall if he doesn't take care.(superordinate)

d) The **idiot's** going to fall if he doesn't take care.(general noun)

Considering example (11), in (a) reiteration comes from the repetition of the same word; in (b), the synonymic relation between *boy* and *lad* creates the connection; the superordinate level of *boy -child-* is used for relation in (c); and finally, in (d) the general noun *idiot* refers back to *boy* in the first sentence.

The most complicated part of lexical cohesion is *collocation*; i.e. cohesion "achieved through the associations of lexical items that regularly co-occur" (Halliday & Hasan, 1976:p.284). The lexico-semantic relations can be provided by *opposite* (antonymy) relations, part of whole or *part of part* relations, and by *hyponymy* between in lexical items. All these patterns constitute *collocations*.

Both *collocation* and *reiteration* are based on *co-occurrence*. The referential relations in reiteration can be provided by the same referent (*repetition*), the lexical items may have an inclusive meaning pattern (*synonymy*, or near *synonymy*), they may exclude each other (*superordinate*), or their meaning relation may be unrelated referentially (*general word*). The same *referential* relations are also seen in *collocation*. *Collocation* may occur not only in *synonymy* or near *synonymy* relations, but also *antonymy*, *hyponymy*, some *temporal timelines* (such as *Tuesday* followed by *Thursday*) and *meronymy* (part of whole) relations may be *collocations*. Collocations can be difficult to analyze because "there is always that possibility of cohesion between any pair of lexical items which are in some way associated with each other in the language" (Halliday & Hasan, 1976: p.285).

2.2.2.3.4.1 The concept of lexical cohesion and its cohesive role

While it is easier to identify grammatical cohesion than lexical cohesion, there is no one-to-one specific relation between lexical cohesive items in a text. In other words, the relations are sometimes provided by linguistic lexical items or the lexical collocations, whose relatedness comes from both the text and the context of language. In particular, it is difficult to identify textual lexical cohesion, which is only created in a text, not in the language itself. This kind of cohesion comes from the whole of the text, and its specific nature spreads cohesiveness to all the vocabulary in the text, instead of indicating one-to-one lexical associations (Halliday & Hasan, 1976).

Despite collocation being hard to identify, there are some factors that simplify the designating or guessing which vocabulary items contribute to the cohesion in texts and which have the potential to be connected or disconnected. First is the degree of proximity in the lexicon. This means that the words with a high degree of proximity to occur together have a great potential to create cohesion with collocation in a text. In addition, the distance between two lexical items also affects their potential connection. This distance is created by the number of words, clauses or sentences. For example, in a sentence there can be a synonymic relation between two lexical items that have a greater or fewer number of words separating them (see Example 11 and Example 11a, there are four words between them), their potential to have a synonymic relation more possible than if they have more words between. Finally, there is the frequency factor. Roughly, one lexical item that shows high frequency use in language tends not to be connected to another item with high frequency. For instance, '*man*' is a highly frequent word, just as the word '*know*'. Cohesive collocation between them is really hard to build directly (Halliday & Hasan, 1976).

As a final remark, stating that lexical cohesion is hard to identify does not mean it is impossible. Figure 4 exemplifies how lexical cohesion analysis can be undertaken for a text.

It should also be noted that in this thesis only overt lexical items are used in order to create lexical cohesion. More specifically, antonymy, meronymy, hyponymy and synonymy relations are used, based on the studies on lexical cohesion by Halliday (1994), Hasan (1989) and Halliday and Hasan (1976).

2.2.2.3.5 Combining all cohesion items

Halliday & Hasan, (1976: p.1-2) stated that "the word text is used in linguistics to refer to any passage, spoken or written, of whatever length, that forms a unified whole" and also "it is not a grammatical unit, like a clause or a sentence". However, texture is created partly by cohesion and the text unity is generated. Textuality is not related to the density of cohesive ties; it is possible to observe texts that have few cohesive ties. Although cohesion is a required condition for text creation, nevertheless it does not mean that it is a competence factor for text and it is only one of the factor that create texture and textuality.

Cohesion is not created only through grammatical or lexical elements. There are also semantic factors such as; reference, lexico-grammatical factors based on grammar, including substitution and ellipsis, and lexical factors like lexical cohesion. Beside this, there is collocation that creates external or internal relations grammatically and partly lexically. In general, the continuity of cohesion according to Halliday and Hasan (1976) has three main bases, as follows:

(I) Cohesion provides continuity of lexico-grammatical meaning. If a hierarchical schema is created for the role of cohesion related to lexico-grammatical continuity, this hierarchy would start with vocabulary level connections, which are based on the lexical item connections (lexical cohesion). It would continue with substitution and finish with ellipsis, which is a purely grammatical construction. More specifically, the hierarchy would be as follows: collocates, reiterations (repetition and synonymy), superordinates, general terms, and substitutes and ellipsis.

(II) Referential meaning provides continuity with the aim of developing phoric relatedness of reference items.

(III) The semantic connectedness of a text or a clause with the preceding text or clause is provided by conjunction that has additive, adversative, causal or temporal subcategories in terms of external (ideational meaning) and internal (interpersonal meaning).

In this chapter the contribution of Halliday and Hasan to cohesion studies has been discussed in this chapter. Their views about cohesion are text oriented and they explain cohesion through overt textual units. However, Martin (1992, 2003), a prominent figure in cohesion studies, emphasizes the role of semantic relations in the cohesion of a text and his general views on cohesion are explained in the following section.

Peter rushed straight up to the monster and aimed a slash of his sword at its side. That **stroke** never reached the Wolf. Quick as **lightning** it turned round, its eyes flaming, and its mouth wide open in a howl of anger. If it had not been so **angry** that it simply had to **howl** it would have got him by the **throat** at once. As it was – though all this happened too **quickly** for Peter to think at all – he had just **time** to duck down and plunge his **sword**, as hard as he could, between the **brute's** forelegs into its heart. Then came a horrible, confused **moment** like something in a **nightmare**. He was tugging and **pulling** and the Wolf seemed neither alive nor **dead**, and its bared **teeth** knocked against his forehead, and everything was blood and heat and hair. A **moment** later he found that the **monster** lay **dead**.

S id
 slash
 Coll
 quick
 Rep
 Rep
 Coll /
 S mer
 mouth
 Coll
 quick
 Rep
 S id
 Wolf –
 S hyp
 time
 Coll
 monster
 Coll
 tugging
 Coll
 alive
 Coll /
 S mer
 mouth
 Rep
 Rep/S id
 Wolf
 Rep

Coll = collocation
 Rep = repetition
 S = synonymy

S id = identity (of reference)
 S hyp = hyponymy
 S mer = meronymy

Figure 4: Text analysis for lexical cohesion (from Halliday, 1994; p.335)

2.2.2.3 Martin (1992, 2003): Semantic system and cohesion

Martin considers that texture, as a kind of study of coherence, can be studied in terms of cohesion. In his system, Martin (1992) takes Halliday's (1994) non-structural cohesion relations (See 'Reference, Ellipsis and Substitution, Conjunction and Lexical Cohesion' in Halliday, 1994), reformulates them as a semantic system and embeds them in semantic discourse structure. From this process he achieves the following four different kinds of relations; identification, negotiation, conjunction, and ideation.

Conjunctions are the message connectors, and they connect messages additively, comparatively, temporarily or casually which is very similar to views of Halliday and Hasan (1976). On the other hand, ideation is a semantic relation that replaces earlier lexical cohesion, but in a broader sense. Ideation relations are the semantics of lexical relations

(Martin, 1992, 2003). Martin (2003) states that identification, negotiation, conjunction, and ideation have metafunctions in discourse and his views are given in with those of Halliday in Figure 5:

Martin	Halliday
Identification → Textual meaning	Theme → Intratextual (discourse organization)
Negotiation → Interpersonal meaning	Mood → Intrapersonal (speech function)
Conjunction → Logical meaning	Logical → Logical structure (logical function)
Ideation → Experiential meaning	Transitivity → Experiential

Figure 5: Comparison of the views on the process of discourse from Martin (2003) and Halliday (1967)

These functional properties are quite similar to Halliday's (1967) classification of discourse processes of all languages (See Figure 5). Halliday comments that the study of texture considers the interactive patterns between discourse grammar, lexico-grammar, and phonology/graphology. All these interactions constitute the experiential and textual grammar which reveals cohesive harmony.

2.2.2.4 Hoey (2005): Lexical Priming, Lexical Relations and Text

While Halliday and Hasan (1976), and Martin (2003) focus on how the relations of cohesion are created, Hoey (2005) points to the facilitative role of cohesion relations in reading. He argues that lexical relations are primed and these primed relations provide the cohesiveness of texts. Furthermore, he considers the role of the reader of texts, emphasizing expectations of the reader. Priming is possible for different kinds of semantic relations; collocation, semantic association, and colligation. The primed elements are not only words but also sometimes words sequences. These primed units are semantic sets that include more than one primed item (Hoey, 2005).

Semantic sets are based on primed words or word sequences. Semantically, primed sets of semantic units can be categorized under two types: co-hyponymy and synonymy. Some words are used in discourse collectedly: 'Train as a teacher', 'train as a dancer' etc. It is possible to obtain semantic sets derived from collocations.

The other semantic set shows synonymic relations, this does not mean that they are identically primed words or units, close sense similarities or collocations. 'Round the world' and 'around the world' collocations do not need to be primed identically, but both these collocations are used similarly, if sense relations are considered (Hoey, 2005).

Decisions are more closely linked with organizing discourse relations than is thought. Sometimes, the sense relations obtained from the discourse are concerned with the reader's or listener's expectations and/or decisions (Hoey, 2005). The following example shows the part played by expectations in discourse organization.

‘In winter, Hammerfest is a thirty-hour ride by bus from Oslo... (Hoey, 2005: p.114)’

The content of the sentence is understandable. A reader can guess that this sentence is not about winter in Oslo, but about Hammerfest.. If s/he is interested in Hammerfest, the content of the sentence directs him or her to have some expectation about the sentence. That is to say, the cohesiveness of the text is connecting with the participant’s first expectation. On the other hand, the text-linguistic features (semantic organization) are organized according to the participant’s expectations. It means, expectations are part of the priming of the vocabulary. The word *winter* is known and experienced, so cohesive chains of lexical items are not expected to be related to winter. Experience and expectations are based on *placed* (location, transport) words or chains. Hence, lexical *placed* references and cohesive chains or semantic sets are expected.

2.2.2.5.1 The way in which words or nested combinations are textually primed

Hoey (2005: p.115) tries to determine how words are textually primed and offers three suggestions:

- Words (or nested combinations) may be primed positively or negatively to participate in cohesive chains of different and distinctive types (textual collocations)
- Words (or nested combinations) may be primed to occur (or to avoid occurring) in specific types of semantic relations, e.g. contrast, time, sequence, exemplification (textual semantic association)
- Words (or nested combination), may be primed to occur (or avoid occurring) at the beginning or end of independently recognized discourse units , e.g. the sentence, the paragraph, the speech turn (textual colligation)

These three ideas are based on three essential notions; *textual collocation*, specific types of *textual semantic associations* and *textual colligation* in discourse. The *semantic relationships* or *textual semantic associations* in the terminology used by Hoey (2005) is similar to the non-structural cohesion of Halliday (1994), and Hasan (1989). Thus, *textual colligation* can be evaluated as the *structural cohesion* of Halliday (1994) and Hasan (1989). However, *textual collocations* are defined positively or negatively according to the participant’s expectations and they are primed depending on some semantic sets. In one sense textual collocations are similar to Hasan’s (1989) semantic ties but fundamentally, Hoey’s (2005) lexical priming is inclusionary and connected with participant, context and text. All Hoey’s (2005) descriptions of textual priming basically includes cohesive harmony (Hasan, 1989) and semantic based explanations that includes language, register and genre (Martin 2003). Hoey (2005) evaluates and combines three possible claims: *textual collocation*-claim one-, *textual semantic association* –claim two-, and *textual colligation* –claim three.

2.2.2.5.2 Three claims for textual priming

Participating cohesive chains (textual collocation): The first claim is "words (or nested combinations) may be primed positively or negatively to participate in cohesive chains (textual collocation)" (Hoey, 2005: p.116). A central feature underpinning this claim is that it is possible for any lexical item in the textual circle to be primed. Hoey (2005: p.115-116) makes the connection between first claim and textual cohesion by stating that "textual collocation is therefore what lexis is primed for and the effect of the activation of this priming is textual cohesion" and he points to coherence explaining that; "cohesion is a

recognizable phenomenon in a text and has been shown to correlate in interesting ways with coherence and to recognize that part of our knowledge of a word is a knowledge of the ways in which it is capable of forming cohesive relations". These ideas create a dilemma concerning cohesion: is it an internal (textual) or external (coherence) factor? This external-internal separation has similarities to the explanations given by Halliday and Hasan (1976) in relation to internality and externality. Hoey (2005) emphasizes that overt linguistic markers in text can be determined as internal; however, for external he means the contextual and readers based connections. Both these processes are governed by expectations; that is those of the readers, so it is possible to see which words will participate in cohesion with the aim of experienced words or combinations. Secondly, in a broad sense, the cohesion type that will be expected is also known by the participant and the words participate in cohesive chains with both internal and external factors that are evaluated by expectations. This means that a word may be primed positively or negatively in cohesive chains.

Textual semantic association: The second claim is that 'every lexical item (or combination of lexical items) may have a positive or negative preference for occurring as a part of a specific type of semantic relation'(Hoey, 2005: p.122). In this context semantic association is used in a wide sense. It is possible for every lexical item to be primed positively or negatively in some broad semantic pragmatic relations or textual patterns. These semantic-pragmatic relations or textual patterns may have relations such as; "contrast, comparison, time sequence, cause-effect, exemplification or problem solution". Hoey (2005: p.123) stresses the pivotal role of priming of lexis stating that 'lexis is systematically primed for textual semantic association'.

Textual colligation: Concerning this last claim Hoey (2005; p.129) briefly states that "every lexical item (or nested combination of lexical item) is capable of being primed (positively or negatively) to occur at the beginning or end of an independently recognizing *chunk* of texts".

2.3 Lexical and conjunctive cohesion revisited

In Chapter 1, it was stated that cohesion of clauses in this experimental study are created by lexical and conjunctive cohesion. These terms, and the opinions concerning lexical and conjunctive cohesion after Halliday and Hasan (1976) will be detailed in this section with the aim of presenting notions from other authors to create a broader perspective. Firstly, the views about lexical cohesion found in the literature will be briefly outlined, then conjunctive cohesion will be discussed with particular reference to the role of the adversative contrastive *but*.

2.3.1 Lexical cohesion

Before Halliday and Hasan (1976), Enkvist (1975) developed a lexical cohesion model for Finnish, this is very similar to Halliday and Hasan's model; but Enkvist's model includes the *implication* category which is very similar to the collocation category created by Halliday and Hasan (1976). The *implication* category includes *casual* relations (fire-smoke), *culture-based* relations (foot-shoe), and the relations about '*state or condition*' or '*change of state or condition*' (water-ice).

The other attempt to explain lexical cohesion comes from Kallgren (1979) who developed a model based on Swedish children's stories. She uses relations such as *repetition*, *synonymy* and *hyponymy*. In addition, she adds a *comparison* category (tall-taller) and an inference category, which is nearly the same as the collocation (Halliday and Hasan) and Enkvist's implication category.

Since 1988, there have been many attempts to explain lexical cohesion in different ways, although they are based on similar explanations as previous studies. Briefly, McCarty (1988) analyzed lexical relations in conversation. His model contains four main categories: *equivalence*, *inclusion: specific-general*, *inclusion: general-specific*, and *opposition*. They are nearly the same items with previous ones, but with different labels. Morris and Hirst (1991) used Halliday and Hasan's (1976) method in their computational work. They tried to develop an efficient program, to find lexical relations in texts. The other remarkable approach was developed by Hoey (1991:p.10) in which he emphasized the role of lexical cohesion in texts stating that 'lexical cohesion is the only type of cohesion that regularly forms multiple relationships' that are not formed by grammatical relations. Tanskanen (2006; p.42) juxtaposes Hoey's classification of lexical cohesion:

- a) simple lexical repetition (a bear-bears)
- b) complex lexical repetition (a drug- drugging)
- c) simple paraphrase (to sedate – to drug)
- d) complex paraphrase (heat- cold)
- e) substitution (a drug – it)
- f) co-reference (Mrs. Thatcher – the Prime Minister)
- g) ellipsis (a work of art – the work)
- h) deixis (the works of Plato and Aristotle –these writers)

Yet another important attempt to explain lexical cohesion was realized by Martin (1992) in which he redefines the lexical cohesion categories undertaken by Halliday and Hasan. His lexical cohesion relations category consists of three main categories: *taxonomic*, *nuclear* and *activity*. These taxonomic relations are similar to or modification of the general lexical relations of Hasan (1984) and the synonymy relations of Halliday (1985). These relations include; *repetition*, *synonymy*, *hyponymy*, *meronymy*, *co-hyponymy*, and *co-meronymy*. However, the *nuclear and activity sequence* relations are a modification of the collocation category created by Halliday and Hasan (1976).

2.3.2 Conjunction: the role of adversative contrastive *but* (*ama/fakat*)

Fraser (2006) hypothesizes that every language has one primary contrastive marker and the various semantic uses of this contrastive markers are similar in all languages. The primary contrastive marker is *but*. The connector *but* is translated into Turkish as *ama* and/or *fakat*. In this thesis, only *ama* is used as a conjunctive cohesion item. The role and contribution of this item to cohesion will be discussed in this section. A similar differentiation for the use of *but* was developed by Fraser (2006) showing ten different uses of *but* and categorizing them

into the two main domains of; 'direct contrastive context', which is similar to 'external contrast' and 'indirect contrastive context' which is similar to 'internal contrast'.

As was mentioned, Halliday and Hasan (1976) clarified the semantic roles of conjunction relations. They used the terms additive, adversative, clausal and temporal. In their classification, the adversative conjunction has various roles as shown in Table 4.

	External/internal	Internal (unless otherwise specified)		
Additive	Additive, simple: Additive <i>and, and also</i> Negative <i>nor, and . . . not</i>	Complex, emphatic: Additive <i>furthermore, in addition, besides</i>	Apposition: Expository <i>that is, I mean, in other words</i>	Comparison: Similar <i>likewise, similarly, in the same way</i> Dissimilar <i>on the other hand, by contrast</i>
	Alternative <i>or, or else</i>	Alternative <i>alternatively</i> Complex, de-emphatic: After-thought <i>incidentally, by the way</i>	Exemplificatory <i>for instance, thus</i>	
Adversative	Adversative 'proper': Simple <i>yet, though, only</i> Containing 'and' <i>but</i>	Contrastive: Avowal <i>in fact, actually, as a matter of fact</i>	Correction: Of meaning <i>instead, rather, on the contrary</i> Of wording <i>at least, rather, I mean</i>	Dismissal: Closed <i>in any case, in either case, whichever way it is</i> Open-ended <i>in any case, anyhow, at any rate, however it is</i>
	Emphatic <i>however, nevertheless, despite this</i>	Contrastive (external): Simple <i>but</i> Emphatic <i>and, however, on the other hand, at the same time</i>		

Table 4: Additive and adversative conjunctions from Halliday and Hasan, 1976: p. 242

In this study, only the external simple contrastive 'but' will be used (indicated with an arrow in Table 4). In her pioneering work on the English conjunctions; and, but and if, Lakoff (1971) dealt with various senses of *but*. The main aspect of *but* is that it requires "a common topic" (p.131). Common examples, which correspond to Halliday and Hasan's (1976) 'external' relations include:

(12) John is tall but Bill is short.

(13) John likes ice-cream but I hate it.

On the other hand, examples like (14) below are different and correspond to Halliday & Hasan's 'internal' relations:

(14) John is a Republican, but you can trust Bill.

In Example 14, only the textual information is not sufficient to make sense of the contrast. The producer of this sentence has some expectations that the hearer can understand the contrastive relation and this requires the listener to have some specific background knowledge. This means that the hearer needs to take the producer's feelings into account and additionally (s)he needs to infer the relation between *to be able to trust Bill* and *the untrustworthiness of Republicans* according to the producer's feelings. Lakoff (1971) explains the roles of *but* with the terms similarity and difference. She claims that the combinations of "similarity and difference is what allows the use of *but* , and in fact forces *but* rather than

and. Lakoff (1971) says that *but* has a semantic opposition role in general, and similarity and differences between two conjuncts forces to use *but*, not to *and*.

In a different but related vein, Maat (1999: p.148) emphasizes the difference between contrastive use of *but* and as a denial expectation use where the *but* clause denies an expectation by the preceding clause. However, here the arguments about the contrastive use and denial of expectation use of *but* are excluded.

2.3.2.1 Contrastive Conjunction in Turkish

As already mentioned above, Fraser (2006) hypothesized that all languages have one main contrastive relation marker. Jasinskaja and Zeveet (2008) have found that Russian has one main marker for contrast. In Turkish, the most common contrast relation markers are *ama* and *fakat*, both of them can be translated into English as *but, yet* (Zeyrek, in print)'.

How the contrastive conjunction accomplishes cohesion in Turkish can be seen in the following examples.

(15) Mezuniyet törenime ailemi bekliyordum ama annem gelmemişti.

(I was expecting my family to come to my graduation ceremony but my mother had not come.)

(16) Mezuniyet törenime ailemi bekliyordum ama köpeğim de gelmişti.

(I was expecting my family to come to my graduation ceremony but my dog also came.)

(17) Mezuniyet törenime ailemi bekliyordum ama Ahmet yemek yedi.

(I was waiting my family for my graduation ceremony but Ahmet had his meal.)

According Lakoff (1971), examples (15) and (16) have conjunctive cohesion, because we may guess that 'someone came to the ceremony' and we can infer this with the aim of textual cues not requiring external knowledge. There is a relation between first conjunct and second conjunct in examples (15) and (16). However, in example (17), we cannot say that this sentence has conjunctive cohesion, because there is no similarity or difference between first and second conjunct.

2.4 Coherence

In 1952, when the structural views about linguistics were dominant, Harris stated that discourse studies have two sides : "continuing descriptive linguistics beyond the limits of single sentence" and "correlating culture and language" with linguistic units (in Renkema, 2009). If the discourse processes studies are evaluated from the standards of Harris (1952), it may be said that Halliday's contributions to discourse studies have been enormous, beginning with the grammar of texts (1961, 1964, 1969) and extending beyond grammar, to explore the structural and non-structural relations in text (1962, 1966, 1967, 1968). This process of Halliday seems like the first step of Harris's(1952) condition for discourse studies. Halliday's studies continues with the functions of the linguistic text structural relations, and

taking social processes into account (1970, 1971, 1989, 1994). These may constitute the second step of Harris's(1952) view on discourse studies. In addition, Hasan (1989), Martin (1992, 2003) and Hoey (2005) also mention social factors as a contextual factors that affect discourse processes. However, there is one main aspect, which triggers a criticism of their view which is explaining coherence based on text linguistics units without considering readers comprehension.

In the next section the main views concerning coherence and its relation with cohesion will be discussed in the light of linguistic theories. Also the answers are given to following questions: What is coherence? Are there any relations between cohesion and coherence? If so, what kind of relations are they?

2.4.1 Explaining Coherence

Bublitz (2011) argues that the sophisticated structure of the phenomena of coherence cannot be completely identified. The notion of coherence has little practical application, largely because of its complex and blurred structure. This complexity and fuzziness comes from the fact that coherence does not only depend on the structure of texts, but also on the socio-cultural frame, mental categorization, and the background knowledge of reader and writer or speaker and listener. In other words, " since it is not the text which coheres but rather people who make text cohere, we can say that for one and the same text there exist a speaker's/writers, a hearer's/reader's and an analyst's coherence, which may or may not match"..."from such a contextualizing, interpretive viewpoint, speakers/writers are said to intend, anticipate and (overtly and/or covertly) suggest coherence while hearers/readers ascribe coherence to utterances within their linguistic, situational and socio-cultural context"(Bublitz, 2011: p.45).

There have been many attempts to explain this complex concept. The main views come from many kinds of discourse schools, but they generally explain Harris's (1952) first step (Renkema, 2009). However, there have been some enterprises, that exhibit a holistic view such as Renkema's (2009) connectivity theory or Tanskanen's (2006) collaboration theory.

2.4.2 Views on coherence

As explained in section 2.2.2.1.1 of this thesis Halliday (1994), and Halliday and Hasan(1976) state that there are three functions of semantics of discourse: ideational, intrapersonal and textual. Halliday and Hasan explain their views on coherence on the basis of the third item:

"There is a third component, the TEXTUAL, which is the text-forming component in the linguistic system. This comprises the resources that language has for creating text, in the same sense in which we have been using the term all along: for being operationally relevant, and cohering within itself and with the context of situation" (Halliday & Hasan, 1976; p.26-27).

In their view, to be coherent, a text should have well-formed components with cohesion relations providing its textuality.

Halliday (1989) juxtaposes structural units of text and their functions, based on their early explanations in 'Cohesion in English' as follows:

Transitivity → Experiential (extra linguistic experiences)

Mood → Intrapersonal (speech function)

Theme → Intratextual (discourse organization)

Halliday (1989) extends the concept of discourse process and links early views in a *multimodal process*. In other words, a text is not the combination of linguistic units but a reality making and reality changing process and it is the combination of all these processes that provides coherence (Halliday, 1989).

2.4.2.1 Structural Views

One of the first attempts to find formal relations for coherence in texts is Winterowd's (1970) study. He calls coherence relations as 'grammar of coherence' and claims sentences have a set of rules for coherence like grammar rules. Enviskt (1978) considers that coherence requires textual cues and semantic levels of text. Reinhart (1980) has similar ideas about coherence, he also thinks that coherence is based on a set of text-based semantic rules. In his formulation, when cohesion means overt linguistic devices that provide connectivity in text, the coherence relations are the semantic and pragmatic relations in text. Hobbs (1983) and Fahnestock (1983) purport that there is only a set of rules in texts which result in coherence.

These first views on coherence are criticized by Giora (1985) who emphasizes the importance of genre. He says that cohesion-overt linguistic markers for relations and coherence are different notions, they are independent from each other and coherence cannot be explained with a set of rules related to the text. He accepts that coherence comes from well-formedness, but this well-formedness is the result of discourse relevance and discourse topic.

2.4.2.2 Attempts going beyond structures and textual sets

While some early explanations of coherence point to the textual semantic relations, there are some other views that stress the cognitive role of coherence. Widdowson's (1978) *Illocutionary Act Theory* and *Rhetorical Structure Theories* leads the way in terms of the cognitive or participant oriented views of coherence.

(18a)" -What are the police doing?

-They are arresting the demonstrators.

(18b)"-What are the police doing?

-I have just arrived (Widdowson, 1978: p.28-29)"

In these examples, when (18a) has cohesive relation (police-they), in (18b) there is neither cohesive tie nor set of structural rules. Widdowson (1978) claims that although the second example does not have cohesive ties or structural relations, it is coherent and its coherence comes from illocutionary acts, which explains illocutionary development through the text within the context. When cohesion is provided by propositional development in the text, the coherence is provided by illocutionary development through discourse with participants' illocutionary contextual acts.

As can be seen in Widdowson's (1978) *Illocutionary Act Theory*, coherence began to be distinguished as beyond structural textual units. In 1983, Bamberg commented that coherence is the 'sine qua non' of a text; the creation of expectations requires the prior knowledge of the reader or listener and his or her meaning construction and textual cues, which are also related also to their prior knowledge. The text and prior background knowledge of a reader are interactively related and they constitute a dynamic process of text (Bamberg, 1983).

The other theory that attempts to clarify coherent relations of texts is *Rhetorical Structure Theory (RST)*, which is conceptualized by Mann and Thompson (1988; p.247). As a descriptive theory, RST is concerned with the organization of and relations in texts. The RST relations are presented as *Rhetorical Structure Schemas (RSS)*. Each RSS represents a part of a text, which is called text-span. Relations in RST are based on two "non-overlapping" text-spans; nucleus and satellite, which have asymmetric relation. They explain on the terms nucleus and satellite on the ground of text spans:

"For example if span A is standing as evidence for span B, then B is not standing as evidence for A. Examination of large amount of text shows that the use of these asymmetric relations form a patterns, in which one span is consistently more central to the writer's goals and less subject to deletion or substitution of the material. The less central, or satellite, span tends to enhance the function of the more central, or nucleus, spans" (Mann & Thompson, 1987; p.3).

RSS are discourse relations which provide coherence. With a set of coherence relations, such as those given in Figure 6, RST provides an "abstract set of conventions" that use hypothetical cognitive schemas.

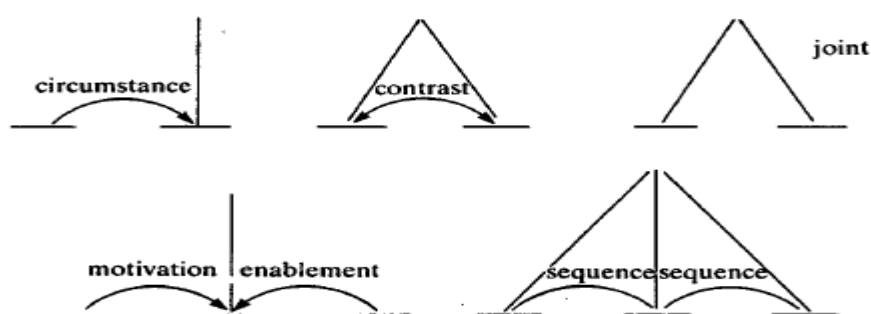


Figure 5: Comparison of the views on the process of discourse from Martin (2003) and Halliday (1967)

2.5 Cohesion, Coherence and Cognition: Experimental and Computational Studies

In the previous sections, the role of cohesion and coherence have been explained and studies on coherence highlighted that the role of speaker or writer as a producer of discourse, and listener or reader, has a considerable effect on cohesion and coherence. It has being stated

that while cohesion is the textual relatedness of text with linguistic overt markers, the creation or comprehension of coherence is a mental process related to text. Based on, Kintsch and van Dijk (1978) proposed a comprehension theory. For this thesis, Kintsch and van Dijk's (1978) and Kintsch's (1988) models are highly relevant hence their model will be explained. In this section, first the relation among cognition, comprehension, cohesion and coherence will be discussed based on a cognitive background. Then the construction integration model will be briefly explained. The connection between comprehension and memory, and comprehension and eye movements will be discussed within the studies about cohesion and coherence. This will be followed by the individual and cognitive differences, and similarities between cohesion and coherence. Finally, the contribution of computational work to cohesion and coherence studies will be introduced.

2.5.1 Cognition and comprehension

Studies have shown that cohesion is a facilitator for coherence and this can be seen in brain activity (Leer & Turkstra, 1999; Ferstl & Cramon, 2002). Ferstl and Cramon (2001) used fMRI in order to scan brain structures, when the subject was reading lexically cohesive or non-cohesive texts and the results showed that areas of the brain are activated according to cohesiveness or non-cohesiveness of the text.

Despite the neurological work on the related parts for coherence and cohesion, the cognitive background of these processes have not been examined by researchers. De Beaugrande (1987) describes the process of cohesion and coherence, pointing out that while cohesion is the process of connectivity of propositional relations in the text, coherence is related to creating meaning and sense relations. Perceiving coherence starts with comprehending the continuity of the text, then, memories related to the text relations and continuity of text are activated. These activations strength the linkages to the episodic and semantic memory, and background knowledge from concepts found in episodic memory and semantic memory, help to spread the activations. The whole process works on a principle of 'economy', because memory has some limitations. Hence, as a result, global patterns are created and the coherent unity of the text is comprehended in accordance with the compatibility of the global patterns in the language, the text and the readers' mind in general.

The process outlined by De Beaugrande were followed by researchers in later years. The meaning of words are represented in sentences semantically (Vigliocco & Vinson, 2007), and the human conceptual system, which is the basis of knowledge is stimulated by the representations (Moss et al., 2007; Barsalou, 2012). Relations between senses in the text and human conceptual system provide a spread activation in memory (Barsalou, 1999), but the memory has some limitations (Miller, 1959; Cowan, 2000), and it needs to unite related units, in addition do some categorizes in the system of working memory (Baddaley & Hitch, 2010).

The comprehension of text is realized from the lower levels of language understanding (word decoding and syntactic parsing) to the higher levels of comprehension (priming related concepts, taking ideas, combining ideas, understanding gist, and doing inferences). Thus, the comprehension process results from possessing information about the text and generating some inferences (McNamara & Magliano, 2009; Townsend & Bever, 2001; Gleason & Ratner, 1998).

If the reader or listener wants to recall the sentence, the recalling procedure is affected by the limitations of the working memory. For example, Rosen and Engle (1998) train participants to use articulatory suppression, when they are reading the words in order to force the

working memory to be employed in the recalling procedure, and they show that their recall results decrease. However, if the participant has a greater vocabulary range then they are less affected by articulatory suppression (Padilla, Bajo & Macizo, 2005) because of their ability to connect the representation of the word sense with conceptual knowledge. This was shown by Lang, John and Jonathan (2011) who found that the limitations of working memory can be compensated by the reader's familiarity with the ideas in the text.

2.5.2 Construction-Integration Model

The role of the mind in comprehension and reading processes has already been mentioned several times in this thesis. As stated at the beginning of this section (2.4), the construction-integration model tries to explain the comprehension process regarding cohesion and coherence. This section will give an overview of the basic notions of the construction integration model.

Kintsch and van Dijk (1978) proposed a comprehension model, which combines cohesion, coherence, comprehension and recall considering the different processes of producer and reader or listener. The minimal semantic structure of a text involves micro level structures, beyond them, there is a macro level structure that constitutes the gist of text. All these processes are realized in relation to readers' schema (comprehender's goal), and the coherent representations are realized within the limitations of working memory.

In the *construction-integration model*, *constructions* are realized by the reader's syntactic, semantic combinations in the text and their knowledge of the words in the text. In the *integration* stage, concepts in the readers cognition are activated with the help of the text; this activation is a dynamic process which continues throughout the text. In this stage, some concepts are activated more, and some concepts lose their activations. Finally, the reader's *mental representation* of text is created. While some mental representations are *textual based*, others are more *situational based*. The *text-based* mental representations are the propositional networks that are created by the text and are developed in the *construction stage*. Text based mental representations require *text based understanding or memory*. On the other hand, *situational* mental representations, which require *situational understanding or memory*, affect readers' inferences based on their prior knowledge. Situational mental representations are created in the integration stage (McNamara, 2001; Kintsch, 1994). The text-based representations are affected by propositional representations of texts and the readers' local inferences. They are called microstructures. Cohesive ties help this process in the propositional text-based level (in the construction process). They connect the prior discourse context and current discourse context, and help text-based memory or understanding and inferences. However, these macrostructures are representations of the global organization of the text. The whole construction-integration model "yield an impoverished and often even incoherent network" and so "the reader must add nodes and establish links between nodes from word knowledge and experience to make the structure coherent" (McNamara, 2001: p.52).

The procedure of recalling a text is text based on inference, namely text-based comprehension (McNamara, 2001). In this thesis, only text-based inferences are obtained. The microstructures are provided by lexical and conjunctive cohesion relations and the macrostructure of clauses is evaluated by asking participants about the understandability of clauses.

Crossley and McNamara (2010) show that comprehension of texts is facilitated by cohesion, and the coherent interpretation of text is most probably affected positively by cohesive ties,

if a reader does not have high prior knowledge concerning the text. However, there are other comprehension studies that show the role of cohesion in comprehension and coherent representations based on different theoretical backgrounds.

In this theses, situation based models were not used because of some practical reasons. Situation model based results get from comprehension questions, which requires long texts. For the further experimental studies about the comparison of text based and situation based comprehension, see 2.5.5).

2.5.3 Connecting text based memory and comprehension with cohesion and coherence

Ehrlich (1991) stated that "the cognitive operations involved in the processing of surface-cohesion devices for the construction of a coherent mental representation is a major issue in text". The role of cohesion in the coherent representation of text has been explored by using comprehension to linking these two.

In order to investigate the link between cohesion and coherence, Ehrlich (1991) uses high narrative and its low cohesive version without changing the content. They decreased the cohesive connections in a narrative to create the low cohesive version of the narrative. The results show that though the relation between reading times is not significant, recall performances show a significant relation between the high cohesive and low cohesive narratives. High cohesive narratives are better recalled, than low cohesive ones. Similar results have also been observed by other researchers including, McNamara et al. ,1996 ; McNamara & Kintsch,1996; and McNamara, 2001).

The comprehension of science texts has been explored by Ozuru et al. (2005). Their results indicate the facilitating role of cohesion. Their participants had better results from text based comprehension questions from high cohesive texts. However, Al-Surmi's (2011) study with conjunctive cohesion (discourse markers) shows that participants' comprehension levels of high and low cohesive texts do not differ significantly.

2.5.4 Eye tracking of cohesion and comprehension

Rayner (1998) argues that eye movement-data is very awareness-raising and they provide valid data that help in understanding reading. Carreiras and Clifton (2003) explain the role of eye movements during reading. When people read a text, they do not follow the straight lines of the print instead their eyes move in small jumps, called saccades. The target word or phrase is fixated after a small jump, and it is these fixations enable the understanding the meaning of the target word or phrase. On average one fixation takes a quarter of a second to obtain the orthographical, phonological and semantic pattern of a word or a phrase, and 90% of the total reading time consists of fixations. A saccade takes 20 to 40 ms in average, and the regression of to the previous fixated words or phrases accounts for nearly 15% of the total count of fixations of a typical college student.

According to Pickering et al., during language comprehension, "people often take a long time to realize that a difficult argument was illogical or based on false promises" (2003: p.34). Eye tracking studies are based on: *immediacy* and *eye-mind* assumptions. Immediacy is the effect of the word or phrase to provide immediate (for continuing to read) or delay (to stop

and reconsider a previous word or phrase) in reading. Besides, *the eye-mind assumption* means "people look at the thing they are thinking about" (Pickering et al., 2003: p.34). That is to say, the patterns of eye movements change according to the effects of words or phrases. Rayner et al. (1989) clarify this process by indicating the fact that the load in cognitive processes that is created by words affects the eye movements, and these patterns provide a valid online data to investigate reading processes. Reitbauer (2008) asserts that longer fixation durations, more regressions and shorter saccades are required by more difficult texts.

Though there are a few eye tracking studies investigating the role of cohesion on reading, some researchers demonstrate the facilitative role of cohesion at the global level of reading and co-referential processes. Co-referential processes have a facilitative role in terms of the total reading time, and as a reference item, pronouns are generally skipped (Gordan et al., 2003). Carrol and Slowiaczek (1986) point to the facilitative role of lexically associative words in sentences. However, Camblin et al. (2007) conducted a study considering both local and global level structures. They used critical words followed by a primed and non-primed word (called congruent or non-congruent associations) in cohesive and non-cohesive discourses. Their eye tracking results show that if the discourse context is not cohesive, associative priming results are significantly affected; thus, if the discourse context is not cohesive, local level associations are badly affected by the global level discourse.

The role of cohesion in coherence representation and comprehension has been shown, however, researchers have indicated some processes such as prior knowledge, and comprehension ability that create individual differences. The next section presents these individual differences.

2.5.5 Individual and Cognitive Differences and Similarities in Cohesion and Coherence

As stated above, the comprehension of texts is facilitated by cohesion, and cohesion relations help to bridge coherent interpretations. This is a general conclusion, but this conclusion is affected and changed by individual and cognitive factors. This section will summarize the experimental studies which have investigated the different cognitive and individual factors affecting the comprehension of cohesion and coherence.

2.5.5.1 Individual and measurement differences: prior knowledge, text quality, different measurements and reading skill

McNamara and Kintsch (1996) designed a study based on Construction-Integration of comprehension (Kintsch & van Dijk, 1978; Kintsch, 1988) in order to show the probable effect of prior knowledge using high or low coherent manipulated texts about the history of the Vietnam War. The participants were given a test that evaluated their prior knowledge of the content of both texts. They read both low and high coherence texts their reading time was measured and their comprehension was measured using free recall, multiple-choice questions and keyword sorting task (22 critical propositions for the micro and macro structure of the text). In addition, participants read sentences both without any pre-information (control) and with some information about the texts given by the researcher (pre-training). As shown in Figure 7, in the control session the participants read the sentences more slowly than the pre-training session. In addition, in the control session, high knowledge readers were able to read the high coherent texts faster than low coherent texts, while there is no significant difference for low knowledge readers between high and low coherence of texts. However, after the pre-

training section about the texts, the high coherent sentences were read faster than the low coherent sentences, both by high knowledge and low knowledge readers. The recall results showed that high knowledge readers recall more propositions than the low knowledge readers and from the high-coherent texts more proposition were recalled than the low-coherent texts. Also, high knowledge readers recalled more propositions after the pre-training section.

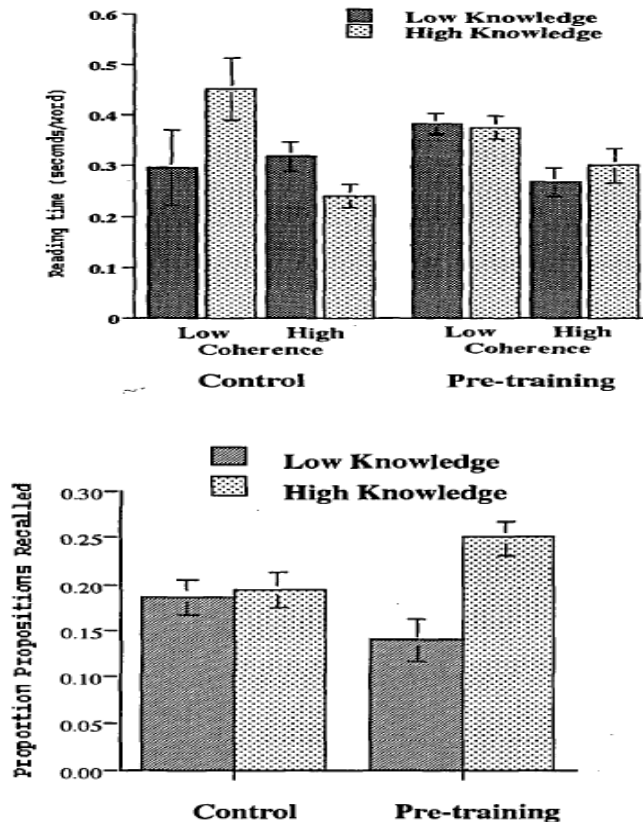


Figure 7: Reading time and recall difference between low and high knowledge readers (McNamara & Kintsch, 1996: p. 264-265)

McNamara et. al. (1996) not only explored the difference between low-knowledge, high-knowledge readers and high and low coherence texts, they also investigated text-based and situation based results. Text-based results such as recall and text-based questions mainly refer to the measures that can be easily obtained from the text without any need for undertaken complex inferences, such as problem solving questions and sorting key words. Their results indicate that the scores of low knowledge readers are enhanced by high coherence in both text-based and situation-based measurements, however, this enhancement effect is only valid for text-based measurements for high-knowledge readers. That is to say, the high knowledge readers obtain better scores than low knowledge readers from situation based inference questions if the text has low-coherence, (See Figure 8).

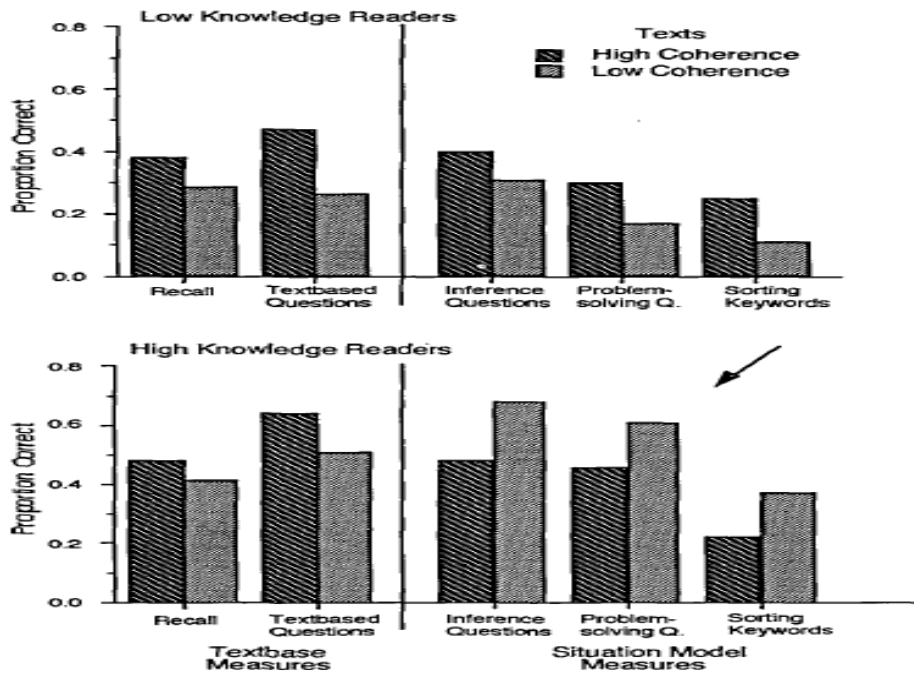


Figure 8:Text-based and situational-based measurements of high and low knowledge readers(McNamara et al. , 1996; in McNamara & Kintsch, 1996: p.250)

Parallel to these studies, McNamara (2001) found that the readers, having high-knowledge about the content of the text, learn better from the low-cohesive texts than the high cohesive ones. On the strength of their results, McNamara (2001) proposed that the prior knowledge possessed by the high knowledge readers gives them the ability to bridging the gaps in the text.

O'Reilly and McNamara (2007) investigated the contribution of low and high cohesive texts to the level of reader comprehension by classifying participants as less-skilled or skilled and low-knowledge or high- knowledge. The measurements were also differentiated as bridging questions (situational questions or situational inference questions) and text-based questions. As can be seen in Figure 9, the results are quite similar to those of McNamara et al. (1996), McNamara and Kintsch (1996) and McNamara (2001). Students with low knowledge about the text have better results if the text is high cohesive; in contrast, high-knowledge readers have better results if the text is low cohesive. This is called the 'reverse cohesion effect'. O'Reilly and McNamara (2007) show that skilled and high-knowledge readers have better results when reading difficult texts, and only the less-skilled but high-knowledge readers' results are enhanced by the reverse cohesion effect. Thus, it can be inferred from these results that low-knowledge readers close the gaps with the aim of high cohesiveness in bridging questions, and questions that require situational-based inferences.

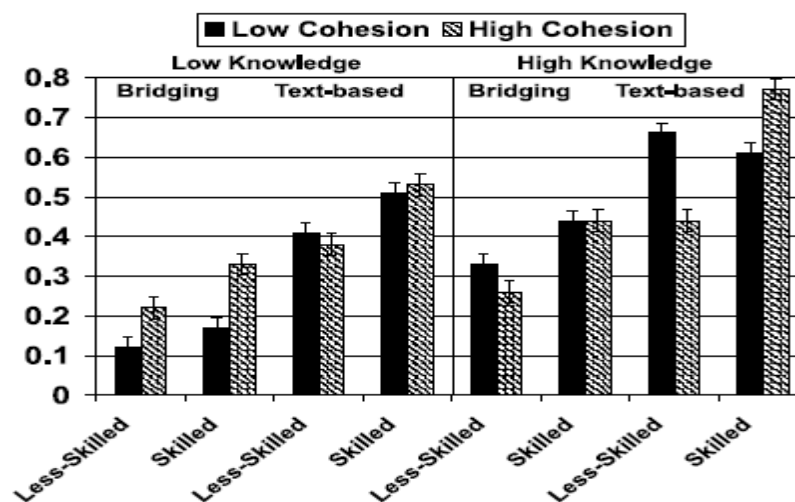


Figure 9: Effects of reading skill, cohesion, type of measurement and the level of knowledge (O'Reilly & McNamara, 2007: p. 135)

Similar findings achieved by Ozuru, Dempley and McNamara (2007). Their findings strengthen the results found by O'Reilly and McNamara (2007). Text-based questions receive a high level of correct responses in high cohesive texts, and the results relating to total comprehension results are closely connected to prior knowledge, furthermore skilled readers benefit from high-cohesive texts.

2.5.5.2 Subjectivity and objectivity of cohesion and coherence: prediction, self-explanation and expectation

In order to determine the effect of cohesiveness on comprehension and reading, it is necessary to consider individual differences in order to clarify the situation. In addition to individual differences, such as skills for comprehension and prior knowledge, there are other kinds of subjective factors, including attending to different lexical cohesive patterns, using predictions, expecting future ties or coherent relations, and using self-explanations. The objectivity and subjectivity of cohesive and coherent patterns are controversial, but researchers have pursued the objective and the subjective character of cohesive and coherent patterns for at least for the last two decades, as can be seen from the studies about the contribution of individual differences.

One of the first experimental attempts concerning the subjectivity of lexical cohesive patterns is the plot study undertaken by Morris and Hirst (2006) which was the antecedent of Klebanov and Shamir's (2006) rigorous investigation that combines many subjective responses. Halliday and Hasan (1976) stated that the role of grammatical cohesion is easy to identify, but lexical cohesion is dominated mostly by semantic relations, not with grammatical and/or lexico-grammatical relations. If the point that is considered by Halliday and Hasan (1976) is taken into account, the reason why Morris and Hirst (2006) needed to conduct a study on the subjectivity of lexical cohesion in text can be illuminated. Morris and Hirst's (2006) first claim is that the perception of an objective text by a reader is subjective to a certain extent. This means, there is a subjectivity difference between the reader's interpretation and the lexical cohesive relations. Morris and Hirst asked five participants to

mark the words which are related semantically. They found that when the mutual word group agreement was 63%, the agreement on direct relations between words was 50%. Though they focused on the subjective way of lexical semantic relations, in contrast Klebanon and Shammir (2006) attempted to find an objective way to evaluate subjective data for lexical semantic relations. They gathered all the close answers and obtained a pattern that fitted 7 out of 10 texts. Using a Wilcoxon matched pairs signed rank test, they reach the conclusion that the agreement of the marked items is $K=0.48$, which is quite similar to Morris and Hirst's (2006) results.

Sometimes, subjectivity may come from sentences however, the coherence will come from the connectives. Canestrelly, Mak and Sanders (2012) use causal connectors with a different content. Their inferred general content is CLAIM-ARGUMENT that requires a subjective content (e.g. Peter must be ill because he looks pale) or CONSEQUENCE-CLAUSE, which is related to the objective content or general reality (e.g. Peter is staying at home because he is ill). They use the Dutch connectors *want* and *omdat*, which both translate into English as 'because'. They found that when a causal relation is created by the CLAIM-ARGUMENT structure that requires *omdat*, the processing times of the sentences decrease, however the processing times do not decrease if one sentence includes CONSEQUENCE-CLAUSE meaning structure that requires *want*.

While some studies show the indispensable contribution of subjectivity for the interpretation of cohesiveness, others such as Ainsworth and Burcham (2007) investigate not the subjective interpretations, but the role of self-explanations that affect the comprehension of the cohesive or coherent texts. Self-explanations are those that a person makes for themselves in order to obtain the important points from text for learning and motivate themselves to understand the connections in the text. Ainsworth and Burcham (2007) point out that the understanding and comprehending of texts are enhanced by self-explanations that the reader guesses to make a contribution to the coherent interpretations of texts. The researchers used participants that had low level knowledge about the human circulatory system. A text with low coherence and high coherence was used and half the subjects were trained to use self-explanations. The results provided the evidence that highly coherent texts have better learning results, however this does not mean that highly coherent texts trigger self-explanation, because low coherent texts are also learned better than highly coherent texts if the participant is trained to use self-explanation.

The results of the study by Ainsworth and Burcham (2007) may be the answer to the question of why high-skilled readers have better results when tested on text comprehension. It may even be that they use self-explanations very quickly in order to fill the gaps in low coherent texts that allow them to make more inferences indirectly. Bellissens et al. (2007) also focused on the ascertained and efficient role of self-explanation, and they built iSTART, a textual cohesion model that indicates to crucial fields, which are important for self-explanation and making more inferences.

Both undertaking self-explanations that increase coherent representations and having subjective ties for cohesion may point to one notable fact; that of the proactive role of memory in predictions. As Bar (2009) comments, people make predictions in real time which provides them with expectations about the future. These predictions are triggered by associative links and allow the creation of expectations about future.

2.5.6 Computational Studies

Another empirical background to cohesion and coherence is provided by computational studies. Although a psycholinguistic experimental study was conducted for the research that underpins this thesis, the contribution of computational studies should not be ignored because they are informative for this thesis. As shown in the section above, computational techniques such as iSTART have also been used in experimental studies. In this section, firstly the computational studies about text summarization and the Coh-Metrix studies will be discussed. Then an overview of computational studies relating to lexical cohesion will be given. The purpose of this short section is to emphasize the fact that for more than one decade, automated approaches have paid attention to cohesion and coherence in discourse.

There have been some attempts in order to discover whether relations between cohesion and coherence assist in the reader in gaining information needed to summarize the content of the text. First, it should be considered that most of the computational studies assume that coherence appears to be a textual based entity coming from the subject matter, argumentation, structure and syntax of the text.

Alemanly and Fort (2003) used lexical chains to obtain the cohesive pattern of the text and the coherence of the text is taken from the matter, argumentation, structure and syntax of the text with the aim of computational programs. Finally, they combine lexical chains and coherence relations signaled by a discourse marker. They achieve understandable summaries of texts assisted by these relations. Lapata and Barzilay (2005) developed an automatic evaluation model in order to evaluate text coherence for machine-generated texts such as automatic text summarizations. The results from their model correlate with human judgments. Mani, Bloedorn and Gates (1998) also developed a text summarization model based on cohesion and coherence relations, their results also correlate with human judgments. However, it should be noted that these studies handle coherence as a connective-based phenomena.

Beyond text summarization, Coh-Metrix is the one program that has the power to evaluate linguistic features of cohesion. It is a computational linguistic tool that evaluates material at the levels of word, sentence, paragraph and discourse using 200 measures for cohesion, language and readability (Graesser et al, 2004; McNamara et al., 2002; McNamara et al., 2010) . Graesser et al. (2007) showed that this program evaluates some discourses better than others, for example, expository monologues. McNamara et al. (2010) analyzed the cohesion in discourse psychology articles using Coh-Metrix. They found a significant relation between the high and low cohesion texts in noun co-reference and causal cohesion.

Throughout the last decade, programs or algorithms have been used in order to evaluate text segmentations, such as TextTiling (Hearst, 1997), C99 (Choi, 2000). Stokes et al. (2004) developed a text segmentation system, SeLeCT which obtains the lexical cohesion chains in news text; and Oliviera, Ahmad and Gillam (2000) also developed a lexical cohesion-based summary system for financial news. The results from text evaluation show that there is a correlation between text structure and lexical cohesion in a text (Morris & Hirst, 1991; Chan, 2004; Teich & Fankhauser, 2005; Ercan & Cicekli,2000).

CHAPTER 3

METHOD

As stated in the introduction, the main aim of the thesis was to investigate the role of cohesion and coherence in relation to comprehension. In order to achieve this aim the following elements were evaluated; recall, acceptability judgment, reading time and eye movement . This chapter details the method of the experimental study.

The aims of the research, given in Chapter 1 are repeated here for ease of reference:

- 1) Understanding the relation between high or low cohesive sentences
- 2) Comparing the role of lexical cohesion and conjunctive cohesion in comprehension.
- 3) Investigating the role of different lexical cohesion items (synonymy, antonymy, meronymy and hyponymy) in comprehension.

3.1 Participants

Forty six right-handed native Turkish speakers with healthy eyes participated in the experiment. However, the data of 3 from participants was not analyzed, since they withdrew from the experiments explaining that they had a breathing problem related to the articulatory suppression. In addition, the data from a further 3 participants was not analyzed since their data was substantially lower than that of the other participants, upon examination of their data it appeared that they were unable to understand the procedure. Thus, the data from 40 participants, 27 females and 13 males, was used in this study. Their ages varied from 24 to 37 (M=23, S.D= 3.93). They were randomly placed in 4 groups. All of them observed different stimuli. The first group contained 10 participants (6 female, 4 male) (age min=21, max=33, M=26, S.D=4.19), in the second group there were 11 participants (10 female, 1 male) (age min=22, max=37, M=36.73, S.D=4.9), the third group consisted of 11 participants (7 female, 4 male) (age min=22, max=29, M=25.55, S.D=2.16), and there were 10 participants(5 male, 5 female) (min=22, max=37, M=27.36, S.=4.27) in the fourth group (see Appendix 2 for the participant summaries). All of the participants were either graduate or undergraduate students from Middle East Technical University and Atılım University. None took regular medication nor had a history of neurological or psychological disorders. All the participants confirmed that for the two days prior to the test they had not drunk alcohol or used any kind of stimulants or palliative substances (except nicotine and caffeine). Informed consent was obtained from all participants (Appendix 3).

3.2 Stimuli and Design

The words used in the experiment were presented in size 15 Times New Roman font. The text color was black, and the screen color was white. All the participants were shown 30 sentences (6 training sentences, 12 distracter sentences and 12 target clauses). The distracters and training sentences were the same for all the groups. The number of words in the sentences varied from 4 to 13, but the total number of words in the target sentences for each group did not vary greatly (Group 1: min=4, max=13, total=111; Group 2: min=4, max=12, total=99; Group 3: min 5, max=12, total=105; Group 6: min=4, max=11, total=93).

In the experiment, two kinds of cohesive ties were used: lexical cohesion (with *hyponymy*, *meronymy*, *antonymy*, and *synonymy*) and conjunctive cohesion (*contrastive conjunction-but-ama*) (See Appendix 4 for all the sentences).

The hyponymy, meronymy, antonymy, and synonymy lexical cohesion relations were constituted according to the explanations given by Saeed (2003: p. 65-70): "Synonyms are different phonological words which have the same or very similar meaning" (e.g., couch/sofa), but "antonyms are words which are opposite in meaning" (e.g., death/ life). "Hyponymy is a relation of inclusion. A hyponym includes the meaning of a general word" (e.g. dog/animal). "Meronymy is a term used to describe a part-whole relationship between lexical items" (e.g., page/book) .

The procedure for the four groups was as follows; groups 1 and 2 were shown the sentence that contained high cohesive ties, and groups 3 and 4 were shown the sentences that had low cohesive ties. All the sentences included two finite clauses, and were linked with a comma or a contrastive conjunction *ama* (in English *but*). For example, a sentence would have a conjunction or a comma and lexical cohesion ties or no lexical cohesion ties. Only the lexical cohesion ties (see below) were used no other cohesion devices (reference, ellipsis and substitution) were used. The first and second groups were high cohesion groups. The first group was shown the clauses that have both lexical cohesion and conjunctive cohesion, the second group was shown the same clauses but there was no CM *ama* or *fakat* in the sentence.

Groups three and four were the low cohesion groups. The sentences shown to group three were the clauses in which the lexical cohesion had been disrupted, but the contrastive conjunction (*ama*) was retained. Finally, the fourth group was shown the clauses in which the lexical cohesion had been disrupted and the contrastive conjunction had been removed. (Figure 9).

The cohesiveness of sentences was evaluated by two linguists. Both experts confirmed that all the sentences were coherent. All the words used for lexical cohesion were checked for frequency of use in the dictionary of Turkish words frequency (Göz, 2003), and only the high frequency words were selected.

The construction of the data

As given in Figure 10 the sentences given to the four groups were as follows; group one was shown a sentence which has an antonymy lexical cohesion relation to the words *death* (in the first conjunct) and *life* (in the second conjunct), and the two conjuncts are tied with contrastive conjunction 'but'. For the second group it is the same sentences except for the contrastive conjunction 'but'. The third group has the same clauses but the lexical cohesion has been disrupted. In other words, there is a distant relation between *death* (in the first conjunct) and *nature* (in the second conjunct). The sentence given to fourth group has neither lexical cohesion nor contrastive conjunction.

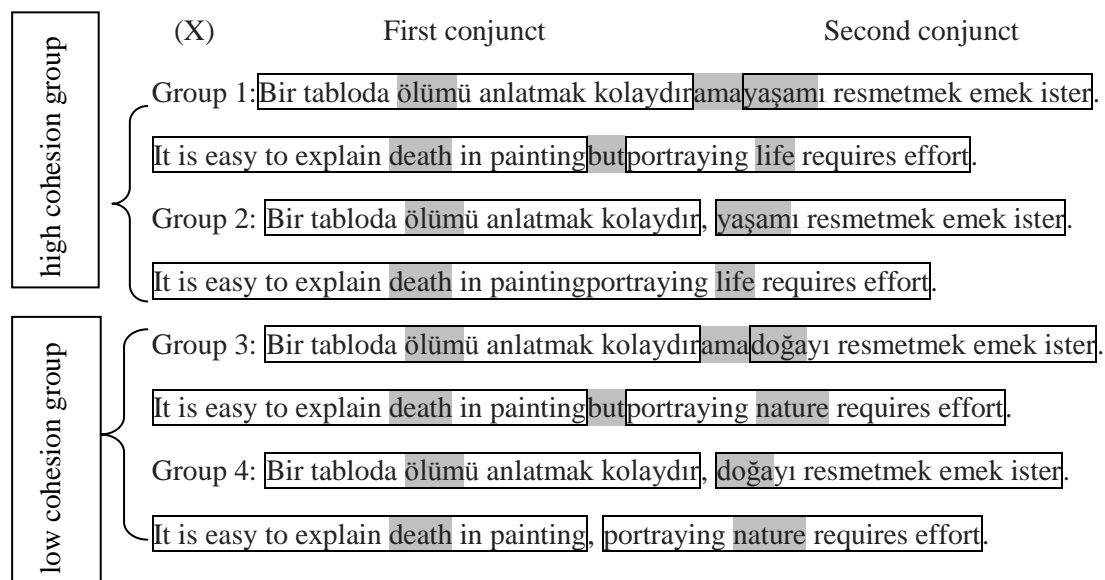


Figure 10: Manipulation of between group stimuli

The design of the experiment was a between subjects design. As stated above, there were four groups of sentences which were being altered 12 target clauses (including two conjunct: (3 hyponymy + 3 meronymy + 3 antonymy + 3 synonymy= 12 total), and also 12 distracters (different types of sentences) and 6 training sentences per group. In addition, all the sentences were presented randomly.

3.3 Experimental technique and apparatus

In the design of the experimental data for this study, the lexical cohesive ties and contrastive conjunction relations were arranged according to Halliday's (1970, 1989, 1994), Hasan's (1989) and Halliday and Hasan's (1976) views. The construction -integration model (van Dijk & Kintsch, 1978; McNamara, 2001; Kintsch, 1994) was useful in the design of the comprehension test for the high cohesive and low cohesive sentences. The results of the recall test were evaluated as text-based memory results (McNamara & Kintsch, 1996). The cohesiveness of sentences was also evaluated with the acceptability judgment test (participants being asked to evaluate the capability of being understood using a scale that had six options varying from 1=totally understandable- to 6=totally vague) . In addition, the time it took the participant to read the sentence was recorded. An articulatory suppression technique was used in order to create a cognitive load. During reading, participants repeated the sound [b] repeatedly. This technique was based on the work of Larsen and Baddeley's (2003) and, Baddeley's (1992) views on working memory and articulatory suppression.

Recall, response time and acceptability judgment only provided off-line results, therefore an eye tracking technique was used in order to achieve on-line results.

The participants' eye movements were tracked by the Tobii Studio T-120 eye tracker program. The data rate is 120Hz and accuracy is 0.5 degrees in this eye tracker. Spatial resolution of the eye tracker is 0.3 degree with 0.1 degrees for drift and 0.2 degrees for head movement error. The latency of maximum 33 ms, and the blink tracking recovery takes maximum 33 ms. The time to tracking recovery is 300msec.

3.4 Location

The experiments were conducted in Middle East Technical University 'Human-Computer Interaction Laboratory', which is used for eye tracking experiments. The room was mid-lighted and had a mirror wall on one side. The room temperature was maintained at 20 degrees centigrade using an air conditioner. In the middle of the room, there was a computer desk. The computer has a Tobii Studios program for tracking and saving participants' eye movements. After obtaining the informed consent, the participants were led into the mid-lit room. For the experiment they sat in a reclining chair. The average distance from the participants' eye to the computer monitor was 170 cm.

3.5 Procedure

Once the participants sat in front of the computer, their positions were balanced. Their eyes were calibrated with the eye tracker program in order to detect possible eye problems.

Participants are firstly instructed about the procedure verbally. as follows:

"The procedure is consists of these processes; reading the sentence, undertaking an acceptability judgment test and recalling the sentence. A sentence will be presented to you and all the sentences have to be read in order to comprehend the sentence, but you should not forget to repeat the sound [b] continuously, loudly and quickly (b, b, b, b...) while you are reading the sentences. In other words, you shouldn't forget to repeat the [b] sound loudly while you are reading the sentences silently. You need to click 'enter', whenever you think that you comprehend the sentence. When you click the 'enter' button, the sentence will disappear, and the acceptability judgment question will be presented. The acceptability judgment question is a scale for the evaluation of the understandability of the sentence that was presented. You need to select one of the numbers varying from 1 to 6 (1,2,3,4,5,6), where '1' means 'totally understandable' and '6' means 'totally vague'. After you select one of the numbers, you need to click the number in the keyboard that you selected, and you need to press the 'enter' button again. After that, you will be asked to recall the sentence that you were shown. You need to recall the sentence word by word and write it in the small frame into the screen using the keyboard and when you have finished then click 'enter'. After some sentences, you won't be asked to evaluate the sentence and recall it. After you read some sentences and press 'enter', you will be presented with another sentence'. Before every sentence, a plus sign will appear on the screen. You should fix your eyes on the sign and start to repeat the [b] sound then a sentence will follow' (See figure 11).

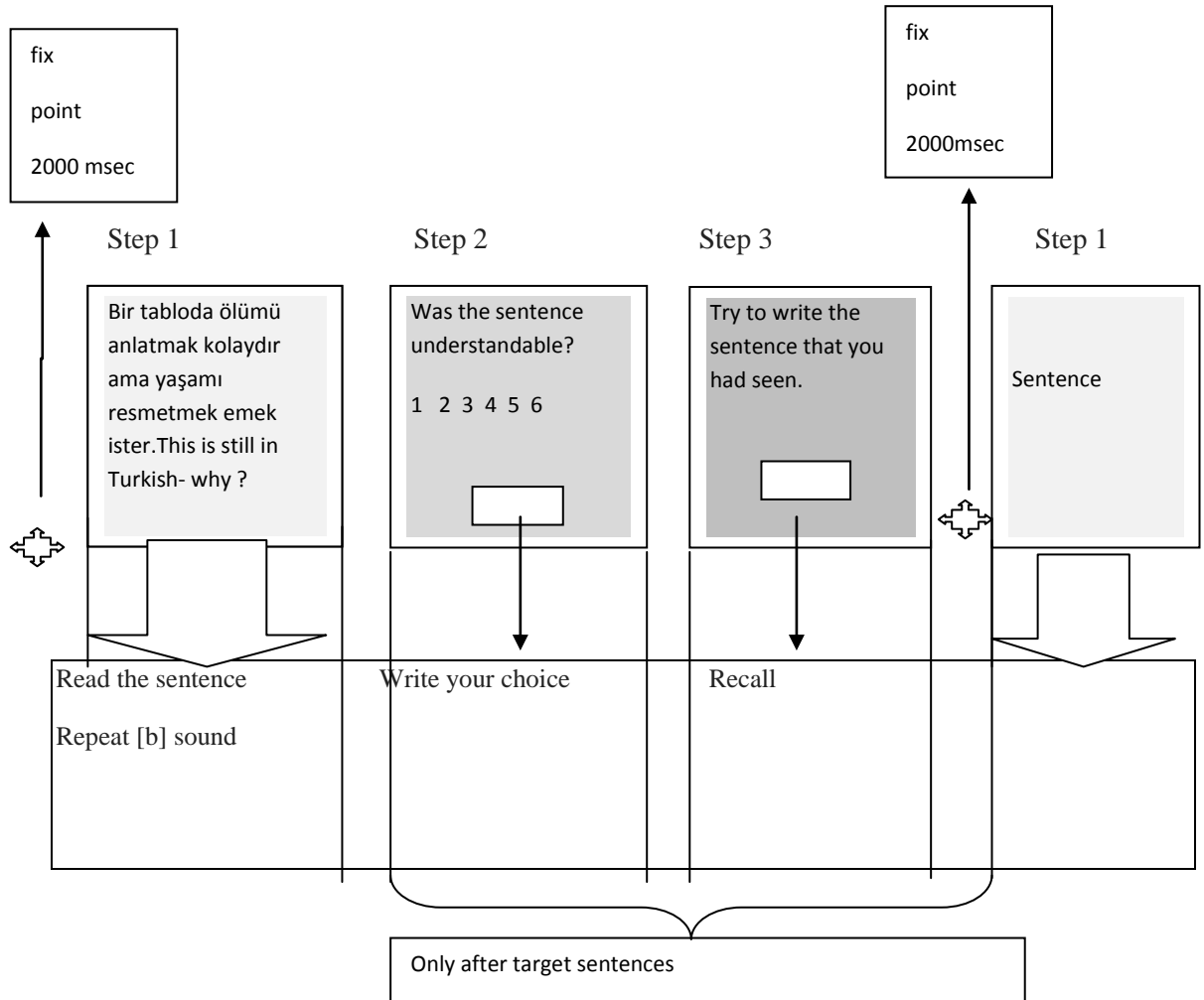


Figure 11: Steps in the experiment

To summarize the participants will see a fixation point for 2000 msec. Whenever a participant sees the fixation point, they will start to repeat the [b] sound. The sentence is presented and the participant continues repeating the sound until (s)he comprehends the sentence and clicks 'enter'(Step 1). If the sentence is a target sentence, it is followed by acceptability judgment question(if the sentence is distracter, fixation will occur after clicking and it will be followed by another sentence -Step 1 again). The participant types his or her choice and clicks 'enter'(Step 2). Then the participant is asked to recall the sentence. After the participant has tried to recall the previous target sentence and type it and (s)he will press the 'enter' key (Step 3) (See Figure 11).

When all the training sentences with all the steps have been performed by a participant, s/he is presented with the sentence 'please press enter in order to continue with the experiment', but the experimenter warns the participant not press the 'enter' button until the experimenter

leaves the room and closes the door. In addition, they are informed that their sounds will be recorded by the computer. This is to prevent the participants from neglecting to repeat the [b] sound, in fact there was no recording of the [b] sound made by the participants. The participants were requested to start repeating the [b] sound whenever they saw the fixation point. The eye tracking program was started and finally the sitting position of the participant was checked then the experimenter left the room. To start the experiment the participant presses the 'enter' button and is randomly presented with the target sentences and distracters. Every participant is observed during the experiment through a two-sided mirror wall. After the experiment, the details of the experiment were explained and the participants were told that their voice was not recorded but they were observed.

3.6 Analysis

3.6.1 Off-line measurement

The analysis was conducted with the independent variable cohesion (high cohesion & low cohesion), the group (1, 2, 3, 4) and the dependent variables acceptability judgment, response times, and recall results. Lexical cohesion was evaluated in the high cohesion group, because the lexical cohesive ties (ties are the words or phrases in clauses that provide lexical cohesion-see example 9, *death* and *life* are ties), so the independent variable was the type of lexical cohesion (hyponymy, meronymy, synonymy & antonymy), and the dependent variable was the total recalled ties (See Appendix 5 for the lexical cohesion ties in the clauses). It was stated that contrastive marker CM used in only Group 1 and Group 3. The recalled CM (*ama* or *fakat*) were considered as dependent variable.

For the acceptability judgment test, the sum of the selected judgments was used. There total response times for the target sentences were divided by the total number of words in target sentences per participant. This gives the response time per word. As in response time, the recall results were calculated per word. However, because the contrastive conjunction markers were analyzed differently, the total number of recalled contrastive markers and total number of contrastive markers (CM) were removed from the analysis. The following formula was used to obtain the recall results:

$$\frac{[(\text{sum of words in target sentences})-(\text{sum of CM in target sentence})]}{[(\text{sum of recalled words in target sentences})-(\text{sum of CM in target sentences})]}$$

$$[(\text{sum of recalled words in target sentences})-(\text{sum of CM in target sentences})]$$

3.6.2 On-line measurement: Eye-tracking

In the eye-tracking experiment, the independent variables were largely the same as those used for off-line measurement, but with different independent variables. Firstly, boundary crossing was used. The CM or comma between the conjuncts in target sentences was used as the boundary and the total number of the boundary crossings (turning back to the first conjunct) were counted. Second, the total fixation durations were counted and the result was divided by the total words in sentences.

CHAPTER 4

RESULTS

4.1 Effects of lexical and conjunctive cohesion

One of the aims of this thesis was to investigate the role of lexical and conjunctive cohesion. The results related to this aim will be explained in this section.

4.1.1 Recalled Lexical Cohesion Ties

Firstly, the role of the type of the lexical cohesion was analyzed. The means of the recalled ties of homonymy (M=4.5; S.D.=1) and meronymy (M=5.4; S.D.=0.8) were lower than the means of the recalled ties of synonymy (M=5.5; S.D.= 0.7) and antonymy (M=5.7; S.D=0.4).

All the effects were significant at $p < .05$. The repeated measure ANOVA results showed that there was a significant main effect of the type of cohesion on the recalled lexical ties, $F(2.6,$

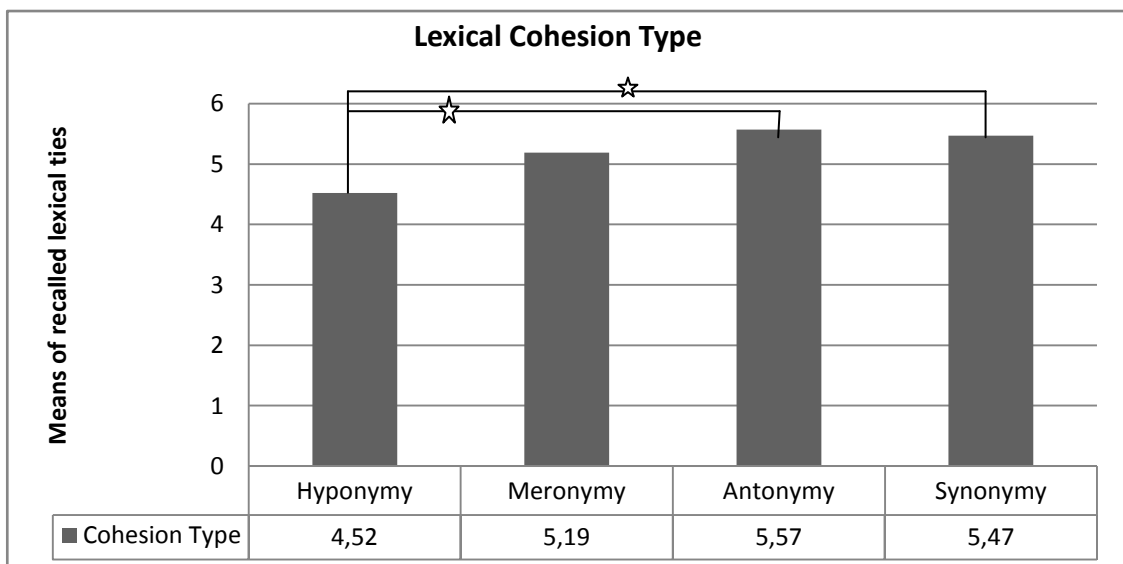


Figure 12: The effect of cohesion type on recalled cohesion ties

29.6)=10.1, $p<.0001$. The synonymy ties were better recalled than hyponymy ties, $F(1, 18)=13.1$, $p<.002$; and antonymy ties were better recalled than hyponymy ties, $F(1, 18)=39.9$, $p<.0001$. Figure 12 shows the mean difference between ties.

4.1.2 Type of lexical cohesion and means of recall for per one word

According to results of the repeated measure ANOVA, there was is also a significant main effect of the type of lexical cohesion on the recall means for per one word, $F(1.95, 35.05)=8.75$ $p<.0001$; the means of recall per one word showed that the clauses that used hyponym ($M=0.71$, $S.D.=0.17$) lexical relations were less well recalled than those with meronymy ($M= 0.81$, $S.D.=0.12$), antonym ($M=0.88$, $S.D.=0.12$), and synonym ($M=0.89$, $S.D.=0.1$) lexical relations (Figure 13). Simple contrasts revealed that the relations between hyponym and synonymy, $F(1, 18)=11.817$, $p<.003$), meronymy and synonymy ($F(1,18)=6.81$, $p<.024$), and hyponymy and antonym ($F(1,18)=18.479$, $p<.0001$) were significant.

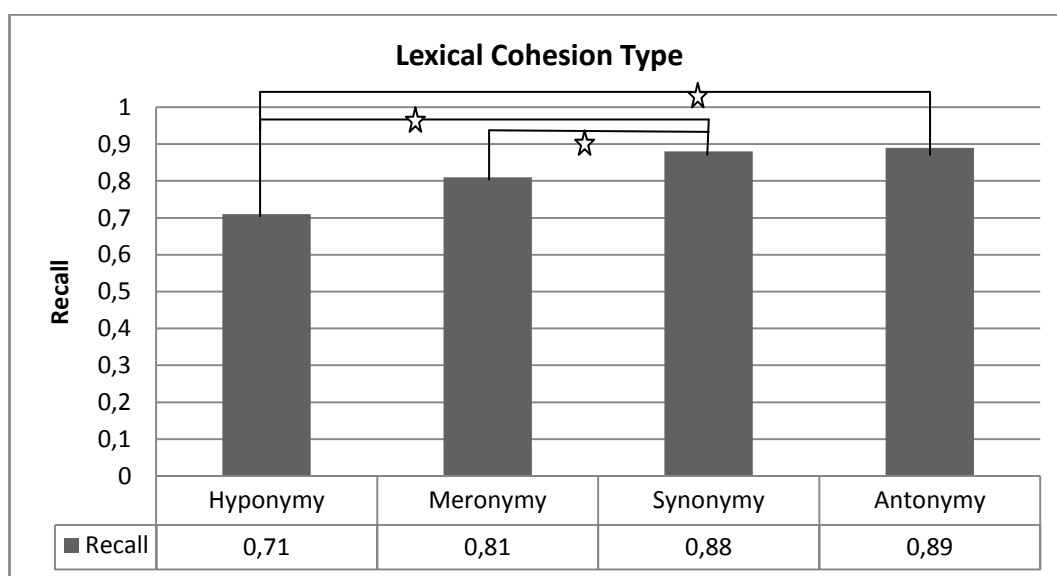


Figure 13: Means of recall for per one word according to use of different lexical cohesion types

4.1.3 Recalled contrastive conjunction markers

The difference between the means of recalled contrastive conjunction marker in group 1 and group 3 was significant, $t(18)=2.82$, $p<.011$; the contrastive conjunction markers were better recalled in group 1 ($M=11.78$, $S.D.=0.67$) than group 3 ($M=9.18$, $S.D.=0.81$) (See Figure 14).

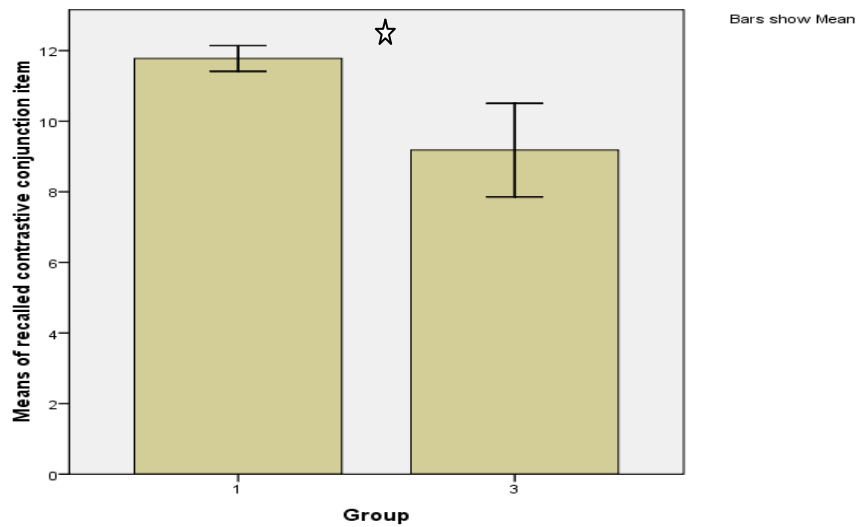


Figure 14: The difference between the means of recalled contrastive conjunction marker in group 1 and group 3

4.2 Effect of cohesiveness

The main aim of this thesis was to investigate the connection between cohesion, coherence and comprehension. In Chapter 3 it was stated that groups 1 and 2 consisted of high cohesion group, with groups 3 and 4 containing low cohesion group. In this section, the results related to the main aim will be given.

4.2.1 Cohesion and recall

The t-test results showed that there was a significant interaction between the recall for the high cohesion and the low cohesion groups, $t(38)=2.71$, $p<.01$; the words in the high cohesive group ($M=0.85$; $S.D.=0.06$; $Min=0.75$; $Max=0.98$) were better recalled than those in the low cohesive group ($M=0.75$; $S.D.=0.13$; $Min=0.33$; $Max=0.96$) (See Figure 15).

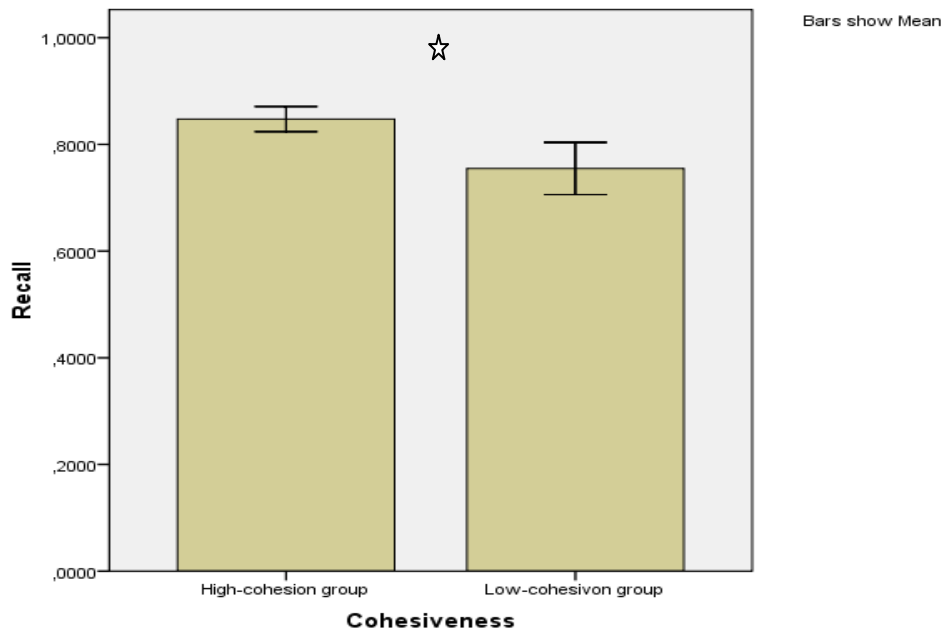


Figure 15: Means of recall for per one word according to use of high cohesive or low cohesive clauses

4.2.2 Cohesion and Reading Times

The difference between reading times for the high cohesive clauses ($M=966.79$; $S.D.=160.06$; $Min=733$; $Max=1295$) and low cohesive ones ($M=1003.57$; $S.D.=172.264$; $Min=686$; $Max=1462$), was not significant, $t(38)=-0.7$, $p>.49$.

4.2.3 Cohesion and Acceptability Judgment Results

The mean values show that the low cohesive groups ($M=22.05$; $S.D.=8.21$; $Min=12$; $Max=40$) had higher acceptability judgment results than the high cohesive clauses ($M=18.21$; $S.D.=5.26$; $Min=12$; $Max=28$) (See Figure 16); though there was no significant relation between acceptability judgments of the low and high cohesion groups but the increasing trend was linear, $t(38)=-1.74$, $p>.09$.

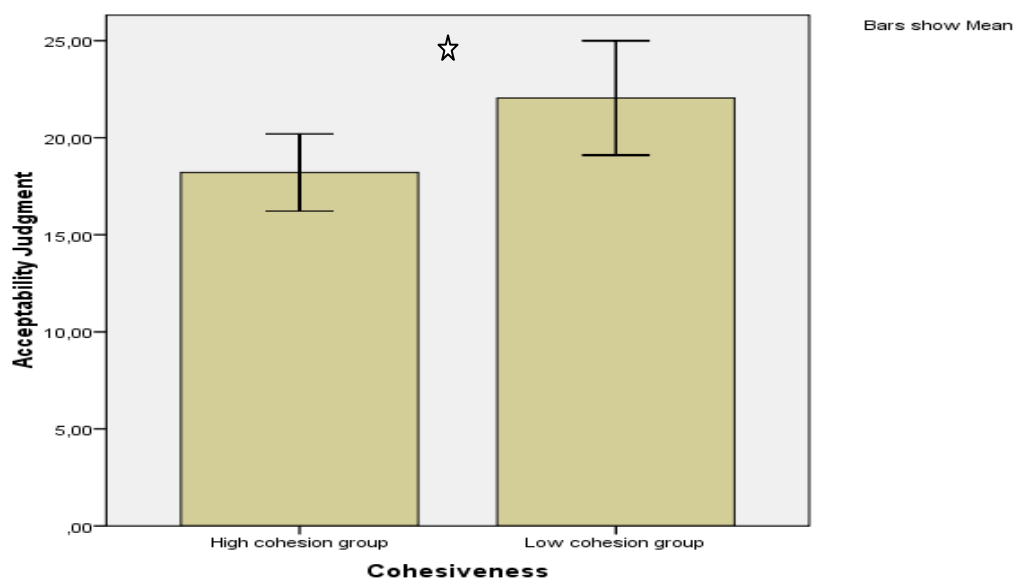
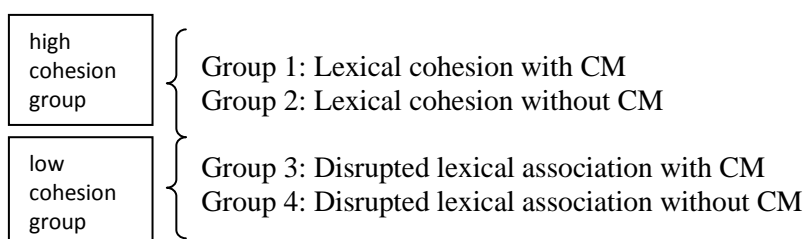


Figure 16: Means of acceptability judgment scores between the high cohesive and low cohesive groups.

4.3 Recall and Acceptability Judgment Differences between Group 1-2-3 and 4

The first section of the results (4.1) showed the effect of lexical cohesion in the high-cohesion group, and the differences between high-cohesion and low cohesion for response time, recall and acceptability judgment. In this section, the results of the differences between the four groups are given in terms of recall and acceptability judgment results. Returning to the stimuli differences between groups, the sentences were presented according to the following manipulations of target clauses:



4.3.1 Recall

One way ANOVA results showed that there was a significant relation between groups, $F(1,39)=1.924$, $p<.048$, $r=.44$, and the linearity of groups was also significant $p<.025$.

Planned contrasts revealed the significant relation between the high cohesion groups (1 and 2) and group 3, $t(36)=2.771$ (two-tailed), $p<.009$; and group 1 and group 3, $t(36)=2.75$ (two-tailed), $p<.009$. Though it was not significant in the contrast test, the relation between group 1 and group 4 was close to the significance level, $t(36)=1.979$ (two-tailed), $p>.055$. Furthermore, the relation between groups 1 and 2 was not significant, $t(36)=0.81$ (two-tailed), $p>.42$. Also the relation between groups 3 and 4 was not significant, $t(36)=-0.91$, $p>.37$ (See figure 17).

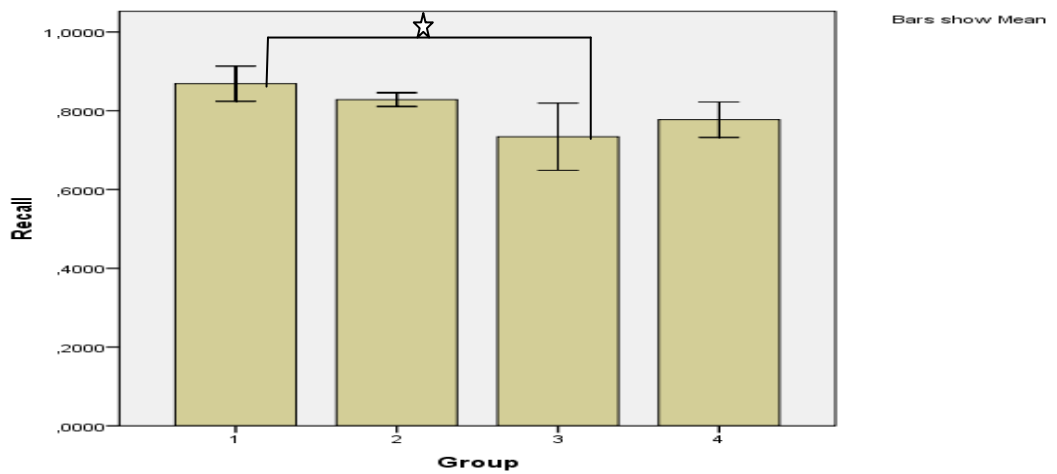


Figure 17: Recall mean per one word results for all the groups

2.3.2 Acceptability Judgments

The descriptive statistics of the acceptability judgment for groups can be seen in Figure 19. The linearity between groups was significant, $F(3,39)=.042$ (See Figure 18). The self-evaluation results increased from the first group, to the second, third and the fourth group linearly. Planned contrasts showed that the relation between the first group ($M=16.11$; $S.D.=4.45$) and the fourth group ($M=22.8$; $S.D.=7.15$), $t(36)= -2.08$, $p<.045$ was significant.

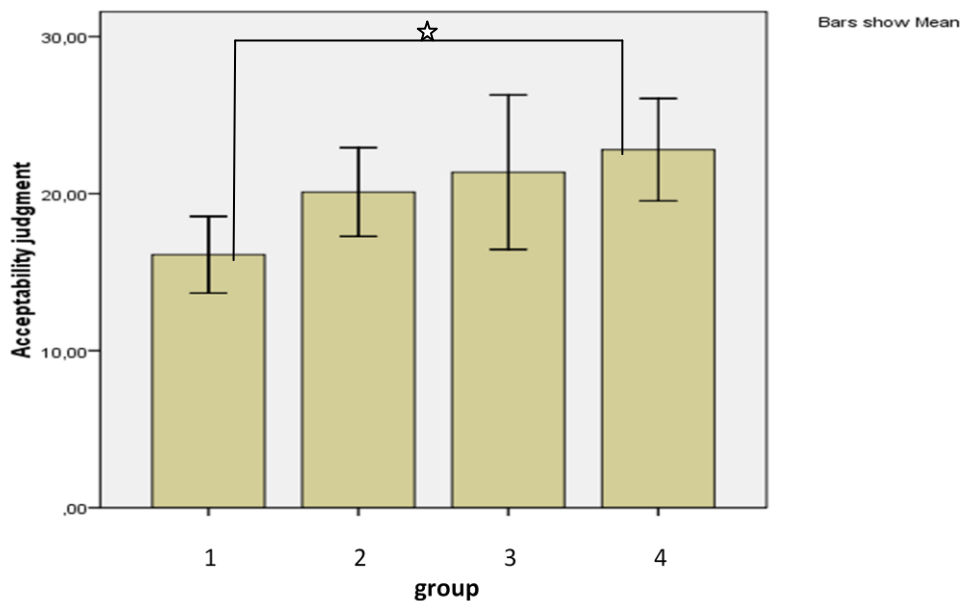


Figure 18: Acceptability judgment means between groups

4.4 Eye Tracking Results

Beyond online methods above, eye tracking results were used as an off-line method. This section presents the results of gaze shift analysis and total fixation count per one word.

4.4.1 Gaze Shift Analysis

The results of gaze shift analysis showed that the relation between the high and low cohesion groups are not significant, $t(37)=-1.09$, $p>.28$, however the mean of the high cohesion group ($M=10.58$, $S.D=4.76$) is lower than the low cohesion group ($M=12.20$, $S.D.=4.52$).

Additionally, the difference between group 1, 2, 3, and 4 are not significant, $F(3, 38)=.53$, $p>.66$; but the mean of the groups increased from group 1 ($M=9.89$, $S.D=5.23$) to group 2 ($M=11.20$, $S.D=4.49$), group 3 ($M=11.91$, $S.D=3.44$), and group 4 ($M= 12.56$, $S.D= 4.65$).

4.4.2 Fixation count per word

The mean of the fixation count of per word was significant between the high and low cohesion groups, $t(37)=-2.265$, $p<.029$; the mean of fixation count per word being lower in the high cohesion group ($M=1.97$, $S.D= 0.49$), than in the low cohesion group ($M=2.32$, $S.D=0.48$) (See Figure 19).

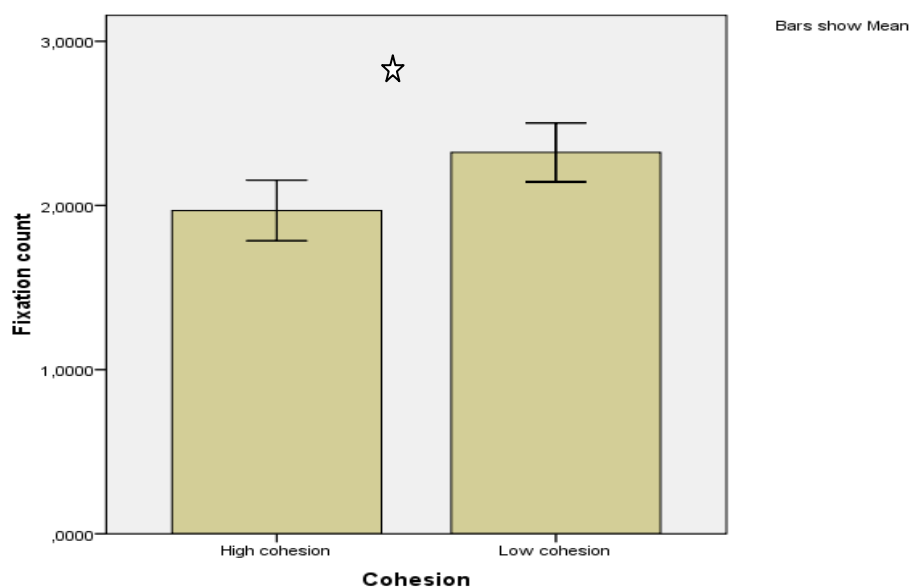


Figure 19: The mean of the fixation count of per word showing the difference between high and low cohesion groups

The linearity between groups 1, 2, 3 and 4 was significant, $F(1, 38)=6.67$, $p<.012$; in other words, the mean of fixation count per word increased from group 1 ($M=1.93$, $S.D=0.54$), to group 2 ($M=2$, $S.D= 0.47$), group 3 ($M=2.17$, $S.D.=0.32$), and group 4 ($M=2.51$, $S.D=0.6$) (See Figure 20).

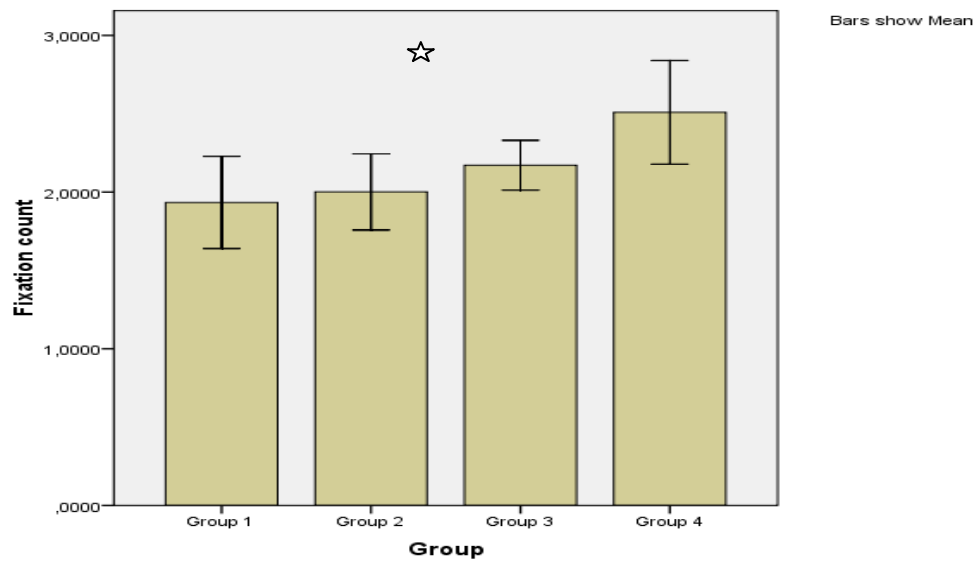


Figure 20: The mean of the fixation count of per word: difference between group 1, 2, 3 and 4

CHAPTER 5

DISCUSSION

This thesis had three aims: the first aim was, to understand the connection between cohesion, coherence and comprehension. The second one was to compare the role of lexical cohesion and conjunctive cohesion. The last aim was to understand the contribution of different cohesion types. On the ground of this thesis, eight hypotheses were tested and they revealed a pattern of results.

The first aim was tested with three hypothesis related to response time, recall and acceptability judgment. Though it was hypothesized that low cohesive clauses had high response time results when compared to high cohesive ones, the relation was not significant. In his study with narrative texts, Ehrlich (1991) finds a relation between low cohesive narratives and high cohesive narratives in their recall results but not in response times. In this study, recall results were crucial in order to evaluate the text based comprehension. McNamara and Kintsch (1996) indicate that recall results are text based, because recalling the text requires text based understanding and memory, so people infer text based concepts in the recall procedure. Recall results showed the facilitative role of cohesion. High cohesive clauses were recalled better than low cohesive clauses. With the aim of acceptability judgment question, the cohesiveness of the sentence was evaluated. Results showed that low cohesive sentences have higher acceptability judgment results than high cohesive sentences, however the relation was not significant. The results of the acceptability judgment question indicated individual differences, since the standard deviation was quite high especially in the low cohesion group.

For the second aim, two hypotheses were tested. Firstly, it was hypothesized that high cohesiveness was accomplished by lexical cohesion. For the aim of this study, recall results were also crucial to differentiate group differences. The rationale was to investigate whether lexical cohesion would suffice for coherence; i.e. we wanted to see whether lexical cohesion without the linking role of conjunctive cohesion would make a difference. We speculated that in a narrow sense, the cohesive role of contrastive conjunction could be compensated for lexical cohesion. Actually, the recall results from low cohesion and high cohesion sentences indirectly showed that lexical cohesion could undertake the cohesive role of conjunctive cohesion, since only group one and two (high cohesion groups) had lexical cohesion and these were the groups of sentences that had high recall results. Additionally, results of the between group differences showed that the relation between group 1 and 2 (high cohesive groups) is not significant. However, the relation between group 2 and group 3 is highly significant; group 2 had better recall results than group 3. All of the results point out the fact that lexical cohesion between conjuncts undertake the role of conjunctive cohesion, but the reverse is not true; i.e., conjunctive cohesion does not undertake the role of lexical cohesion.

The other hypothesis was that the CM was recalled better if the clause was lexically cohesive. The results showed that the CM was recalled better in group 1 than in group 3. This result also emphasizes the crucial role of lexical cohesion. The acceptability judgment results showed the linear increase from the first group to the fourth group. This result indicates that cohesion that is accomplished by linguistic items (both for lexical cohesion and conjunctive cohesion) and the participants' viewpoints about the cohesiveness of clause is parallel.

The last aim was to see the role of different lexical cohesion items. As it was expected, the ties of synonymy and antonymy were recalled better than those of hyponymy and meronymy.

If a sentence is coherent, the disruption of lexical cohesion affects recall negatively. This result is parallel with the results of McNamara et al. (1996), McNamara and Kintsch (1996), and McNamara (2001). However, not all the cohesive items have the same degree of facilitation on text-based comprehension. Lexical cohesion appears to undertake the role of conjunctive cohesion. On the other hand, the sentences whose lexical cohesion is provided by antonymy and synonymy have a better facilitation role than meronymy and hyponymy. This point is compatible with Halliday and Hasan (1976). They emphasize the categorical proximity of lexical items in the conceptual system.

The unexpected result of this study was that group 3 had the worst recall results. Lakoff (1971) says that the CM *but* links two conjuncts but separates them: it conveys the sense of similarity and difference. The clauses in group 3 do not have a direct similarity, it means that this situation may obstruct the successful linking of the conjuncts and their recall. However, the sentences group 4 have the lowest acceptability judgment results. This point indicated that although the recall results were the lowest for the clauses which had the CM but lacked lexical cohesion, the clauses that had neither CM nor lexical cohesion were evaluated as the worst.

Finally, the eye tracking results support our hypothesis, the low cohesive clauses had more fixation count per word; moreover, group differences showed that cohesion has a facilitative role. Though the boundary crossing results are not significant, the means are different from each other. On average, the low cohesion group turned more to the first conjunct after read the whole clause, however, for clear results, more clauses and participants required.

To sum up, this thesis points out the role of cohesion and coherence for comprehension. However, the experimental design and participant group have some limitations. This thesis can be developed methodologically. Because of the some practical reasons, some assumptions were used, this assumptions are the limitations of thesis on the other hand. The most important limitation was participants wrote the sentences that they saw. This would have caused some latency problems in eye tracking results. However, the stimuli were randomized and the latency problem were spread the whole analysis. For a future work, this problem should be considered. The participants looked a fixation point and after 2000msec, they read the sentence. This could cause some problems for tracking eyes.

The articulatory suppression technique was used in order to create a cognitive load for the phonological loop and make difficult to recall items (Scheele & Palmer, 2007). Although this method is effective since it helps to reveal the memory span of the participants, it does not reveal the role of cohesion. Most probably, the high memory span participants are affected less from the articulatory suppression technique (Baddaley, 2003). On the other hand, for a future work, it can be better to use other group of sentences or participants that do not realize articulatory suppression.

The number of participants was ten for one group on the average, which means it may not be enough for such kind of study to avoid individual differences. Additionally, one should consider that the participant groups are university students. all of them have English as a second language. The results cannot be generalized to the whole human population, but we can said that cohesion has a facilitative role if a person highly educated and know at least one language as a second language.

CHAPTER 6

CONCLUSION AND DIRECTIONS FOR FUTURE RESEARCH

In this thesis, firstly aimed to determine the relations between cohesion, coherence and comprehension using an experimental study. The results show that cohesion has a facilitative role in text based comprehension. Moreover, some cohesion items have a more powerful effect than others. The role of conjunctive cohesion shown by the contrastive conjunctive marker *ama* or *fakat* (but) can be overtaken by lexical cohesion if the sentence needs to be recalled. Also antonymy and synonymy lexical items are better recalled than meronymy and hyponymy. Eye tracking results also showed the facilitative role of cohesion.

In the present study, articulatory suppression was used to create a memory load on the phonological loop. This method was selected because it directly affects verbal memory (Baddaley, 1992). Additionally, this method would allow the observation of whether forcing the phonological loop would impair the coherent representation of clauses and obstruct the recall of the sentences. However, it would be interesting to use other techniques like using long texts, or to use complex mathematical problems after the participants have read the sentences. The free recall text could be performed after the participants are presented all the clauses.

Only lexical cohesion and conjunctive cohesion with a contrastive marker was used . It appears to be better to use other conjunctive markers to create conjunctive cohesion and compare their contributions in the data. In addition as was stated in the literature review chapter, *but* has different uses according to the semantic context of text. In the future, the semantic roles of *ama* could be compared with lexical cohesion.

Four different lexical cohesion items were used in the present study, but the items between lexical ties were varied (See Appendix 5 for the lexical ties, the number of words between various ties). It would be interesting to see the effect of the distance between the cohesive ties on comprehension.

Finally, the similarities and differences between groups were observed. This results are similar to some other studies. McNamara et al. (1996), McNamara and Kintsch (1996) and McNamara (2001) showed that comprehension skill, knowledge about the text content and reading skill affect comprehension results. Further research, may prove it is better to evaluate

situational based inferences (inferences not directly related to the text) in comparison with situational based comprehension questions, and recall. As a final remark, the results of this present study could have significant because of using contrastive. Contrastive content of the sentences would create expectation and cause to make inferences.

REFERENCES

- Aijmer, K., & Simon-Vandenberg, A. M. (Eds.). (2006). *Pragmatic markers in contrast*. Elsevier.
- Al-Surmi, M. (2011). Discourse Markers and Reading Comprehension: Is there an effect? *Theory and Practice in Language Studies*, 1(12), 1673-1678.
- Alonso i Alemany, L., & Fuentes Fort, M. (2003, April). Integrating cohesion and coherence for Automatic Summarization. In *Proceedings of the tenth conference on European chapter of the Association for Computational Linguistics-Volume 2* (pp. 1-8). Association for Computational Linguistics.
- Ambiyo, S. (2007). A comparative analysis of cohesion in academic and newspaper texts. *Journal of Language, Technology & Entrepreneurship in Africa*, 1(1), 191-195.
- Ariel, M. (2001). Accessibility theory: An overview. *Text representation: Linguistic and psycholinguistic aspects*, 29-87.
- Baddeley, A. (2007). *Working memory, thought, and action*. Oxford University Press., 5(2):3015
- Baddeley, A. & Hitch, J. G. (2010). Working memory. *Scholarpedia*, 5(2): 3015.
- Bamberg, B. (1983). What makes a text coherent?. *College Composition and Communication*, 34(4), 417-429.
- Bar, M. (2009). The proactive brain: memory for predictions. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 364(1521), 1235-1243.
- Barton, S. B., & Sanford, A. J. (1993). A case study of anomaly detection: Shallow semantic processing and cohesion establishment. *Memory & Cognition*, 21(4), 477-487.
- Barsalou, L. W. (1999). Language comprehension: Archival memory or preparation for situated action? *Discourse processes*, 28(1), 61-80.
- Barsalou, L. W. (2012). The human conceptual system. *The Cambridge handbook of psycholinguistics*, 239-258.
- Bateman, J. A., & Rondhuis, K. J. (1997). Coherence relations: Towards a general specification. *Discourse Processes*, 24(1), 3-49.
- Beaugrande, R. D. DE y DRESSLER, W. (1981) Introduction to Text Linguistics. *London and New York: Longman Paperback*.
- Behjat, F. (2009). Non-Structural Cohesive Devices in English Novels and Their Corresponding Persian Translations. *Journal of Teaching English as a Foreign Language and Literature*, 1(3), 107-118.
- Bellissens, C., Jeuniaux, P., Duran, N., & McNamara, D. S. (2007). Towards a textual cohesion model that predicts self-explanations inference generation as a function of text structure and readers' knowledge levels. In *Proceedings of the 29th Annual Meeting of the Cognitive Science Society*.

- Berzlánovich, I., Egg, M., & Redeker, G. (2012). Coherence structure and lexical cohesion in expository and persuasive texts. *Constraints in Discourse 3: Representing and Inferring Discourse Structure*, 3, 137.
- Best, R., Ozuru, Y., Floyd, R. G., & McNamara, D. S. (2006, June). Children's text comprehension: effects of genre, knowledge, and text cohesion. In *Proceedings of the 7th international conference on Learning sciences* (pp. 37-42). International Society of the Learning Sciences.
- Bolshakov, I. A., & Gelbukh, A. (2001, January). Text segmentation into paragraphs based on local text cohesion. In *Text, speech and dialogue* (pp. 158-166). Springer Berlin Heidelberg.
- Bublitz, W., Lenk, U., & Ventola, E. (Eds.). (1999). *Coherence in Spoken and Written Discourse: How to Create It and How to Describe It, Selected Papers from the International Workshop on Coherence, Augsburg, 24-27 April 1997* (Vol. 63). John Benjamins.
- Bublitz, W. (2011). Cohesion and coherence. *Discursive Pragmatics, John Benjamins Publishing Company, Amsterdam/Philadelphia*, 37-49.
- Burton, C., & Daneman, M. (2007). Compensating for a limited working memory capacity during reading: Evidence from eye movements. *Reading Psychology*, 28(2), 163-186.
- Camblin, C. C., Gordon, P. C., & Swaab, T. Y. (2007). The interplay of discourse congruence and lexical association during sentence processing: Evidence from ERPs and eye tracking. *Journal of Memory and Language*, 56(1), 103-128.
- Canestrelli, A. R., Mak, W. M., & Sanders, T. J. (2012). Causal connectives in discourse processing: How differences in subjectivity are reflected in eye movements. *Language and Cognitive Processes*, (ahead-of-print), 1-20.
- Carrell, P. L. (1982). Cohesion Is Not Coherence. *TESOL quarterly*, 16(4), 479-488.
- Chambers, C. G., & Smyth, R. (1998). Structural parallelism and discourse coherence: A test of centering theory. *Journal of Memory and Language*, 39(4), 593-608.
- Chan, S. W. (2004). Extraction of salient textual patterns: Synergy between lexical cohesion and contextual coherence. *Systems, Man and Cybernetics, Part A: Systems and Humans, IEEE Transactions on*, 34(2), 205-218.
- Choi, F. Y. (2000, April). Advances in domain independent linear text segmentation. In *Proceedings of the 1st North American chapter of the Association for Computational Linguistics conference* (pp. 26-33). Association for Computational Linguistics.
- Connor, U. (1984). A study of cohesion and coherence in English as a second language students' writing. *Research on Language & Social Interaction*, 17(3), 301-316.
- Cowan, N. (2001). The magical number 4 in short-term memory: A reconsideration of mental storage capacity. *Behavioral and brain sciences*, 24(1), 87-114.
- Crossley, S. A., & McNamara, D. S. (2010). Cohesion, coherence, and expert evaluations of writing proficiency. In *Proceedings of the 32nd annual conference of the Cognitive Science Society* (pp. 984-989).
- Daneman, M., Lennertz, T., & Hannon, B. (2007). Shallow semantic processing of text: Evidence from eye movements. *Language and Cognitive Processes*, 22(1), 83-105.

- Daneš, F. (1987). "Lexical relations." In J. Petr, F. Daneš, M. Grepl, & Z. Hlavsa (Eds.), *Mluvnické Cestiny III* (pp. 703–705). Prague: Academia.
- de Oliveira, P. C. F., Ahmad, K., & Gillam, L. (2002). A financial news summarization system based on lexical cohesion. In *Proceedings of the International Conference on Terminology and Knowledge Engineering, Nancy, France*.
- Dehaene, S. , (2009). 'Introduction'. In: Tolkien, J.R.R. (ed), *Reading in the Brain*. 1st ed. New York: Penguin Group (p.13- 36).
- Ehrlich, M. F. (1991). The processing of cohesion devices in text comprehension. *Psychological research*, 53(2), 169-174.
- Enkvist, N. E. (1978). Coherence, Pseudo-Coherence, and Non-Coherence. In: Ostman, Jan-Ola, Ed. *Cohesion and Semantics. Reports on Text Linguistics*
- Ercan, G., & Cicekli, I. (2008). Lexical cohesion based topic modeling for summarization. In *Computational Linguistics and Intelligent Text Processing*(pp. 582-592). Springer Berlin Heidelberg.
- Ferstl, E. C., & von Cramon, D. Y. (2001). The role of coherence and cohesion in text comprehension: an event-related fMRI study. *Cognitive Brain Research*, 11(3), 325-340.
- Ferstl, E. C., & von Cramon, D. Y. (2002). What does the frontomedian cortex contribute to language processing: coherence or theory of mind?. *Neuroimage*, 17(3), 1599-1612.
- Fraser, B. (2006). "Towards a theory of discourse markers", in K. Fischer (ed.), *Approaches to discourse particles*. Amsterdam: Elsevier, 189–204.
- Freebody, P., & Anderson, R. C. (1983). Effects of vocabulary difficulty, text cohesion, and schema availability on reading comprehension. *Reading research quarterly*, 277-294.
- Gernsbacher, M. A., & Givón, T. (Eds.). (1995). *Coherence in spontaneous text*(Vol. 31). John Benjamins Publishing.
- Gleason, J. B., & Ratner, N. B. (1998). *Psycholinguistics*, Harcourt Brace Collage Publishers.
- Goolkasian, P., Foos, P. W., & Eaton, M. (2009). Modality Effects in Sentence Recall. *The Journal of general psychology*, 136(2), 205-224.
- Gordon, P. C., Camblin, C. C., Swaab, T.Y. (2004). Online measures of coreferential processing. In E. M. Charles, *The Online Study of Sentence Comprehension: Eye tracking, ERPs and Beyond* (s. 139-150). New York: Psychology Press.
- Graesser, A. C., McNamara, D. S., Louwerse, M. M., & Cai, Z. (2004). Coh-Metrix: Analysis of text on cohesion and language. *Behavior Research Methods, Instruments, & Computers*, 36(2), 193-202.
- Graesser, A. C., Jeon, M., Yan, Y., & Cai, Z. (2007). Discourse cohesion in text and tutorial dialogue. *Information Design Journal*, 15(3), 199-213.
- Haarmann, H. J., Cameron, K. A., & Ruchkin, D. S. (2002). Neural synchronization mediates on-line sentence processing: EEG coherence evidence from filler-gap constructions. *Psychophysiology*, 39(6), 820-825.

- Halliday, M.A.K. (1961). "Categories of the theory of grammar". *Word* 17: 241- 92.
- Halliday, M.A.K. (1962). "The linguistic study of literary texts" in Halle (ed.).
- Halliday, M. A. (1963). Class in relation to the axes of chain and choice in language. *Linguistics*, 1(2), 5-15.
- Halliday, M.A.K. (1964). "Syntax and the consumer" in Monograph Series on Languages and Linguistics, 17. Washington, D.C.: Georgetown University, pp. 11-24.
- Halliday, M.A.K., McIntosh, Angus and Strevens, Peter (1964). *The linguistic sciences and language teaching*. London: Longmans.
- Halliday, M.A.K. (1966). "Descriptive linguistics in literary studies" in Halliday & McIntosh 1966.
- Halliday, M.A.K. and McIntosh, A. (1966). *Patterns of language: papers in general, descriptive and applied linguistics*. London: Longmans.
- Halliday, M.A.K. (1967-68). "Notes on transitivity and theme in English". *Journal of Linguistics* 3: 37-81, 199-244, and 4: 179-215.
- Halliday, M.A.K. (1969). "Relevant models of grammar". *Educational Review* 22 (1): 26-37.
- Halliday, M. A. K. (1967–1968) Notes on transitivity and theme in English, Parts 1–3. *Journal of Linguistics* 3(1): 37–81; 3(2): 199–244; 4(2): 179–215. Reprinted in *Collected Works*, vol. 7 (2005): 5–153.
- Halliday, M.A.K. (1970). "Functional diversity in language as seen from a consideration of modality and mood in English". *Foundations of Language* 6 (3):322-61.
- Halliday, M.A.K. (1970a). "Language structure and language function" in Lyons (ed.) 1970.
- Halliday, M.A.K. (1970b). *The place of 'Functional Sentence Perspective' in the system of linguistic description*. A report prepared for the international Symposium on Functional Sentence Perspective. Mārianske Lāznĕ, October 1970, mimeo. University College, London.
- Halliday, M. A. (1971). language in social perspective. *Educational Review*, 23(3), 165-188.
- Halliday, M.A.K. (1973). *Talking one's way in: a socio-linguistic perspective on language and learning*. Paper prepared for the S.S.R.C. Research Seminar on Language and Learning. Edinburgh, January 1973, mimeo.
- Halliday, M. A. K. (1976). Anti-Languages. *American Anthropologist*, 78(3), 570-584.
- Halliday, M. A. K. (1985). *An Introduction to Functional Grammar*. London: Edward Arnold.
- Halliday, M.A.K., and Hasan, Ruqaiya (1989). *Language, Context and Text: Aspects of language in asocial-semiotic perspective*. Geelong, Victoria:Deakin University Press. (republished by Oxford University Press, 1989).
- Halliday, M. A. K. (1994). *An introduction to functional grammar*. (2nd ed.). London: Edward Arnold.
- Halliday, M. A., & Hasan, R. (1976). *Cohesion in English*. London: Longman.
- Harris, Z. (1952). Discourse analysis. *Language*, 28, 1-30.

- Hasan, R. (1968). *Grammatical cohesion in spoken and written English, Part One*. Programme in linguistics and English Teaching Paper No. 7. London: Longman.
- Hasan, Ruqaiya (1984). Coherence and Cohesive Harmony. In J. Flood (Ed.), *Understanding reading comprehension: Cognition, language and the structure of prose* (pp. 181–219). Newark, Delaware: International Reading Association.
- Hearst, M. A. (1997). TextTiling: Segmenting text into multi-paragraph subtopic passages. *Computational linguistics*, 23(1), 33-64.
- Hobbs, J. R. (1983). *On the coherence and structure of discourse* (pp. 85-37). CSLI.
- Hoey, M. (1991). *Patterns of Lexis in Text*. Oxford: Oxford University Press.
- Hoey, M. (2008). A tentative map of discourse studies and their place in linguistics. *Ilha do Desterro A Journal of English Language, Literatures in English and Cultural Studies*, (25/26), 131-150.
- Jakobson, R. (1960). *Linguistics and poetics* (pp. 33-57). Massachusetts Institute of Technology.
- Jasinskaja, K., & Zeevat, H. (2008). Explaining additive, adversative and contrast marking in Russian and English. *Revue de Sémantique et Pragmatique*, 24, 65-91.
- Jefferies, E., Lambon Ralph, M. A., & Baddeley, A. D. (2004). Automatic and controlled processing in sentence recall: The role of long-term and working memory. *Journal of Memory and Language*, 51(4), 623-643.
- Johansson, S. (2005). *Origins of language: constraints on hypotheses* (Vol. 5). John Benjamins Publishing.
- Jordan, M. P. (1984). *Fundamentals of Technical Description*. Malabar, FL: Krieger.
- Källgren, G. (1979b). "Some types of textual cohesion and their effects on texts." In T. Pettersson (Ed.), *Papers from the Fifth Scandinavian Conference of Linguistics* (pp. 133–145). Stockholm: Almqvist & Wiksell.
- Kintsch, W., & Van Dijk, T. A. (1978). Toward a model of text comprehension and production. *Psychological review*, 85(5), 363.
- Kintsch, W. (1994). Text comprehension, memory, and learning. *American Psychologist*, 49(4), 294.
- Kintsch, W. (1988). The role of knowledge in discourse comprehension: a construction-integration model. *Psychological review*, 95(2), 163.
- Klebanov, B. B., & Shamir, E. (2007). Reader-based exploration of lexical cohesion. *Language Resources and Evaluation*, 41(1), 27-44.
- Lakoff, R. (1971). If's, and's and but's about conjunction. *Studies in Linguistic Semantics*, 3, 114-149.
- Lapata, M., & Barzilay, R. (2005, July). Automatic evaluation of text coherence: Models and representations. In *IJCAI* (Vol. 5, pp. 1085-1090).
- Lee, M. W., & Williams, J. N. (1997). Why is short-term sentence recall verbatim? An evaluation of the role of lexical priming. *Memory & cognition*, 25(2), 156-172.

- Long, D. L., Johns, C. L., & Jonathan, E. (2012). A memory-retrieval view of discourse representation: The recollection and familiarity of text ideas. *Language and Cognitive Processes*, 27(6), 821-843.
- Maat, H. P. (1999). The differential linguistic realization of comparative and additive coherence relations. *Cognitive Linguistics*, 10, 147-184.
- Mak, W. M., & Sanders, T. J. (2012). The role of causality in discourse processing: Effects of expectation and coherence relations. *Language and Cognitive Processes*, (ahead-of-print), 1-24.
- Malmkjær, K. (Ed.). (2004). *Linguistics encyclopedia*. Routledge.
- Manabu, O., & Takeo, H. (1994, August). Word sense disambiguation and text segmentation based on lexical cohesion. In *Proceedings of the 15th conference on Computational linguistics-Volume 2* (pp. 755-761). Association for Computational Linguistics.
- Mani, I., Bloedorn, E., & Gates, B. (1998, March). Using cohesion and coherence models for text summarization. In *Intelligent Text Summarization Symposium* (pp. 69-76).
- Mann, W. C., & Thompson, S. A. (1988). Rhetorical structure theory: Toward a functional theory of text organization. *Text*, 8(3), 243-281.
- Marslen-Wilson, W. D. (2007). Morphological processes in language comprehension. *The Oxford handbook of psycholinguistics*, 11, 175.
- Martin, J. R. (1992). *English Text: System and Structure*. Amsterdam & Philadelphia: John Benjamins.
- Martin, J. R. (2003). Cohesion and Texture. *The handbook of discourse analysis*, 18, 35.
- McCarthy, P. M., Briner, S. W., Rus, V., & McNamara, D. S. (2007). Textual signatures: Identifying text-types using latent semantic analysis to measure the cohesion of text structures. In *Natural language processing and text mining* (pp. 107-122). Springer London.
- McCarthy, M. (1988). "Some vocabulary patterns in conversation." In R. Carter & M. McCarthy (Eds.), *Vocabulary and Language Teaching* (pp. 181–200). London & New York: Longman.
- McKoon, Gail, and Roger Ratcliff. "The comprehension processes and memory structures involved in anaphoric reference." *Journal of Verbal Learning and Verbal Behavior* 19.6 (1980): 668-682.
- McNamara, D. S., & Kintsch, W. (1996). Learning from texts: Effects of prior knowledge and text coherence. *Discourse processes*, 22(3), 247-288.
- McNamara, D. S., Kintsch, E., Songer, N. B., & Kintsch, W. (1996). Are good texts always better? Interactions of text coherence, background knowledge, and levels of understanding in learning from text. *Cognition and instruction*, 14(1), 1-43.
- McNamara, Danielle S. (2001). Reading both high-coherence and low-coherence texts: Effects of text sequence and prior knowledge. *Canadian Journal of Experimental Psychology/Revue canadienne de psychologie expérimentale* 55.1: 51.

McNamara, D. S., Louwerse, M. M., & Graesser, A. C. (2002). Coh-Metrix: Automated cohesion and coherence scores to predict text readability and facilitate comprehension. *Unpublished Grant proposal, University of Memphis, Memphis, Tennessee.*

McNamara, D. S., Louwerse, M. M., McCarthy, P. M., & Graesser, A. C. (2010). Coh-Metrix: Capturing linguistic features of cohesion. *Discourse Processes, 47*(4), 292-330.

McNamara, D. S., & Magliano, J. (2009). Toward a comprehensive model of comprehension. *Psychology of learning and motivation, 51*, 297-384.

Michael, E. B., Keller, T. A., Carpenter, P. A., & Just, M. A. (2001). fMRI investigation of sentence comprehension by eye and by ear: Modality fingerprints on cognitive processes. *Human brain mapping, 13*(4), 239-252.

Miller, G. A. (1956). The magical number seven, plus or minus two: some limits on our capacity for processing information. *Psychological review, 63*(2), 81.

Moe, A. J. (1979). Cohesion, coherence, and the comprehension of text. *Journal of Reading, 23*(1), 16-20.

Morgan, J. L. (1978, July). Toward a rational model of discourse comprehension. In *Proceedings of the 1978 workshop on Theoretical issues in natural language processing* (pp. 109-114). Association for Computational Linguistics.

Morley, J. (2006). Lexical cohesion and rhetorical structure. *International Journal of corpus linguistics, 11*(3), 265-282.

Morris, R. K. (2006). Lexical processing and sentence context effects. *Handbook of psycholinguistics, 2*.

Morris, J., & Hirst, G. (1991). Lexical cohesion computed by thesaural relations as an indicator of the structure of text. *Computational linguistics, 17*(1), 21-48.

Morris, J., Beghtol, C., & Hirst, G. (2003, May). Term relationships and their contribution to text semantics and information literacy through lexical cohesion. In *Proceedings of the 31st Annual Conference of the Canadian Association for Information Science* (pp. 153-168).

Morris, Jane and Hirst, Graeme (2004). The subjectivity of lexical cohesion in text. AAI Spring Symposium on Exploring Affect and Attitude in Text, Stanford.

Mosenthal, J. H., & Tierney, R. J. (1984). Commentary: Cohesion: Problems with Talking about Text. *Reading Research Quarterly, 19*(2), 240-244.

Moss, H. E., Tyler, L. K., & Taylor, K. I. (2007). Conceptual structure. *The Oxford handbook of psycholinguistics, 217-234.*

Mulder, G., & Sanders, T. J. (2012). Causal coherence relations and levels of discourse representation. *Discourse Processes, 49*(6), 501-522.

Myers, G. (1991). Lexical cohesion and specialized knowledge in science and popular science texts. *Discourse Processes, 14*(1), 1-26.

Nicol, J., & Swinney, D. (1989). The role of structure in co-reference assignment during sentence comprehension. *Journal of psycholinguistic research, 18*(1), 5-19.

- Ober, B. A., & Shenaut, G. K. (2006). Semantic memory. *Handbook of psycholinguistics*, 403.
- O'Reilly, T., & McNamara, D. S. (2007). Reversing the reverse cohesion effect: Good texts can be better for strategic, high-knowledge readers. *Discourse Processes*, 43(2), 121-152.
- Otterbacher, J. C., Radev, D. R., & Luo, A. (2002, July). Revisions that improve cohesion in multi-document summaries: a preliminary study. In *Proceedings of the ACL-02 Workshop on Automatic Summarization-Volume 4* (pp. 27-36). Association for Computational Linguistics.
- Ozuru, Y., Dempsey, K., Sayroo, J., & McNamara, D. S. (2005). Effects of text cohesion on comprehension of biology texts. In *Proceedings of the 27th Annual Meeting of the Cognitive Science Society* (pp. 1696-1701).
- Ozuru, Y., Dempsey, K., & McNamara, D. S. (2009). Prior knowledge, reading skill, and text cohesion in the comprehension of science texts. *Learning and Instruction*, 19(3), 228-242.
- Padilla, F., Bajo, M. T., & Macizo, P. (2005). Articulatory suppression in language interpretation: Working memory capacity, dual tasking and word knowledge. *BILINGUALISM LANGUAGE AND COGNITION*, 8(3), 207.
- Perlovsky, L. , (2009). Language and Cognition. *Neural Networks*. 22 (Special Issue), pp.247-257.
- Pickering, M. J., Frisson, S., McElree, B., Traxler, M. J., & Pickering, M. (2004). In E. M. Charles, *The Online Study of Sentence Comprehension: Eye tracking, ERPs and Beyond* (s. 33-50.). New York: Psychology Press.,
- Radach, R., & Kennedy, A. (2013). Eye movements in reading: Some theoretical context. *The Quarterly Journal of Experimental Psychology*, 66(3), 429-452.
- Rayner, K., Sereno, S. C., Morris, R. K., Schmauder, A. R., & Clifton Jr, C. (1989). Eye movements and on-line language comprehension processes. *Language and Cognitive Processes*, 4(3-4), SI21-SI49.
- Rayner, K. (1998). Eye movements in reading and information processing: 20 years of research. *Psychological bulletin*, 124(3), 372.
- Redeker, G. (2000). Coherence and structure in text and discourse. *Abduction, Belief and Context in Dialogue*, 233-263.
- Reinhart, T. (1980). Conditions for text coherence. *Poetics today*, 1(4), 161-180.
- Reitbauer, M. (2008). Keep an eye on information processing: Eye tracking evidence for the influence of hypertext structures on navigational behaviour and textual complexity. *LSP and professional communication (2001-2008)*, 8(2).
- Renkema, J. (2009). *The texture of discourse: towards an outline of Connectivity Theory*. John Benjamins Publishing.
- Revlín, R., & Hegarty, M. (1999). Resolving signals to cohesion: Two models of bridging inference. *Discourse Processes*, 27(1), 77-102.
- Rohde, H., & Horton, W. (2010). Why or what next. In *Eye movements reveal expectations about discourse direction. Talk presented at the 23rd Annual CUNY Conference on Human Sentence Processing. New York, NY, March* (pp. 18-20).

- Rogalski, Y., Altmann, L. J., Plummer-D'Amato, P., Behrman, A. L., & Marsiske, M. (2010). Discourse coherence and cognition after stroke: A dual task study. *Journal of communication disorders*, 43(3), 212-224.
- Rosen, V. M., & Engle, R. W. (1998). Working memory capacity and suppression. *Journal of memory and language*, 39(3), 418-436.
- Saeed, J. I. (2003). Semantics (Introducing Linguistics). *Semantics-introducing linguistics*.
- Sanders, T. J., & Noordman, L. G. (2000). The role of coherence relations and their linguistic markers in text processing. *Discourse processes*, 29(1), 37-60.
- Sanders, T., & Maat, H. P. (2006). Cohesion and coherence: Linguistic approaches. *reading*, 99, 440-466.
- Sanders, T. J., Spooren, W. P., & Noordman, L. G. (1992). Toward a taxonomy of coherence relations. *Discourse processes*, 15(1), 1-35.
- Singer, M. (2007). Inference processing in discourse comprehension. *The Oxford handbook of psycholinguistics*, 343-359.
- Schiffrin, D., Tannen, D., & Hamilton, H. E. (Eds.). (2008). *The handbook of discourse analysis*. Wiley.
- Spiegel, D. L., & Fitzgerald, J. (1990). Textual cohesion and coherence in children's writing revisited. *Research in the Teaching of English*, 48-66.
- Staub, A., & Rayner, K. (2007). Eye movements and on-line comprehension processes. *The Oxford handbook of psycholinguistics*, 327, 342.
- Stokes, N., Carthy, J., & Smeaton, A. F. (2004). SeLeCT: a lexical cohesion based news story segmentatio (P. C. Gordon, 2003)n system. *AI Communications*, 17(1), 3-12.
- Stotsky, S. (1983). Types of lexical cohesion in expository writing: Implications for developing the vocabulary of academic discourse. *College Composition and Communication*, 34(4), 430-446.
- Sturt, P. (2003). The time-course of the application of binding constraints in reference resolution. *Journal of Memory and Language*, 48(3), 542-562.
- Swinney, D. A. (1979). Lexical access during sentence comprehension:(Re) consideration of context effects. *Journal of verbal learning and verbal behavior*, 18(6), 645-659.
- Taboada, M., & de los Angeles Gómez-González, M. (2012). Discourse markers and coherence relations: Comparison across markers, languages and modalities. *Linguistics and the Human Sciences*, 6(1-3), 17-41.
- Tabor, W., Galantucci, B., & Richardson, D. (2004). Effects of merely local syntactic coherence on sentence processing. *Journal of Memory and Language*, 50(4), 355-370.
- Tanskanen, S. K. (2006). Collaborating towards Coherence: Lexical cohesion in English Discourse. John Benjamins Publishing Company. Amsterdam/ Philadelphia.
- Teich, E., & Fankhauser, P. (2005). Exploring lexical patterns in text: Lexical cohesion analysis with WordNet. *Interdisciplinary studies on information structure*, 129-145.

- Thompson, S. (1994). Aspects of cohesion in monologue. *Applied Linguistics*, 15(1), 58-75.
- Tierney, R. J., & Mosenthal, J. (1982). Discourse comprehension and production: Analyzing text structure and cohesion. *Reader meets author: Bridging the gap*, 55-104.
- Townsend, D. J., & Bever, T. G. (2001). *Sentence comprehension: The integration of habits and rules* (Vol. 1950). Cambridge, MA: MIT Press.
- Van Dyke, J. A., & McElree, B. (2006). Retrieval interference in sentence comprehension. *Journal of Memory and Language*, 55(2), 157-166.
- Unger, C. (2006). *Genre, relevance and global coherence: the pragmatics of discourse type*. Palgrave Macmillan.
- Van Gompel, R. P., & Pickering, M. J. (2007). Syntactic parsing. *The Oxford handbook of psycholinguistics*, 289-307.
- Van Leer, E., & Turkstra, L. (1999). The effect of elicitation task on discourse coherence and cohesion in adolescents with brain injury. *Journal of Communication Disorders*, 32(5), 327-349.
- Vigliocco, G., & Vinson, D. P. (2007). Semantic representation. *The Oxford handbook of psycholinguistics*, 195-215.
- Von Eckardt, B., & Potter, M. C. (1985). Clauses and the semantic representation of words. *Memory & Cognition*, 13(4), 371-376.
- Ward, A., Connelly, J., Katz, S., Litman, D., & Wilson, C. (2009, June). Cohesion, semantics and learning in reflective dialog. In *AIED 2009: 14 th International Conference on Artificial Intelligence in Education Workshops Proceedings* (p. 18).
- Wasserman, T. (2012). Attention, motivation, and reading coherence failure: A neuropsychological perspective. *Applied Neuropsychology*, 19(1), 42-52.
- Whitney, P., Ritchie, B. G., & Clark, M. B. (1991). Working-memory capacity and the use of elaborative inferences in text comprehension. *Discourse Processes*, 14(2), 133-145.
- Widdowson, H. G. (1973). *An applied linguistic approach to discourse analysis* (Doctoral dissertation, University of Edinburgh).
- Williams, R. (1983). Teaching the Recognition of Cohesive Ties in Reading a Foreign. *Reading in a foreign language*, 1(1), 35-52.
- Winterowd, W. R. (1970). The grammar of coherence. *College English*, 31(8), 828-835.
- Witte, S. P., & Faigley, L. (1981). Coherence, cohesion, and writing quality. *College composition and communication*, 32(2), 189-204.
- Xi, Y. (2010). Cohesion Studies in the Past 30 Years: Development, Application and Chaos. *The International Journal-Language Society and Culture*, 31, 139-147.
- Yeh, C. (2004). The relationship of cohesion and coherence: a contrastive study of English and Chinese. *Journal of language and linguistics*, 3(2), 243-260.

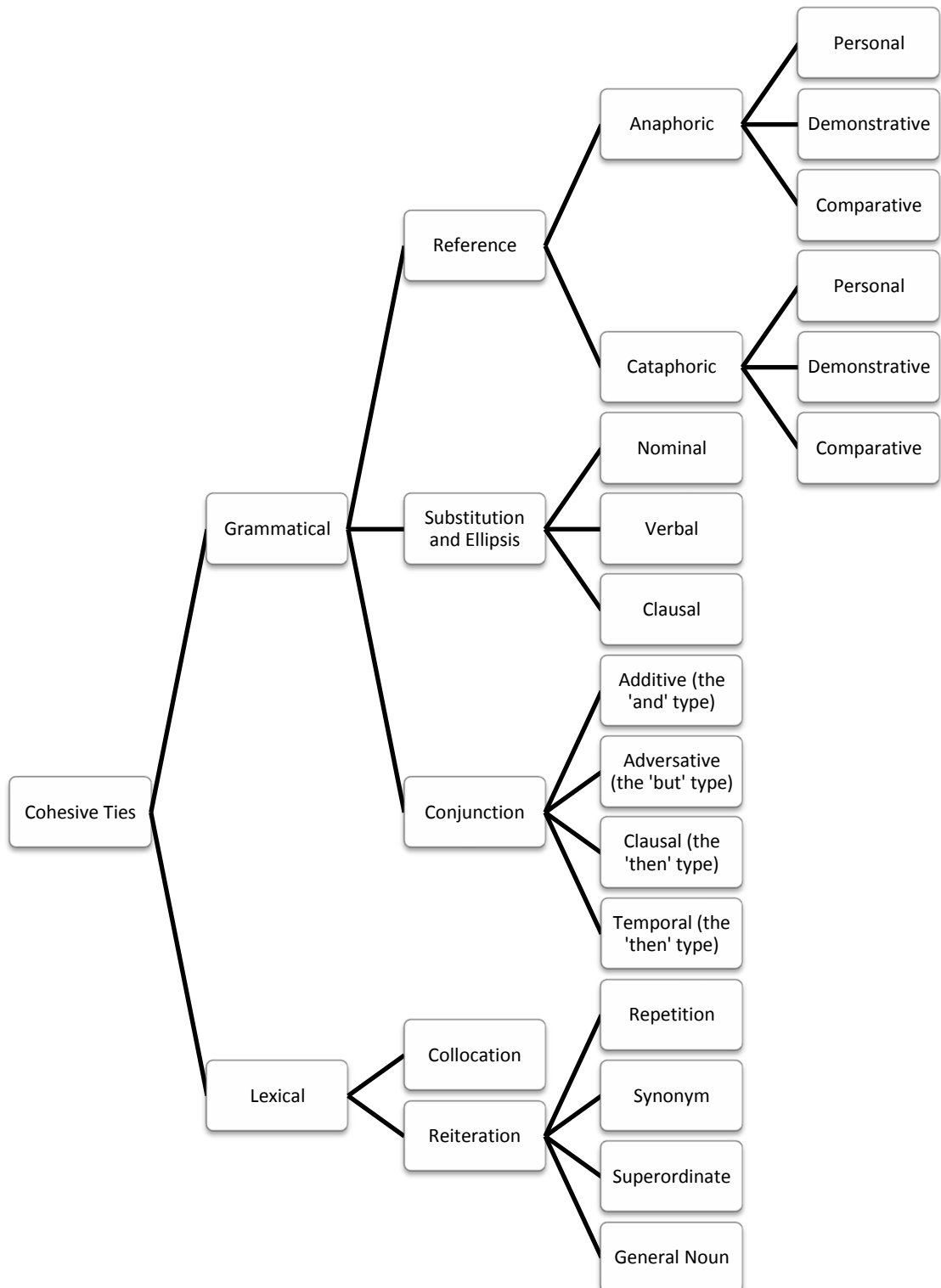
Zeyrek, D. (in print). A comparison of *ama* and *fakat* in Turkish Discourse Bank

Zwaan, R. A., & Radvansky, G. A. (1998). Situation models in language comprehension and memory. *Psychological bulletin*, 123(2), 162.

APPENDICES

APPENDIX 1

Cohesion relations in Halliday and Hasan (1976)



APPENDIX 2

Case summaries of participant groups (age and gender)

Case Summaries (Man=M, Woman=W)

			Gender	Age
Group	Group 1	1	W	23
		2	W	21
		3	M	26
		4	W	22
		5	M	31
		6	W	22
		7	W	33
		8	W	25
		9	M	30
		Total N	9	9
	Mean		25.89	
	Group 2	1	W	22
		2	W	28
		3	M	24
		4	W	34
		5	W	25
		6	W	23
		7	W	22
		8	W	25
		9	W	25
		10	W	29
	Total N	10	10	
	Mean		25.70	
	Group 3	1	W	26
		2	M	25
		3	W	26
		4	M	25
		5	W	23
		6	W	24
		7	W	22
		8	M	28
		9	M	29
		10	W	25

		11	W	28
	Total	N	11	11
		Mean		25.55
Group		1	W	23
		2	W	25
		3	W	28
		4	M	25
		5	M	22
		6	M	37
		7	W	28
		8	M	29
		9	W	29
		10	M	24
	Total	N	10	10
		Mean		27.00
Total	N		40	40
	Mean			26.02

APPENDIX 3

Informed consent form

Bu çalışma, Enformatik Enstitüsü Bilişsel Bilimler Bölümü Arş. Gör. ve yüksek lisans öğrencisi Gökhan Gönül tarafından, Bilişsel Bilimler Bölümü öğretim üyesi Prof. Dr. Deniz Bozşahin danışmanlığında yürütülen bir yüksek lisans tez çalışmasıdır. Çalışmanın amacı, sözcüksel anlam ilişkilerinin dili kullanmadaki rolünü araştırmaktır. Çalışmaya katılım tamimiyle gönüllülük temelinde olmalıdır. Çalışmada sizden kimlik belirleyici hiçbir bilgi istenmemektedir. Cevaplarınız tamimiyle gizli tutulacak ve sadece araştırmacılar tarafından değerlendirilecektir; elde edilecek bilgiler bilimsel yayımlarda kullanılacaktır.

Çalışma, genel olarak kişisel rahatsızlık verecek soruları içermemektedir. Ancak, katılım sırasında sorulardan ya da herhangi başka bir nedenden ötürü kendinizi rahatsız hissederseniz cevaplama işini yarıda bırakıp çıkmakta serbestsiniz. Böyle bir durumda çalışmayı uygulayan kişiye, çalışmayı tamamlamadığınızı söylemek yeterli olacaktır. Çalışma sonunda, bu çalışmayla ilgili sorularınız cevaplanacaktır. Bu çalışmaya katıldığınız için şimdiden teşekkür ederiz. Çalışma hakkında daha fazla bilgi almak için ODTÜ Enformatik Enstitüsü Bilişsel Bilimler Bölümü Arş. Gör. Gökhan Gönül (Oda: B-111; Tel: 210 7862; E-posta: gokhan.gonul@metu.edu.tr) ile iletişim kurabilirsiniz.

Bu çalışmaya tamamen gönüllü olarak katılıyorum ve istediğim zaman yarıda kesip çıkabileceğimi biliyorum. Verdiğim bilgilerin bilimsel amaçlı yayımlarda kullanılmasını kabul ediyorum. (Formu doldurup imzaladıktan sonra uygulayıcıya geri veriniz).

İsim Soyad ya da Takma Ad

Tarih

İmza ya da Mahlas

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Target clauses

Altanlamlılık (hyponymy)

A.

- 1) Mezuniyet törenime ailemi bekliyordum ama annem gelmemiştii. 7
- 2) Mezuniyet törenime ailemi bekliyordum, annem gelmemiştii. 6
- 3) Mezuniyet törenime ailemi bekliyordum ama köpeğim de gelmişti. 8
- 4) Mezuniyet törenime ailemi bekliyordum, köpeğim de gelmişti. 7

B.

- 1) Cennet papağanları parlak renkleriyle ünlüdür fakat kaçakçık yüzünden nesli tükenmekte olan kuşlar arasındadır. 13
- 2) Cennet papağanları parlak renkleriyle ünlüdür, kaçakçılık yüzünden nesli tükenmekte olan kuşlar arasındadır. 12
- 3) Cennet papağanları parlak renkleriyle ünlüdür fakat kaçakçılık yüzünden nesli tükenmekte olanlar arasındadır. 12
- 4) Cennet papağanları parlak renkleriyle ünlüdür, kaçakçılık yüzünden nesli tükenmekte olanlar arasındadır. 11

C.

- 1) Kıyafetlerimi getirmişsin ama şortumu unutmuşsun. 5
- 2) Kıyafetlerimi getirmişsin, şortumu unutmuşsun. 4
- 3) Kıyafetlerimi getirmişsin ama çekicimi unutmuşsun. 5
- 4) Kıyafetlerimi getirmişsin, çekicimi unutmuşsun. 4

Parça-bütün anlam ilişkisi (meronymy)

A.

- 1) Ev sahibim yukarı kattan eve su aktığını söyledi ama tek bir damla göremiyorum. 13
- 2) Ev sahibim yukarı kattan eve su aktığını söyledi, tek bir damla göremiyorum. 12
- 3) Ev sahibim yukarı kattan eve su aktığını söyledi ama iz göremiyorum. 11
- 4) Ev sahibim yukarı kattan eve su aktığını söyledi, iz göremiyorum. 10

B.

- 1) Arabanın dış görünüşünde sorun yok fakat motoru yağ sızdırıyor. 9
- 2) Arabanın dış görünüşünde sorun yok, motoru yağ sızdırıyor. 8
- 3) Arabanın dış görünüşünde sorun yok fakat su eklenmeli. 8
- 4) Arabanın dış görünüşünde sorun yok, su eklenmeli. 7

C.

- 1) Alış-veriş merkezi on ağacın kesilmesine sebep oldu ama ormana dokunurlarsa dava açarız. 12
- 2) Alış-veriş merkezi on ağacın kesilmesine sebep oldu, ormana dokunurlarsa dava açarız. 11
- 3) Alış-veriş merkezi diktiler ses çıkarmadık ama ormana dokunurlarsa dava açarız. 10
- 4) Alış-veriş merkezi diktiler ses çıkarmadık, ormana dokunurlarsa dava açarız. 9

Zıt anlamlılık-karşıt anlamlılık (Antonymy-opposites)

A.

- 1) Sabah çıkamayacağımı söyledim ama akşam gelmem için ısrar etti. 9

- 2) Sabah çıkamayacağımı söyledim, akşam gelmem için ısrar etti. 8
- 3) Sabah çıkamayacağımı söyledim ama bir ay sonrası için ısrar etti. 10
- 4) Sabah çıkamayacağımı söyledim, bir ay sonrası için ısrar etti. 9

B.

- 1) Bir tabloda ölümü anlatmak kolaydır fakat yaşamı resmetmek emek ister. 10
- 2) Bir tabloda ölümü anlatmak kolaydır, yaşamı resmetmek emek ister. 9
- 3) Bir tabloda ölümü anlatmak kolaydır fakat doğayı resmetmek emek ister. 10
- 4) Bir tabloda ölümü anlatmak kolaydır, doğayı resmetmek emek ister. 9

C.

- 1) Siyah arabayı alacağını söyledi ama akli bulamadığı beyazdaydı. 8
- 2) Siyah arabayı alacağını söyledi, akli bulamadığı beyazdaydı. 7
- 3) Siyah arabayı alacağını söyledi ama akli bulamadığı tam otomatik olanındaydı. 10
- 4) Siyah arabayı alacağını söyledi, akli bulamadığı tam otomatik olanındaydı. 9

Eşanlamlılık (synonymy)

A.

- 1) Kocaman bir heykelin yanından geçtik ama büyüklüğüne çok da şaşırmadık. 10
- 2) Kocaman bir heykelin yanından geçtik, büyüklüğüne çok da şaşırmadık. 9
- 3) Kocaman bir heykelin yanından geçtik ama şekline çok da şaşırmadık. 10
- 4) Kocaman bir heykelin yanından geçtik, şekline çok da şaşırmadık. 9

B.

- 1) Tenha bir sokakta yürüdük fakat ıssızlıktan korkmadık. 7
- 2) Tenha bir sokakta yürüdük, ıssızlıktan korkmadık. 6
- 3) Tenha bir sokakta yürüdük fakat hayvanlardan korkmadık. 7
- 4) Tenha bir sokakta yürüdük, hayvanlardan korkmadık. 6

C.

- 1) Sakin bir yere oturmuştuk ama dinginliğimiz uzun sürmedi. 8
- 2) Sakin bir yere oturmuştuk, dinginliğimiz uzun sürmedi. 7
- 3) Sakin bir yere oturmuştuk ama sohbetimiz uzun sürmedi. 8
- 4) Sakin bir yere oturmuştuk, sohbetimiz uzun sürmedi. 7

Distracter sentences

- 1) Yaptığın şeylere gülebilirim ama bu alay ettiğim anlamına gelmez.
- 2) Eninde sonunda barışırız onunla fakat insan incinince kolay kolay kendine yapılanları unutmuyor.
- 3) Şimdi hava atıyorsun ama bu yaptıkların yanına kalmayacak.
- 4) Ders çalışmayı hiç istemiyorum ama çalışmayınca da içim rahat etmiyor.
- 5) Eve geldi ve eşyalarını hızla topladı, sonra da gitti.

- 6) Bir daha sana sır falan vermem, gidip herkese anlatıyorsun.
- 7) Bu kadar güzel kokan karafilleri başka bir yerde bulamazsın.
- 8) Polisten edinilen bilgilere göre dört yüz kişi tutuklanarak ceza evine konuldu.
- 9) Milli takımın İspanya ile yaptığı maçların istatistiklerini bulmak isteyen spor programı ekibi, yeni maçtan önce bilgilere ulaşabilmek için bir gün boyunca arşiv taraması yaptı.
- 10) Aldığın onca kitabı kütüphaneye daha teslim etmedin mi?
- 11) Bana sevdiğim renkte bir pantolon almış; keşke bir de bu kadar zayıf olmadığımı düşünebilseydi.
- 12) Her gün işe yürüyerek gidiyor ve her gün hemen hemen aynı saatte evimin önünden geçiyor.

APPENDIX 5

Lexical cohesion ties (ties are delineated in red)

Hyponymy

- 1) Mezuniyet törenime **ailemi** bekliyordum ama **annem** gelmemiști.
- 2) Mezuniyet törenime **ailemi** bekliyordum, **annem** gelmemiști.

B.

- 1) **Cennet papağanları** parlak renkleriyle ünlüdür fakat kaçakçık yüzünden nesli tükenmekte olan **kuşlar** arasındadır.
- 2) **Cennet papağanları** parlak renkleriyle ünlüdür, kaçakçılık yüzünden nesli tükenmekte olan **kuşlar** arasındadır.

C.

- 1) **Kıyafetlerimi** getirmiști ama **şortumu** unutmuști.
- 2) **Kıyafetlerimi** getirmiști, **şortumu** unutmuști.

Parça-bütün anlam ilişkisi (meronymy)

A.

- 1) Ev sahibim yukarı kattan eve **su** aktığını söyledi ama tek bir **damla** göremiyorum.
- 2) Ev sahibim yukarı kattan eve **su** aktığını söyledi, tek bir **damla** göremiyorum.

B.

- 1) **Arabanın** dış görünüşünde sorun yok fakat **motoru** yağ sızdırıyor.
- 2) **Arabanın** dış görünüşünde sorun yok, **motoru** yağ sızdırıyor.

C.

- 1) Alış-veriş merkezi on **ağacın** kesilmesine sebep oldu ama **ormana** dokunurlarsa dava açarız.
- 2) Alış-veriş merkezi on **ağacın** kesilmesine sebep oldu, **ormana** dokunurlarsa dava açarız.

Zıt anlamlılık-karşıt anlamlılık (Antonymy-opposites)

A.

- 1) **Sabah** çıkamayacağımı söyledim ama **akşam** gelmem için ısrar etti.
- 2) **Sabah** çıkamayacağımı söyledim, **akşam** gelmem için ısrar etti.

B.

- 1) Bir tabloda **ölümü** anlatmak kolaydır fakat **yaşamı** resmetmek emek ister.
- 2) Bir tabloda **ölümü** anlatmak kolaydır, yaşamı resmetmek emek ister.

C.

- 1) **Siyah** arabayı alacağını söyledi ama akli bulamadığı **beyazdaydı**.
- 2) **Siyah** arabayı alacağını söyledi, akli bulamadığı **beyazdaydı**.

Eşanlamlılık (synonymy)

A.

- 1) **Kocaman** bir heykelin yanından geçtik ama **büyüklüğüne** çok da şaşırmadık. 10
- 2) **Kocaman** bir heykelin yanından geçtik, **büyüklüğüne** çok da şaşırmadık. 9

B.

- 1) **Tenha** bir sokakta yürüdük fakat **ıssızlıktan** korkmadık. 7
- 2) **Tenha** bir sokakta yürüdük, **ıssızlıktan** korkmadık. 6

C.

- 1) **Sakin** bir yere oturmuştuk ama **dinginliğimiz** uzun sürmedi. 8
- 2) **Sakin** bir yere oturmuştuk, **dinginliğimiz** uzun sürmedi. 7

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