Hacettepe University Graduate School of Social Sciences

Department of English Linguistics

VERBAL HUMOR PROCESSING IN TURKISH: AN EYE TRACKING STUDY ON THE INFLUENCE OF SET EFFECTS AND THE READING PATTERNS IN JOKES

Metin ÖZDEMİR

Master's Thesis

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BİLDİRİM

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KABUL VE ONAY

Metin Özdemir tarafından hazırlanan "Verbal Humor Processing in Turkish: An Eye Tracking Study on the Influence of Set Effects and the Reading Patterns in Jokes" başlıklı bu çalışma, 25. 09. 2012 tarihinde yapılan savunma sınavı sonucunda başarılı bulunarak jürimiz tarafından Yüksek Lisans Tezi olarak kabul edilmiştir.

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Yukarıdaki imzaların adı geçen öğretim üyelerine ait olduğunu onaylarım.

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To my precious family
And
To a world where laughter is experienced more than agony

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ÖZET

ÖZDEMİR, Metin. *Söze Dayalı Mizahta Yönlendirmenin Anlamsal İşlemlemedeki Etkisi: Göz Hareketlerinin ve Okuma Örüntülerinin İncelenmesi,* Yüksek Lisans Tezi, Ankara, 2012.

Bilişsel dilbilim alanında sözlü mizah üzerine yapılan çalışmaların, bilişsel süreçleri açıklamada önemli katkıları olmuştur. Anlamsal şemalar aracılığı ile mizahı açıklamaya çalışan dilbilimsel yaklaşımlar (Attardo, 1997, 2001; Attardo ve Raskin, 1991; Coulson, 2001; Raskin, 1985) bu alana yeni bir bakış açısı sunmuştur. Fıkralar anlam bulanıklığı içerdikleri için bu bilişsel süreçleri açıklamada önemli rol oynarlar. Bu çalışmanın amacı fıkraların anlamsal işlemlenmesi sırasında kullanılan bilişsel süreçleri ortaya çıkarmaktır.

Çalışma için iki deney yapılmıştır. İlk deneyde kullanılan yöntem göz izleme aracıyla sözcük düzeyinde anlam bulanıklığı içeren kısa fıkraların iki farklı grup tarafından nasıl işlemlendiğini araştırmaktadır. Deneyden önce bir gruba (n=18) kısa fıkra okuyacakları söylenerek yönlendirme yapılmış, ikinci gruba (n=18) okuyacakları parçalarla ilgili bilgi verilmemiştir. Okuyacağı parça konusunda beklentileri şekillenen deneklerin okuyacağı tümcelerin içeriği hakkında herhangi bir bilgisi olmayan deneklerden farkı incelenmiş, fıkralarda anlam canlanmasının ne derece stratejik ya da otomatik kontrole bağlı olduğu geri dönüş sayısına ve fıkra anlamı taşıyan sözcüklerdeki toplam odaklanma süresine bakılarak karşılaştırılmıştır. Ardından, toplanan veriler yüzde ve istatistiksel analizler yoluyla değerlendirilmiştir.

İkinci deneyde ise fıkra işlemlenmesinin geliştirilmiş dilbilimsel şema kuramlarına (Raskin, 1985; Attardo ve Raskin, 1991; Attardo, 1997; 2001) uygunluğu ölçülmüştür. Bu deneyde de, deneklere kısa fıkralar ve bu fıkraların gülmece içermeyen türleri okutulmuş *(küçükken bana yaramaz diyorlardı artık büyüdüm ve yarabiliyorum / küçükken bana yarama diyorlardı artık büyüdüm ve uslandım)* bu iki tümce arasındaki fark aynı şekilde geri dönüş sayısı ve toplam odaklanma süreleri açısından incelenmiştir.

İlk deneyin sonucunda, fıkralarda anlam canlanmasında otomatik kontrolün önemli olduğu bulgulanmıştır. Fıkra okuyacakları söylenmeyen deneklerde tümce içinde daha az geri dönüş ve anlam bulanıklığı olan sözcüklerde daha az odaklanma süresi gözlemlenmiştir. İkinci deney sonucunda ise kısa fıkra okuyan denekler, bu fıkraların gülmece içermeyen türlerine kıyasla odaklanma süresi ve geri dönüş sayısı bakımından daha fazla zaman harcamışlardır ve bu sonuç dilbilimsel mizah kuramları (Raskin, 1985; Attardo ve Raskin, 1991; Attardo, 1997; 2001; Coulson, 2001) ile örtüşmektedir.

Anahtar Sözcükler: Söze dayalı mizah, anlamsal işlemleme, göz hareketleri, göz izleme, anlam canlanması, anlam bulanıklığı, stratejik kontrol, otomatik kontrol.

ABSTRACT

ÖZDEMİR, Metin. *Verbal Humor Processing In Turkish: An Eye Tracking Study on the Influence of Set Effects,and Reading Patterns in Jokes* Master's Thesis, Ankara, 2012

Studies on verbal humor in cognitive linguistics have contributed a lot to understanding the cognitive processes. Linguistic approaches (Attardo, 1997, 2001; Attardo and Raskin, 1991; Coulson, 2001; Raskin, 1985) which aimed to explain humor with the help of semantic scripts (a.k.a. frames) have given new insights to the field. Since jokes are the texts that contain ambiguity, they have important roles in accounting for these cognitive processes. The aim of this study, thus, is to explore these processes and analyze meaning activation during the comprehension of a joke.

Two experiments were carried out in order to see on – line processing of the jokes. In the first experiment, the study examined the eye movements of two groups of participants while they processed one – liner jokes. Before the experiment, participants in one group (n = 18) were manipulated by explaining that they were going to read one – liner jokes whereas the participants in the other group were told nothing about the content of the paragraphs. The differences between the participants in the first group, which were pre – conditioned to read a joke, and the participants in the second group, which had no idea about what to read, were compared via the number of regressions and total fixation duration on the joke meaning carrying word (punchline) of the sentence in order to see whether joke meaning activation is subject to strategic or automatic control. Later, the collected data were analyzed by means of percentage and statistical analysis.

In the second experiment, the study tested the script theories of humor developed by Raskin (1985), Attardo and Raskin (1991) and Attardo (1997, 2001). This time, participants' eye movements were monitored in order to find whether there were differences between the processing of one liners and their non – joke counterparts (*küçükken bana yaramaz diyorlardı*

artık büyüdüm ve yarabiliyorum vs. *küçükken bana yaramaz diyorlardı artık büyüdüm ve uslandım*). Similarly, total fixation durations on joke meaning carrying words and the number of regressions upon encountering the joke meaning were measured and the differences between one – liners and their non – joke counterparts were measured.

In the first experiment, the study found out that meaning activation in jokes is subject to automatic control. Participants who did not know that they were going to read jokes made fewer regressions and shorter fixations on joke meaning words. In the second experiment, participants needed more time – longer fixation duration and more regressions - to process the one – liners than their non – joke counterparts suggesting that participants exerted more cognitive resources on script – switch trigger (the word carrying joke meaning). This result has been found consistent with the script/frame theories (Raskin, 1985; Attardo and Raskin, 1991; Attardo, 1997; 2001; Coulson, 2001).

Key words: Verbal humor, semantic processing, eye movements, eye tracking, meaning activation, ambiguity, strategic control, automatic control.

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CHAPTER 1

INTRODUCTION

Tragedy is when I cut my finger. Comedy is when you fall down an open sewer and die.

Mel Brooks (Actor, writer and producer)

1.1. INTRODUCING HUMOR

Few things in the world are as challenging to understand as human brain and this challenge has always been one of the major interests of disciplines. Two of these few things are inarguably language and humor which are thought to be inherent in human. The intersection of language and humor, thus, may provide invaluable contributions which will, in turn, help us understand the nature of the complexity of human mind.

It has usually been thought that humor and laughter are a universal phenomenon which can be experienced in all cultures in the world (Apte, 1985). This universality can be supported by the fact that anyone can recognize the sound of laugher since it is nearly same across the world. It is further reinforced by the fact that surprisingly many jokes or situations will strike surprisingly many, if not all people as funny (Raskin, 1985). It has been observed that after crying, laugher is vocalized by infants, making it an innate proponent of human mind (McGhee, 1979). Vaid (2002) also states that even deaf-blind children who never have the chance to learn it can laugh by touching people's faces. As Martin (2007: 3) maintains "there is evidence of specialized brain circuits for humor and laugher in humans, which researchers are beginning to identify by means of neural imaging studies… thus, being able to enjoy humor and express it through laugher seems to be an essential part of what it means to be human". Nash (1985) even states that

humor is a characteristic of humanity which makes it different from other livings along with the power of speech, the mathematical gift and the gripping thumb.

The relation between humor and human mind has been one of the major topics among humor researchers. Raskin (1985:2) states that "responding to humor is part of human behavior, ability or competence, other parts of which comprise such important social and psychological manifestations of homo sapiens as language, morality, logic, faith, etc". From this statement, it is clear that humor can be half natural and half acquired. Humans' having greater intellectual and linguistic abilities have provided them to adapt the laughter-generating play activities with words and ideas that we now call humor (Caron, 2002). Language, which is also a complex phenomenon, has helped a lot to produce and understand humor. Martin (2007) argues that the complexity of human language and imagination enables us to create humor in a seemingly endless variety of forms. He then goes on to explain the relation between humor and language:

> "As human language, culture, and technology have evolved, we have developed new methods and styles of communicating it, from spontaneous interpersonal joking and banter to oral storytelling traditions, comedic drama and humorous literature, comedy films, radio and television shows, and jokes and cartoons disseminated over the Internet" (Martin, 2007:4).

Then the question arises: what is humor? To answer this seemingly simple question, one has to come up with a definition which embraces all the disciplines. Humor is broadly defined as "that quality of action, speech, or writing which excites amusement; oddity, jocularity, facetiousness, comicality, fun…the faculty of perceiving what is ludicrous or amusing, or of expressing it in speech, writing, or other composition; jocose

imagination or treatment of a subject" (Simpson and Weiner, 1989: 486 cited in Martin: 2007: 5).

A rich set of phenomena relating to humor has been accumulated in different cultures, and numerous words for their description have come to use. However, there is still no agreed-upon terminology in research on humor and certainly no consensual definition (Ruch, 2007 cited in Samson, 2008: 5). It is a known fact that in the comprehension of humor, information is taken (something someone says or does or something we read) through eyes and ears, the meaning, both initial and the intended, of this information is processed and it is appraised as non-serious and humorous. Humor is understood as the cognitive capacity to process potentially funny incongruities, which means to comprehend and appreciate humorous stimuli. "Humor processing is understood in the sense of cognitive processing of complex stimuli with a potential affective (positive) experience resulting from successful cognitive (comprehension) processes" (Samson, 2008: 6). Therefore, it is possible to say that humor processing has a clearly cognitive component. Every study on humor takes researchers one step closer to understanding the cognitive processes. Therefore, experimental studies and on-line measurements carry importance in understanding the reception of joke stimuli. Although interest in humor research has been great, there is surprisingly little empirical evidence to analyze how processing humor occurs while getting a joke (Vaid, 2002). The next section is about this lacuna.

1.2. STATEMENT OF THE PROBLEM

"Humor has been studied for a long time, originally by philosophers, subsequently by literary critics and essayists, and more recently by psychologists, sociologists and linguists. This long heritage of reflection and discussion has produced an accumulation of ideas, proposals and claims about the nature of humor, but… the vast majority of these ideas have been stated informally" (Ritchie, 2004: 11). Disciplines dealing with humor have to answer a lot of questions. For example, linguistics encompasses many types of verbal humor such as jokes, irony, conversational humor, wit, pun, etc. and each of these humor types offer some unanswered questions regarding comprehension and production. It should also be noted that an interdisciplinary study to analyze this complex phenomenon would yield more tangible results. Developing a universal approach for humor would be difficult, at least for now, and it would take decades to provide a complete theory. However, following a descriptive approach helps researchers examine particular types of humor thoroughly, developing detailed descriptions of the workings of the chosen genres of humor and placing that kind of research in an advantageous state due to the fact that the descriptions would genuinely reflect the data, and would be sufficiently detailed to provide falsifiable predictions; further, more general, theorizing could be based on these descriptions, since the theoretician would be starting from analyzed data displaying some relevant structure, rather than raw data (Ritche, 2004).

Linguistic theory of humor, at this point, enjoys a cognitive orientation which aims to account for the semantic and pragmatic mechanisms in joke perception (Attardo and Raskin, 1991; Attardo, 1997, 2001; Coulson, 2001; Giora, 1991; Raskin, 1985; Yus,

2003). Besides theorizing on humor processes with the help of semantic/pragmatic and cognitive proposals, there are diversified methodological perspectives whose global aim, regardless of the methodologies and postulates advocated, is to describe chosen aspect of verbal humor, such as sociolinguistic researches and laboratory studies (which will be mentioned in detail in literature review section) with real-life or media discourses (Dynel, 2008). However, lack of empirical data has been emphasized by some researchers (Attardo, 2001; Martin, 2007; Vaid, 2002 and Vaid et al, 2003), and need for further experimental studies have been promoted to broaden the scope of inquiry. On-line experimental data therefore provides significant contributions to the field since these measurements could explain, in terms of milliseconds, how the context is disambiguated or how participants' cognitive processes differ during comprehension of a joke. On-line analysis of meaning activation in jokes is also helpful since meanings are constructed with the help of incoming information and background knowledge or world experience. Coulson (2001:29) states:

> "an active process in which the speaker integrates ongoing aspects of perceptual and conceptual information with more abstract information available from long-term memory.

On-line meaning construction is a natural process which precludes delays in interpretation and often relies on cognitive shortcuts in the process of ambiguity resolution (Dynel, 2009). Eye movements, at this point, could give the researchers a chance to observe participants' cognitive processes by analyzing fixation times on words, the number of regressions, fixation counts and so on until the participants comprehend the joke. It is expected that the present study fills these gaps in the

literature, and gives an insight to the understanding of how a joke is comprehended on - line.

1.3. THE AIM OF THE STUDY

Understanding the cognitive processes underlying humor comprehension could create a path for further research. However, this goes without saying that there is more than just comprehending a joke. It is also worth mentioning that the psychological states of the participants also have effects on comprehending a joke/non-joke sentence. For example, people watch stand – up shows in order to laugh, or to put it in a different way, they go and watch these shows knowing that they are going to laugh and they attune themselves to hear some jokes and cognitively prepare themselves by adopting **a strategic control**. On the other hand, there are instances of jokes in which you simultaneously encounter and then realize that you have actually read or heard a joke. There is no preparation beforehand and your cognition automatically comprehends the joke (in other words**: automatic control**). What this study is mainly interested in is to provide an answer to the question **"Does pre-conditioning to hear/read a joke help someone process the joke faster or slower?"** This study focuses on the mental processes involved in "getting a joke" or perceiving a joke as funny with two different experiment groups, one group knows that they will read a joke and the other group has no idea about what to read. Therefore the study also examines a condition which Freud (1905:282-285, cited in Raskin, 1985:11-12) also mentioned, along with other six conditions, as a favorable condition: "[a] similarly favorable effect is produced by an expectation of the comic, by being attuned to comic pleasure." In this case, to what extent comprehension of a joke depends on automatic and strategic control, i.e., the effects of manipulating subjects'

expectations about whether or not they will be encountering humorous materials (Martin, 2007). Choosing a descriptive approach, the present study is an interdisciplinary one which borrows heavily from linguistics and psychology; making it a psycholinguistic analysis to investigate both the behavior and the language processes of the participants' while reading one-liners. Here, behavior refers to the participant's being attuned to hear a joke, in other words, pre-conditioned before reading a joke, and providing a strategic control for him/her. The primary aim of the study is thus to analyze the influence of set effects in joke detection and comprehension with one-liners. More detail about the experiment groups and the design will be given in methodology section.

The second aim of the study is to examine the processing differences between joke and non-joke control sentences. There have been linguistic humor theories (described in detail in Chapter 2) in order to account for the funniness of a sentence in a theoretical fashion. **What do eye movements say about these theories? Are eye movements consistent with the linguistic humor theories?** The second aim of this study, thus, is to compare one-liner jokes with their non – joke controls.

1.4. RESEARCH QUESTIONS

This study has an interdisciplinary character as it investigates behavioral and mental correlates of processing humor stimuli, i.e., one-liner jokes, which have the incongruity – resolution characteristics according to parameters obtained from cognitive-linguistic (Attardo and Raskin, 1991). The incongruity-resolution stage of humor processing lies

in the main focus of interest. For this aim, the research questions addressed in this study are as follows:

1. Will expecting to read a joke make one more attuned to alternate readings earlier on in joke processing than if one does not expect to encounter a joke? To put it in a different way, is meaning activation in joke processing subject to strategic control or automatic control?

2. Is it possible to observe differences in terms of processing between one-liners and their non-joke counterparts? Are the reading patterns for the jokes consistent with the incongruity – resolution models developed by Attardo and Raskin's (1991) GTVH and frame – shifting model by Coulson (2001)? That's to say, what do eye movements show when the reader encounter with the second (opposed) scrip?

The first question aims to find out the effects of manipulating subjects' expectations about a text: subjects who know that they will read a joke will adopt a strategic control since they will have the opportunity to attune themselves to the text during processing it and subjects who know that they will read paragraphs will adopt an automatic control.

The second question is generally interested in examining the cognitive processes of the participants while they are reading one – liners and their non – joke counterparts. It aims to explore the script overlapping and opposition developed by Rakin (1985) Attardo an Raskin (1991), Attardo (1997; 2001).

To answer these research questions, an experimental design with eye tracking paradigm will be used and with the help of these sub – questions, an answer to main research questions will be sought.

1.1. Is there a significant difference between the groups (automatic vs. strategic) and sentences (jokes vs. non - jokes) in terms of total fixation duration?

1.2. Is there a significant difference between the groups (automatic vs. strategic) and sentences (jokes vs. non - jokes) in terms of number of regressions?

1.5. LIMITATIONS OF THE STUDY

In previous studies such as Emerich et al. (2003) and Ruch (1992), it has been stated that cognitive responses have been influenced by individual characteristics: socio – cultural differences, metalinguistic skills and personality (Samson, 2012). It is also impossible to find joke instances that will strike everyone funny at the same degree. Since life experience of the subjects may differ from each other, some joke will be processed easier or harder than the others. In total, it is possible to argue that individual differences play an important role in joke comprehension. In this study individual differences are disregarded, however, with a quantitative and statistical approach, these differences are aimed to be compensated.

Second limitation is about the experimental device that the study uses: eye – tracker. Although eye – tracking paradigm has been said to be used increasingly over the years due to its possibility to examine moment to moment processing (details will be given in the survey of literature section), it alone may not be sufficient when accounting for the

cognitive processes. Along with eye – movements, other online experiments could be used such as fMRI and ERP to get more robust findings about these cognitive processes.

1.6. OUTLINE OF THE STUDY

There are five chapters in this study and the outline of the study is as follows:

Chapter 1 introduces the concept of humor in general. Some definitions of the term are given and how linguistics and psycholinguistics are situated in terms of humor studies is explained. This is followed by the statement of the problem, the aim of the study and the research questions. At the end, limitations of the study are presented.

Chapter 2 is about the studies and theories developed related to humor research. Since the field includes more than one discipline, the approaches to humor are stated in sociological, psychological and linguistic perspective. Then, the focus is directed to linguistic approaches to humor. These approaches are divided into two: theoretical approaches and descriptive approaches. Theoretical approaches are about the linguistic theories which are aimed at explaining the phenomena via semantic scripts (a.k.a frames) while descriptive studies are the ones which include sub – branch of linguistics such as sociolinguistics, discourse analysis and psycholinguistics. More detail was given to psycholinguistic approaches since they are similar to the present study. At the end of the chapter, the technique used in this study – eye tacking – is explained.

Chapter 3 includes the methodological aspect of the study. How the experiment was carried out, information about participants, data collection tool and materials were given

in this section. At the end, how the data would be analyzed in the analysis section was described.

In Chapter 4, findings of the study are presented with tables and charts. Later, a discussion section followed these findings and the possible reasons for the results are given in this section.

Final chapter, Chapter 5, is about the conclusion of the study. Here, research questions were answered with the help of the findings presented in the previous chapter. Later, implications and suggestions for further research are presented.

CHAPTER 2

REVIEW OF LITERATURE

Imagination was given to man to compensate him for what he is not; a sense of humor to console him for what he is.

Francis Bacon (English Philosopher)

2.1. CLASSICAL DEFINITIONS OF HUMOR

When Plato (427 – 347 BC) was talking about his views on humor, he was paving the way for further research and definitions. As Morreall (1987) puts it, he was considered to be the first theorist of humor and the one who attempted to define this complex phenomenon. In Philebus, it is possible to see Plato's idea on humor as Socrates mentions:

> "... Our argument declares that when we laugh at the ridiculous qualities of our friends, we mix pleasure with pain, since we mix it with envy; for we have agreed all along that envy is a pain of the soul, and that laughter is pleasure, yet these two arise at the same time on such occasions." (Philebus 50A) (cited in Attardo, 1994: 18).

Aristotle (384 – 322 BC), following Plato, was also interested in comedy or more generally humor in his Poetics. It is also worth quoting his views on comedy in order to see how Greeks had an influence on later periods:

> "As for Comedy, it is (as has been observed) an imitation of men worse than average; worse, however, not as regards any and every sort of fault, but only as regards one particular kind of the Ridiculous, which is a species of the Ugly. The Ridiculous is something wrong *(ap.aprep.a* n) and a deformity not productive of pain *(cww6vvov)* or harm *(ov cptJapnK.ov);* the mask, for instance, that excites laughter, is something ugly and distorted without causing pain." *(De Poetica* 1449a) (cited in Attardo, 1994: 20).

Aristotle, with these views on comedy, became the first thinker whose influence had a great impact on the superiority theories of humor (mentioned below) developed later. Latin authors were heavily influenced by Greeks in their treatment of humor while there are no considerable studies or original theories on humor in middle ages, making this age a boring one in terms of humor and laugher (Bremmer and Roodenburg, 1997). In Renaissance, new ideas about humor came up but in general, most studies were related to the discussion of the literary character of humor in plays (Attardo, 2009). Darwin's contributions to humor are also worth mentioning, especially with his 1782 monograph (Ekman, 1998), *The Expressions of the Emotions in Man and Animals*:

> "Joy, when intense, leads to various purposeless movements – dancing about, clapping the hands, stamping, etc., and to loud laughter." (cited in Vaid, 2002).

2.2. MODERN APPROACHES TO HUMOR

After Renaissance, humor studies and theories started to broaden and it is possible to see specialization in these theories, with the help of various disciplines such as sociology, psychology and philosophy. These disciplines recognized the complex structure of humor and avoided providing global theories of humor developed before. It is still not possible to see linguistics, which will be a sine qua non constituent of humor research later on, dealing with the field at these times. These disciplines were about to create a large family of humor theories that are still used in literature today. Raskin (1985: 31-36) divides the theories of humor into three categories: incongruity theories, hostility theories and release theories. Each discipline will heavily borrow from these categories and provide synonyms for the classifications. A chart taken from Attardo (1994: 47) could summarize these theories:

Table 1

Humor Theories and Their Equivalences in the Literature (After Attardo, 1994)

Incongruity	Hostility	Release
Contrast	Aggression	Sublimation
Incongruity/resolution	Superiority	Liberation
	Triumph	Economy
	Derision	
	Disparagement	

Martin (2007:32) summarizes the recent situation in humor research, stating

> "Today, with the cognitive approach dominating all areas of psychology and related disciplines, cognitive theories of humor tend to predominate. However, many of the themes from each of the traditional theories continue to influence research today. In humor research we are seeing a movement away from "grand theories" that attempt to explain all aspects of humor toward smaller "mini-theories" that focus on more circumscribed aspects (e.g., teasing, irony). Researchers today also tend to draw on a variety of theoretical influences to develop their models and hypotheses, rather than remaining committed to a single traditional theoretical approach".

In order to see how humor researchers have approached this phenomenon, it is reasonable to see the main theories that have been developed so far.

2.2.1. Superiority Theory

You are sitting in your armchair and watching the TV or looking out of the window. You observe people and watch their movements. You see an awkward event which has been caused by another person and you start to laugh. Inside, you can feel the disparagement of this person and you begin to consider yourself superior to that person since you know, at least for that moment, you cannot possibly make the same mistake

that the person has just done or you can see the weakness and you feel stronger. This is the basic principle behind laugher, according to superiority theories.

This theory of humor is the oldest one, dating back to Aristotle and Plato whose views on humor can be seen above. Aristotle states that what make something funny are the weakness and the ugliness of people. A brief definition of this theory is as follows, according to Stott (2005:125)

> "The superiority theory of laughter states that human beings are moved to laugh when presented with a person or situation they feel themselves to be intellectually, morally, or physically above".

Laugher is seen as scorn, mockery or contempt in the Old Testament (Koestler, 1964; Raskin, 1985). Sadistic forms of humor, such as laughing at, say, a blind person falling from somewhere, helpless people running from a dangerous situation, an overweight person falling from the a chair which is not able to carry him/her etc. The fact that children are afraid to being laughed at is an indication of the humiliating aspect of humor. Disparagement generally shows itself in situations where there are different national groups and people of low intelligence, just to name some of them. Some theorists that used superiority as a central mechanism in humor include Bergson (1911), Ludovici (1933) and Gruner (1978) and for a review of most of these studies, see Keith-Spiegel (1972) and Ruch (2007).

An important point that can be put forward against this theory might be the fact that there are a lot of jokes which do not have any targets or which do not include any hostility or disparagements of others; or in other words, there are innocent jokes that heavily rely on other elements such as ambiguous jokes. Morreall (1983:14) concludes that "there are cases of both humorous and nonhumorous laughter that do not involve

feelings of superiority". However, this theory is especially useful for sociolinguistic approach to humor in the context of sociocultural, political and some places where language of humor means something since this theory puts the emphasis on the social and interpersonal aspects of humor (Ermida, 2008).

2.2.2. Release Theory

Psychologists have also been interested in humor since the beginning of 20th century. Especially with Freud's works, humor has been seen as an escape from all the inhibitions which have been thought to be caused by the society. According to this theory, laughter is an expression of relief which comes after various tensions and it helps some repressed desires to come out. Laughter can also be seen a getaway from the constrains and limitations that the society has on people and laughing is a way that liberates individual from these obstacles.

This theory is based on Freud's concept of unconsciousness. It is stated that humor is recognized when unconscious thoughts that are hidden in our daily social interactions are released and "since sex and viciousness comprise the two major streams of impulse we normally try to control, it should come as no surprise that they fuel our gustiest laughter" (Mindess, 1971:59). This can be said to form the basics of release theory.

It is important here to touch on Freud's studies on humor which are *Jokes and Their Relation to the Unconscious* (Freud, 1905) and *Humour* (Freud, 1928). Mainly, the aim of laughter, as the name of the theory suggests, is to release the nervous energy which is no longer needed. Freud divided humor into two categories: tendentious and abstract or nontendentious jokes. The former refers to the jokes which contain sexual or aggressive elements and the latter is about joke types which do not show any aggressive aspects.

These nontendentious jokes are also relevant to the cognitive mechanisms that superiority theories undermined. According to Freud, "the reason we enjoy jokes so much is that they enable us to experience for a moment the illicit pleasure derived from releasing some of our primitive sexual and aggressive impulses" (Martin, 2007: 33).

Raskin (1985:12) also mentions Freud's (1905) factors and predispositions that affect humorous pleasure:

1. the most favorable condition for the production of comic pleasure is a generally cheerful mood in which one is inclined to laugh and

2. when one expects the comic, is attuned to comic pleasure.

3. Unfavorable conditions arise from the kind of mental activity with which a particular person is occupied at the moment, especially if

4. the attention is focused precisely on the comparison from which the comic may emerge.

5. the comic is greatly interfered with if the situation from which it ought to develop gives rise at the same time to a release of strong affect, but

6. the pleasure can be encouraged by any other pleasurable accompanying circumstance.

Freud also dealt with the linguistic mechanism of humor since he gave attention to the puns. However, research has shown that none of these mechanisms located by Freud were unique to humor, these elements could be found in any linguistic form, in a way, it can be said that he just rediscovered these mechanisms (Attardo, 1994).

Freud's contributions to linguistics can also be seen as breaking the rules in a language itself since language has its own norms and subverting these norms could give pleasure and cause laughter:

> "From the standpoint of linguistics, the release theory just sketched is interesting insofar as it explains the motivation process underlying wordplay, as well as phenomena like the infraction of Grice's Cooperative Principle, a central concept to most verbal humor theories. Indeed, subverting linguistic rules and the communicational contract has a lot to do with the principle of liberation mentioned above: to go against the norm is to break free. This explains the fact that the humorous game is often viewed as an iconoclastic and subversive exercise" (Ermida, 2008: 24-25).

After Freud some other scholars contributed to psychoanalytic approach to humor (see Fry, 1963; Mindess, 1971; Kline, 1977), and for a review of most of these studies, see Keith-Spiegel (1972) and Ruch (2007).

2.2.3. Incongruity Theory

What makes incongruity theories different from other humor theories is that these theories put little emphasis on the social and emotional aspect of humor. Instead, this kind of humor theory focuses on cognition. This theory has an old history dating back to philosophers Kant and Schopenhauer. Kant states that "Laugher is an affection arising from sudden transformation of a strained expectation into nothing" (Kant, 1790:177; cited in Morreall, 1987:47). It is Schopenhaur's definition which clearly uses the word "incongruity": "The cause of laughter in every case is simply the sudden perception of the incongruity between a concept and the real objects which have been thought through it in some relation, and laughter itself is just the expression of this incongruity" (Schopenhauer, 1819, cited in Morreall, 1987: 52). In general, these kinds of theories

are based on two different concepts that are, in a way, contradict each other. “When we find something funny, it is because the sudden perception of an incongruity makes us drop our initially wrong interpretation, and, as if in a game, search for a surprising meaning we had not anticipated” (Ermida, 2008: 25).

In this theory, expectations turn into nothing and that is the main reason which makes us perceive something funny since endings are unusual, surprising and different from what we expect. “[h]umor is understood as the cognitive capacity to process potentially funny incongruities, which means to comprehend and appreciate humorous stimuli. Humor processing is understood in the sense of cognitive processing of complex stimuli…. Humor processing has therefore a clearly cognitive component”. (Samson, 2008:6). However, it was not until the second half of 20th century that cognitive humor theories which claimed the perception of an incongruity is the main reason behind any humorous experience showed themselves (Koestler, 1964; Suls, 1972; Shultz, 1976; McGhee, 1979). These theories mainly claim that “playing with multiple meanings is a critical ingredient of jokes, which typically set up an opposition between two disparate meanings” (Vaid et al. 2003: 1432).

Koestler (1964) proposed an approach to incongruity theories by coining the concept of “bisociation”. Bisociative thinking includes the perception of a situation with regard to incompatible frames or schemas. According to Koestler “bisociation occurs when a situation, event, or idea is simultaneously perceived from the perspective of two self-consistent but normally incompatible or disparate frames of reference” (Martin, 2007: 63). Thus, a single event “is made to vibrate simultaneously on two different wavelengths, as it were” (Koestler, 1964: 35 cited in Martin, 2007: 63). After Koestler, It is Suls (1972, 1983) who came up with a two-stage model of humor comprehension

which has had significant influence on humor research since then. His theory composes of two sections: incongruity and resolution, shortly I-R. It is a kind of problem – solving tasks in which the reader or listener first detects an incongruity and then resolves it. The model maintains that joke setup will help the listener or the reader make a prediction about the situation. However, upon encountering with the punch line, s/he will be surprised and start to look for other interpretations which will give the joke meaning, and this is called the resolution. "The two stages involve giving the text a first interpretation which is then rejected in favor of a second interpretation" (Attardo, 1997: 397).

Incongruity has been seen as a necessary condition for a joke although many theorists claim that it is not a sufficient element for the funniness of a joke. Suls (1972, 1983), Shultz (1976) and McGhee (1979) are among the theorists who argue that this incongruity has to be resolved in some way in order to cause laughter since not all incongruities are funny: being hit by a car while walking on the sidewalk is incongruous but it may not cause laughter (Martin, 2007). The incongruity disappears only when the pattern is seen to be meaningful or compatible in a previously overlooked way (McGhee 1979: 6-7 cited in Attardo, 1997). A figure taken from Suls (1972) summarizes how IR model works.

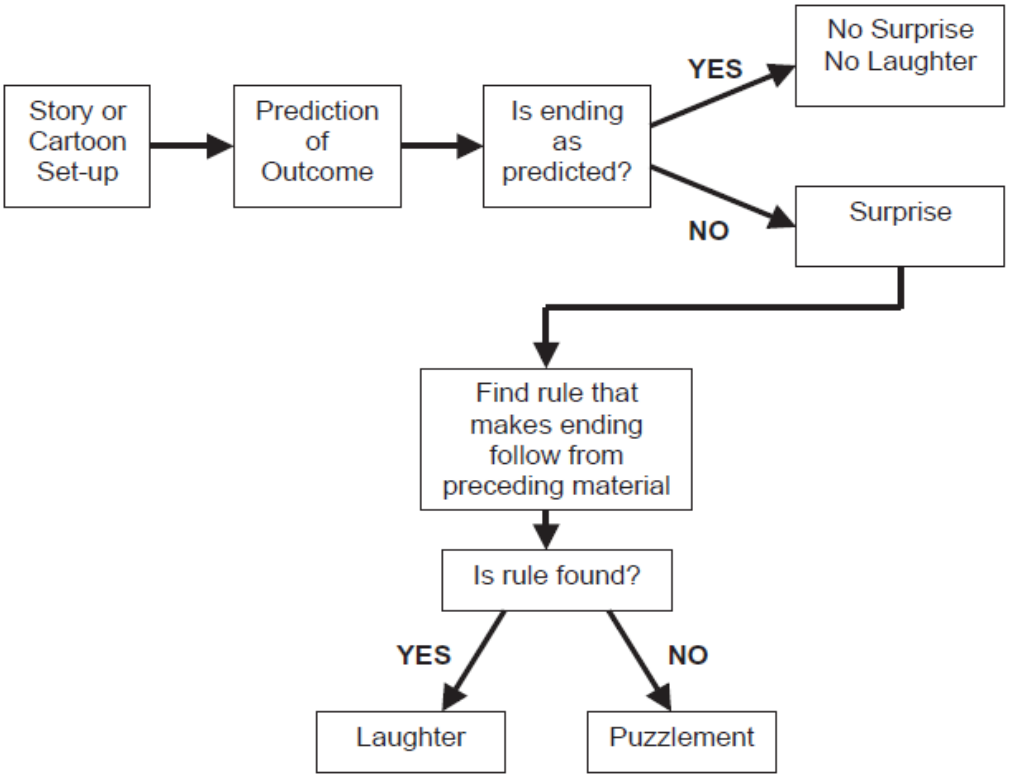


Figure 1: Working principle of IR model (After Suls, 1972)

A survey of incongruity theories is can be found in Keith- Spiegel (1972: 7-9) and Forabosco (1992). "Very productive within cognitive psychology, the incongruity theory enjoys an established reputation in many fields, including linguistics" (Ermida, 2008:25).

Forabosco (1992: 45) summarizes the importance and future of incongruity theories saying:

> "Studies devoted to cognitive aspects in the humor process have attached increasing importance to the perception of incongruity. This concept offers extremely fertile ground for investigation in theoretical-experimental terms, as revealed by studies undertaken mainly in the early 1970s and subsequently. In particular, a stimulating debate has grown up over its role and over the need for and

> function of the 'resolution" of incongruity in the humor experience (for appreciation and understanding)".

2.3. LINGUISTIC APPROACHES TO HUMOR

Many jokes involve hearing or reading, so research on humor would not be holistic without a linguistic point of view. Although no researchers denied the relation between language and humor, it was only until 1980s that linguistics became a sine qua non constituent of humor research and took a central role, together with psychology and sociology, in this field. In his article, Goldstein (1990:37) postulates the relation between language and humor in terms of violations:

> "Speaking a language is an activity governed by rules and conventions. Many of these are such that they may be violated to a certain degree, often with amusing results. Therefore, studying the resulting incongruities leads to an identification of rules and conventions the existence or influence of which may have passed unnoticed but for attention to their violation".

It is possible to divide humor into two categories: nonverbal and verbal humor. The former contains forms such as cartoons, gestures, facial expressions and clumsiness observed in both humans and animals whereas the latter includes canned jokes, conversational jokes, witticisms, puns and everyday or media discourses, both written and spoken. Such a diversified and broad field cannot be narrowed down to a discipline and it is nearly impossible to come up with an all-embracing theory of humor. However, if one talks about verbal humor, it becomes a must to apply a linguistic insight to the field. To begin with, Ermida (2008: 41) lists some questions that linguistics should deal with such as "What is the language of humor? Is there one, to begin with? In what way, and to what extent, is humor conveyed linguistically? Does it conform to common language usage, or does it subvert its norms and conventions? What linguistic

mechanisms do comedians exploit? Are there specific linguistic resources available to humorous use? If so, how do they work?" It is even possible to widen the scope and add some other questions such as:

How do people comprehend and appreciate verbal humor? What are the individual differences in getting a joke? How can verbal humor help researchers understand the cognitive processes in human mind? Are there any differences in terms of comprehension among the types of verbal humor?

From above mentioned theories, linguistics has sided with incongruity theories since these theories are essentialist, i.e., the attempt to pinpoint what makes humor funny (Attardo, 1994, 2008). Other important reason for linguistics to side with incongruity theories is further maintained by Dynel (2008: 2):

> "Linguistic research on humor mechanisms is acknowledged to enjoy a cognitive orientation. By necessity, the studies on the comprehension of verbal humor entail the description of cognitive processes. The conceptual framework provided by cognitive linguistics for language use in general should easily capture the nature of humor, simultaneously shedding light on its distinctive features".

As stated before, it is challenging to develop a general theory of humor, even narrowing down the scope does not make it easier. However, Raskin (1985), Carrell (1997) and (Ritchie, 2004) made analogies that would give insights about the general theory of "verbal" humor.

Table2

An Analogy between Linguistics and Humor Research (After Ritchie, 2004)

Linguistics	**Humor Research**
Strings	*Grammatical texts*
Grammaticality	*Being a joke*
Sentence Type	*Subclass of jokes*
Structural description	*Description of a joke*
Grammar rule(s)	*Definition for a joke class*
Theory of grammar	*Theory of jokes*
Theory of language	*Theory of humor*

This table, taken from Ritchie (2004: 9), clearly demonstrates the similarities between Chomskyan approach to language, whose ultimate aim is to provide a universal theory of language, and linguistic approach to humor, which aims is to develop a theory of humor – at least theory of verbal humor. Ritchie (2004: 9) explains:

> "In generative grammar, linguists take strings of words as the basic data, and attempt to formulate rules which will separate the grammatical (well-formed) strings from the ungrammatical. In the analogy here, joke-theorists take grammatical texts as the basic data, and try to devise definitions which will distinguish those texts which are jokes from texts which are not. Although we will

> not be stating our formal definitions as generative rules, the role that the definitions play in this analogy is comparable to grammar rules or sets of grammar rules, within syntactic theory".

After these basic distinctions, it is time to form the abstract syntax of jokes from "description of a joke" and "definition of a joke class". Definitions pertaining to abstract entities underlying the actual joke texts will help the researchers characterize what is a joke. Ritchie (2004: 9) then goes on to say:

> "Once we have developed a full description of the ways that jokes can be constructed, a 'theory of jokes' will have been constituted. This will not, however, be a complete theory of humor, any more than a theory of grammar is a full theory of language and its use. However, much as a theory of grammar is a building block for a theory of language, a theory of jokes becomes part of, or informs work on, a theory of humor."

Raskin (1985), in order to justify the necessity of a linguistic inquiry into the field, refers to Chomsky (1965) and his notion of grammaticality, competence and performance. Raskin (1985: 51) states that "the ability of the native speaker to pass judgments as to the funniness of a text is also part of his [or her linguistic] competence". For him, it is the linguistic competence of a speaker that also includes his/her humor competence.

Linguistic approaches to verbal humor have opened the path for more systematic and falsifiable humor theories and "the period from the 1980s to the present has witnessed sustained and progressively heightened interest among language scholars in linguistically based accounts of verbal humor" (Simpson, 2003: 16). Since then, linguists have contributed to the field with their renewed theories that offers new

hypotheses about the cognitive processes of humor. It is Raskin's (1985) *Semantic Script Theory of Humor* and Attardo and Raskin's (1991) *General Theory of Verbal Humor* that is still considered as the leading and the most influential theory in linguistics.

2.3.1. Semantic Script Theory of Humor

What most of the psychological humor theories lacked until the Semantic Script Theory of Humor (Hereafter, the SSTH) is a systematic and theoretical approach. In Ritchie's (2004: 69) words, "the SSTH/GTVH is also one of the few attempts to approach verbally expressed humor in a systematic and theoretical fashion, and as such is to be welcomed". General aim of the SSTH is to form information – processing system which is able to account for the humorousness of a text. For the SSTH, the central aspect of verbal humor was semantic/pragmatic and it explains the funniness of a joke with scripts or frames defined as "an organized complex of information about some entity, in the broadest sense: an object (real or imaginary), an event, an action, a quality, etc" (Attardo, 2001: 2). In Raskin's (1985: 81) own words it is "a large chunk of semantic information surrounding the word or evoked by it".

According to the SSTH, a text can be characterized as a single-joke-carrying- text if both of the following conditions are satisfied:

> a) The text is compatible, fully or in part, with two different scripts,
>
> b) The two scripts with which the text is compatible are opposite (…)
>
> (Raskin, 1985: 99).

In order to see how SSTH works, Raskin's (see 1985: 117 – 127) protypical joke will be used here: "Is the doctor at home?" the patient asked in his bronchial whisper. "No," the doctor's young and pretty wife whispered in reply. "Come right in."

To analyze the joke with SSTH, first, words and their senses are listed and what is evoked by that words are noted (i.e. scripts are listed), and second, by applying combinatorial rules, compatible scripts are selected amongst the different scripts. Upon reading the joke, it is clear that the patient comes to a doctor because of his illness and it constitutes a "DOCTOR" script. This script is reinforced with the words such as 'patient' and 'bronchial' which form a combinatorial rule with the script 'doctor'. The negative reply from the wife is also acceptable since it is possible for the doctor to be not at home. However, her invitation to come in is somehow weird since her doctor husband is not at home and she wants the patient to come in. This time, the reader looks for another interpretation other than a normal doctor-patient situation. The patient is a male and the wife is young and pretty; she whispers for a different reason to the patient. The reader or hearer now activates the other script: "LOVER" who has sex with men other than her husband. Until the final sentence, scripts are overlapping, but at the punch line, script opposition is obvious.

2.3.2. General Theory of Verbal Humor

Attardo and Raskin (1991) revised the SSTH and extended it into GTVH. GTVH has been further extended by Attardo (1997, 2001) to analyze not only jokes but also narratives, standup or longer humorous texts. Attardo (2001: 22) claims that "whereas the SSTH was a semantic theory of humor, the GTVH is a linguistic theory at large –

that is, it includes other areas of linguistics as well, including, most notably, textual linguistics, the theory of narrativity, and pragmatics broadly conceived". The extension has been made with six "knowledge resources", shortly KRs which are the script opposition (SO) - known from the SSTH, the logical mechanism (LM), the target (TA), the narrative strategy (NS), the language (LA) and the situation (SI). Table below summarizes the KRs.

Table 3

Parameters of GTVH (After Attardo and Raskin, 1991)

Parameter	**Definition**	**Instance (examples)**
Language (LA)	Verbalization of the text: word choice, placement of functional elements, etc.	- verbal humor (punning) - position of the punch line
Narrative Strategy (NS)	Narrative structure of the humorous text (genre)	- narratives - question and answer dialogues - riddles
Situation (SI)	The situational embedding of the joke: characters, activities, objects, setting, etc.	- doctors jokes - jokes about blondes
Target (TA)	Humor often aims at (social) stereotypes as 'butts'	- Austrians - Scots
Script Opposition (SOp)	Central requirement fort he generation of a humorous effect: opposition between script	- good vs. bad - possible vs. impossible
Logical Mechanism (LM)	Cognitive operation needed to achieve a (partial) resolution of the incongruity	- juxtaposition - false analogy - figure ground reversal

Attardo and Raskin (1991) uses ‘light bulb’ joke to explain the KRs: “How many Poles does it take to screw in a light bulb? Five. One to hold the light bulb and four to turn the table he’s standing on”.

KRs used in this joke are as follows:

SO: dumb

LM: figure-ground reversal

SI: light-bulb changing

TA: Poles

NS: riddle.

Attardo (2001: 73) also adds the SO is ‘normal/abnormal; smart/dumb’, the NS is ‘question and answer’ and the LA is ‘“How”, “many”, etc.’).

This theory is significant in terms of script opposition and logical mechanisms since they are used for accounting for the cognitive processes while comprehending a joke. This is also stated by Samson (2008: 15):

> “For cognitive processes, two KRs are of particular interest and shall be described here in more detail: Script Oppositions (SOp) and Logical Mechanisms (LM). Humorous texts consist of at least two scripts which are opposite to each other, but do partly overlap. The SOp can be described according to their degree of abstraction: actual vs. non-actual, normal vs. abnormal, possible vs. impossible. The LM is the dynamic function that brings about the script overlap, which means, that it describes the relation of the two scripts. LMs can also be described as the cognitive rule, *how* an incongruity has to be resolved in order to understand the joke. Therefore, the SOp is related more to the incongruity, the LM more to the resolution of the incongruity”.

For more detailed explanations and some logical mechanisms examples that can be seen in jokes, see Attardo (1997) and Attardo et al. (2002).

2.3.3. Other Theoretical Accounts of Verbal Humor

Apart from the SSTH and GTVH, there are some other theories that have aimed to explain how humor comprehension works. Giora's (1991) well – formed joke requirements and Coulson's (2001) and Coulson et al's (2006) *space structuring model* also enjoys a cognitive linguistic approach.

2.3.3.1. Giora's Selective Activation View

Giora (1991) limits herself to jokes with semantic ambiguities rather than analyzing syntactic and pragmatic violations. For her, it is possible to see an increase in terms of informativeness in all normal texts, i,e,. non- joke texts and this increase is gradual. However, in joke texts, the increase in informativeness of a text is sudden and it causes the reader or hearer to switch his/her initial reading and interpret the text wholly. This brings about a shift from an unmarked meaning to a final marked meaning. Giora (1991: 470) states that the joke "… causes the reader to perform a linear shift: the reader is made to cancel the first unmarked interpretation upon processing the second marked interpretation". More detailed explanations could be found in Giora (1991: 470 – 471).

2.3.3.2. Space Structuring Model

This model is based on the ideas of Fauconnier's (1994) mental space theory, Fauconnier and Turner's (1998, 2002) conceptual blending theory and Langacker's (1987) cognitive grammar. In general, it can be stated that the model enjoys a cognitive

linguistic orientation and it aims to account for the language processes in terms of perceptual and language input, social context and the speaker's current cognitive state and they all together help the speaker construct the cognitive models of the discourse situation (Coulson et al, 2006).

Space structuring model involves frame shifting, i,e, linguistic and non – linguistic elements make the retrieval of frames from long – term memory and these retrieved frames are used, exploited and evaluated in order to construct the cognitive models in the message – level representation (Coulson, 2001). Coulson et al. (2006:232) uses a joke to explain the cognitive processes and the frame shifting observed in the reader:

> "When I asked the bartender for something cold and full of rum, he recommended his wife"

Upon reading the first part of the sentence, the reader expects to hear some kind of recommendation and as in the SSTH and GTVH, his/her expectations are shaped. However, after the reader processes the sentence, he/she needs to retrieve some other information from the long – term memory and this frame shifting is explained in Coulson et al. (2006: 232):

> "Rather than recommending a drink, the bartender in has just insulted his wife! The semantic and pragmatic reanalysis that reorganizes existing elements in the message-level representation is known as frame shifting. With the activation of background knowledge and the establishment of mappings between counterpart structure in the old and new frame, the bartender's wife is accused of being a frigid lush. In fact, jokes are deliberately constructed to suggest one frame while evoking elements consistent with another".

2.3.4. Sociolinguistic Approaches to Humor

Although much humor is related to culture and society, sociolinguistic studies on humor is surprisingly little. However, this fertile ground has recently been recognized by some researchers. Some of the famous work on gender include Rutter (2000), Liao (2001) and Everts (2003); see Attardo (2008) for more details for a general review of sociolinguistic studies on humor.

Scholars dealing with sociolinguistic of humor focus on conversational data and they analyze it in terms of quantitative methods (see Holmes, 1998; Holmes and Marra, 2002 and Hay 1996, 2001). There are some other studies focusing on gender such as Everts (2003) and here Gunther's (2003) and Holmes et al. (2001) studies analyze whether women produce less humor or not (Attardo, 2008).

As stated before, sociolinguistic perspective on humor is needed to be studied further and it can also touch on the topics such as race, ethnicity, age, and social class and so on. One important finding that deals with the differences between lower class and higher class and between old speakers and young speakers comes from Gunther (2003). According to the study, speakers younger than 25 are more prone to produce humor than older speakers and lower class speakers talk more about taboo topics than higher classes. Apart from Attaro (2008), see Dynel (2008) for more studies analyzing humor with a sociolinguistic perspective.

2.3.5. Discourse Analysis of Humor

Discourse analysis of humor focuses on naturalistic data and researchers analyze the transcription of that recorded data in order to see the mechanisms involved in humorous discourse. Discourse analysis of humor are generally gathered under the term *conversational joking* (Norrick, 1993).

2.3.5.1. Conversational Joking

Above mentioned theoretical accounts of humor comprehension such as Raskin (1985) and Attardo and Raskin (1991) generally uses jokes as their data in order to account for the cognitive aspects. However, it is not these types of canned jokes that we encounter in our everyday conversations. Much everyday humor we witness are caused spontaneously in our conversational – whether intentional or unintentional – such as wordplay, irony, sarcasm, slips of the tongue and practical jokes (Norrick, 1993).

There are some researchers who aim to fill this lacuna such as Norrick (1993, 2003) and Kotthoff (2006) by analyzing humor forms in everyday interactions in terms of some specific criteria. Norrick (1993), for example, is one of the researchers who contributed a lot to discourse of humor. He developed the terms "conversational joking" and "conversational aggression" which can be defined as the disruption in the regular turn – taking pattern since it involves a shift from serious conversation to a humorous one. "Thus, any attempt at a joke implies a conversational *coup* on the part of the joker, who breaks both the serious frame and the turn-taking pattern" (Kuipers, 2008: 375). Other example that he provides explains how humor can affect the conversations. Humor helps people initiate conversations in situations which include strangers. "For

example, a witty comment about the weather might generate further conversation, whereas a more serious comment that simply states the obvious might seem trite" (Martin, 2007:123). Norrick (2003) further classified conversational joking into three categories: anecdotes, wordplay and irony.

More surveys and studies regarding discourse analysis of humor can be found in Norrick (1993) and Attardo (1994).

2.3.6. Psycholinguistic Approaches to Humor

Most related to the present study are the psycholinguistic approaches to humor since these studies examine the meaning activation in jokes via on – line and off – line experiments to see how cognitive processes are affected as the joke unfolds. Goldstein (1990: 38) explains the general process while processing a joke:

> "Consider the mental mechanisms involved in coming to understand a joke — the digital and analog processes in the brain that are invoked for decoding the auditory input and for searching and retrieving just that additional information which, when juxtaposed with that input, makes manifest the humorous point intended by the speaker. This task is much more complex than, say, responding to a straightforward question, where the information required is *specified*, so guiding the searching routine. In humor, clues for searching are frequently withheld or distorted by the speaker, thus creating a puzzle for the hearer to resolve…"

Psycholinguistic approaches to humor, in general, aims to account for when these puzzles are processed and comprehended. As this processing and comprehension occurs in seconds or even in milliseconds, researchers dealing with experimental approaches need to come up with a well – organized experimental methods and designs. Many researchers on humor (Attardo, 2001; Brone et al. 2006; Martin, 2007; Vaid et al. 2003) has stated the importance of carrying out more experimental studies in order to reach

more robust findings about humor theories which have been proposed so far. It is also stated by these researchers that psycholinguistic approaches to humor is still in its infancy since it is hard to design methodologically sound tests (Brone et al, 2006).

Many forms of humor that are seen everyday are based on language, so psycholinguistics is one of the best domains which will have a lot to say about the cognitive processes so researchers design and carry out experiments to find out these processes. When the literature is reviewed, it is possible to observe that scholars within this field generally study non – literal language such as irony processing (Colston, 2002; Gibbs, 1994; Giora, 2002, Giora and Fein, 1999; Giora, Fein and Schwartz, 1998; Ivanko and Pexman, 2003). Apart from humorous types of non – literal language, some scholars have dealt with canned jokes instances (Coulson et al. 2006; Coulson and Kutas, 2001; Coulson and Severens, 2007; Vaid et al. 2003). However, compared to irony processing, these is little empirical evidence when it comes to joke processing. Data are received by experiments such as priming tests, eye movements, reading times and ERP analysis while participants are reading the stimuli.

2.3.6.1. Off – line Experiments

Recently, there have been contributions from psychologists to humor comprehension studies. Vaid et al. (2003) designed the lexical decision semantic priming task in order to examine script or more generally meaning activation during the reading of jokes. Their main aim, firstly, was to question the two competing views on incongruity – resolution theories: Suls (1972) and Shultz (1976) who propose that there are two stages in joke processing: incongruity and resolution, IR (mentioned above) and Attardo and

Raskin (1991) and Attardo (1997) who claim that there are three stages in joke comprehension: setup, incongruity and resolution, shortly SIR. They, secondly, aimed to analyze the fate of the first script after the participants encountered the second script by using the same technique. This was designed to test two views: selective attention view (see Giora, 1991) which supports that the first script is no longer active after the joke is comprehended and concurrent activation view (see Attardo, 1997) which suggests that the first and second script remain active after the joke is processed.

In the first experiment, jokes are divided into three segments: onset, intermediary position (incongruity) and punch line offset and after each segment, probes related to first and second scripts have been presented shortly after the onset, at the incongruity stage and just before the punch line. Results for this experiment supported the concurrent meaning activation, that is, as Attardo (1997: 403) puts it "to the extent that joke texts being linear are subject to temporal ordering, scripts presented earlier become part of the context and establish a framework of expectations against which scripts occurring later are to be processed". Here, S1 has been activated after the onset and S2 during the second segment (incongruity section). In the second experiment, participants have read the jokes and after they have read they have been given enough time to process the joke and then they have been presented with two scripts, initial and intended, to test the fate of the first script when the second script is encountered. This experiment supported the selective activation view, the view that Giora (1991:470) maintains as "the joke causes the reader to perform a linear shift: the reader is made to cancel the first unmarked interpretation upon processing the second marked interpretation". However, Vaid et al. (2003: 1443 – 1444) left some unanswered

questions due to the limitations of the test design. For more details about these questions and limitations of the study see Vaid et al. (2003) and Martin (2007).

2.3.6.2. On – line Experiments

Vaid et al.'s (2003) lexical decision priming technique, which is an off – line experiment, hasn't provided firm conclusions. Therefore, it has been necessary to study with on-line experiment techniques such as ERP and eye movements to reach firmer results. There have been some ERP studies that record the brain activities of participants as they read and comprehend jokes. Coulson and Kutas (2001) and Coulson and Severens (2007) carried out ERP experiments to analyze jokes and puns.

Coulson and Kutas (2001) recorded participants' brainwaves while they read sentences which finished either as a joke or with an expected end. As in the example:

> "When I asked the bartender for something cold and full of rum, he recommended his daiquiri" (this sentence ends as a normal sentence, there is no incongruity).
>
> "When I asked the bartender for something cold and full of rum, he recommended his wife" (this sentence ends as a joke).

After the experiments, it was found that jokes elicited larger amplitude N400, which is associated with semantic incongruities and "occurring when categorization, usually semantic, is relatively unsuccessful and a search is initiated for better alternatives" (Derks et al., 1997: 287) than non-joke endings.

From these studies, It has been shown that "the right hemisphere is important for language tasks that require the listener to strategically recruit background knowledge, or to appreciate the relationship between an utterance and its context" (Coulson and Severens, 2007: 172). Since this field requires highly technical discussions about the lateralization of humor processing, see Derks et al. (1997) and Coulson and Kutas (2001) for more elaborated information on the topic. However, in general, it is possible to say that these psycholinguistic and neurolinguistic studies support the cognitive theories of humor, i.e., incongruity – resolution theories.

More related to the present study is Coulson et al.'s (2006) examination of eye movements while participants read one- liners and sentences that end normally as in the *daiquiri and wife* example given above. Main aim of the researchers was to find evidence for frame – shifting (Coulson, 2001). This was done by analyzing total viewing duration of the sentences, both one – liners and non – joke endings, and the amount of regressions (leftward eye movements). The eye tracking data have shown that (i) total viewing duration lasts longer for one – liner jokes than for non-joke controls and that, (ii) participants have made more regressions when after they have encountered with the word that required frame – shifting (or a.k.a script trigger in SSTH, see Raskin, 1985) for the interpretation.

These on – line ERPs and eye movement studies show evidence for incongruity resolution models such as SSTH/GTVH or frame shifting. However, as stated before by many researchers in this field, more psycholinguistic studies needs to be done in order to find firm conclusions, broaden the inquiry and bring new insights to comprehension

of jokes for further studies. This present study aims to fill this lacuna by providing an on – line measurement to the field.

2.4. LEXICAL AMBIGUITY AS A SOURCE OF HUMOR

One of the most crucial elements of verbal humor is the disambiguation of words which have more than one meaning (Attardo, 2001). Although ambiguity resolution have attracted the scholars for a long time and many of the studies on ambiguity resolution have been carried out in the field of psycholinguistics (Binder, 2003; Franz, 1996; Gorfein, 2001; Sereno, 1995), these studies generally have been interested in the resolution of ambiguity in non- joke sentences. When the literature is reviewed, the number of the studies dealing with ambiguity and humor is relatively low (Attardo, 1994; Bekinschtein et al., 2011; Bucaria, 2004).

Lexical ambiguity can be defined as "a word with more than one possible meaning in a context" (Oaks, 1994:378) and it can be observed in everyday discourse. Lexical ambiguity is also an important source of verbal humor. Expectations shaped in a sentence unexpectedly turn into nothing with the ambiguous word, a situation observed in incongruity theories (see 2.2.3).

Attardo (1994) examined 2000 jokes and found that most of the jokes rely on lexical ambiguity by using his disjunctor/connector model and this is followed by syntactic ambiguity. Later, a study whose main aim was to investigate newspaper headlines with lexical, structural and phonological ambiguities was carried out by Bucaria (2004) and it

was found out that most of the headlines involve structural ambiguity instances, a result not compatible with Attardo (1994).

There is also an experimental study on the subject. As stated before, experimental studies have usually focused on processing ambiguous words and sentences (not necessarily jokes). However, Bekinschtein et al. (2011) limited the subject only to humor. They examined the relation between humor and semantic ambiguity using an on – line experimental method: fMRI. They compared a set of sentences: jokes with ambiguity, jokes without ambiguity and sentences with ambiguity but not jokes and found an increased activity in a network of subcortical regions. See the article for more detailed and technical explanations.

2.5. EYE MOVEMENTS IN READING

Since we interpret the world around us with the help of eyes, they provide invaluable information about people's perception and processing. These saccades and fixations provide people with taking in the visual information. Eye movements are also a good indicator for researchers to understand the reading patterns of participants since eye movement data can be used to examine moment – to moment processing. Besides providing moment – to moment processing, eye movement data are relatively more natural than other experiment designs to analyze important psycholinguistic issues. For example, priming paradigm requires participants to press a button in the middle of the experiment and thus disturbs the natural flow of information, or ERPs and fMRI, though provides on – line measurements, is not naturalistic due to the equipments used during an experiment. It is often easy for a researcher to record the eye movements even with a

paragraph or a single sentence since recording and monitoring readers' eye movements does not interfere with participants' normal reading processes.

During reading, it occurs to us that our eyes follow a smooth pattern across the page but there is more than that. It is possible to observe rapid movements – saccades – lasting around 20 – 40 ms and fixations in which new visual information is encoded from the text and which last as short as 50 – 100 ms and as long as 500ms (Rayner and Pollatsek, 2006). From a line to the next line follows *return sweeps* which are longer than a normal saccade.

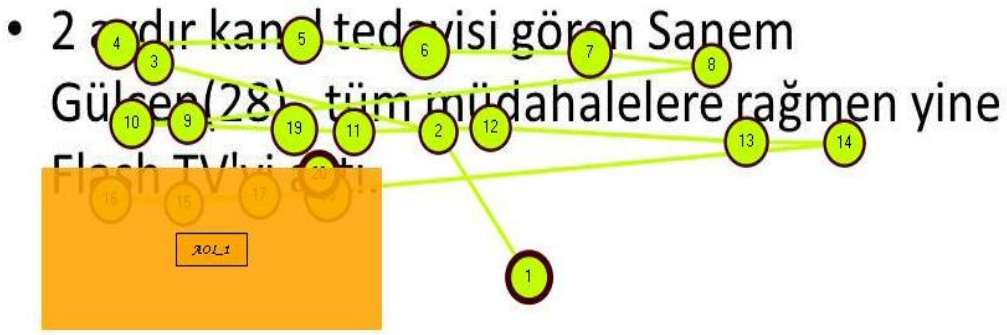


Figure 2: Eye Movements across a text.

From this text, it is possible to see saccades, return sweeps and fixations. Numbered circles are fixations and lines connecting these numbers are called saccades, and the line from 8 to 9 or 14 to 15 is the return sweep. Framed rectangular area is the area of interest on which the researcher makes his/her analysis.

The measures mostly used in eye tracking paradigm are generally carried out investigating a target word or area. Some of these measures are: *first fixation duration*, measured as the duration of the first fixation on a word; *gaze duration*, which is the sum of the durations of all fixations on a target area; *regressions*, a type of saccade which moves back in the text; *total fixation duration*, measured as the durations of all fixations and regressions on a word or target area; and the *spillover time*, which includes the fixation time on the word following the target word (Rayner and Pollatsek, 2006).

While investigating these measures on a target word or on an area, it is possible to observe that some sentences and words become much more difficult to comprehend than others. There are some factors influencing fixation times such as the physical length of a word, word frequency, number of meanings – ambiguity, morphological effects, syntactic structure and function, contextual constrains and so on (Rayner and Pollatsek, 2003).

CHAPTER 3

METHODOLOGY

If you smile at me, I will understand. That is something everybody everywhere does in the same language.

WOODEN SHIPS (a rock song in 1960s), David Crosby and Stephen Stills (composers)

Interest in verbal humor processing has been great for nearly two decades, however, as it has been stated earlier, it needs more empirical evidence. Methodology used in this thesis to evaluate and investigate the set effects, i.e., to what extent joke comprehension is subject to automatic and strategic control in one-liners will be further mentioned in this section in terms of the participants, data, test design/procedure and data analysis.

3.1. PARTICIPANTS

40 students at Hacettepe University and METU participated in the experiment. However, 4 of these participants were excluded from the experiment since they gave wrong answers to the comprehension questions. Therefore, in total, data collected from 36 participants were used. They were third and fourth grade and post – graduate students. All participants were native Turkish speakers, aged between 22 and 26 had normal vision. The participants were selected randomly and variables such as gender, age or socio-cultural level were not taken into account since the experiment used a quantitative approach.

3.2. DATA COLLECTION TOOL

Tobii T120 Eye Tracker™ monitor and Tobii Studio 2 Enterprise Recording Edition™ software program at METU-HCIRAL were used as the main data-collecting instrument. Tobii T120™ is a screen based eye tracker which enables researchers to conduct on – screen eye tracking studies. It is integrated in a 17 – inch monitor that is non-invasive infra-red and it collected various quantitative gaze data during the test as specified above, However, for the purpose of the study, only total fixation duration and the number of regressions data were chosen for the analysis.

3.3. MATERIALS

The data have been taken from various sources: joke books, Internet web pages of jokes and social media sites from November 2011 to May 2012. All the materials used in the study were one – liner jokes which are a type of canned joke in only one line. These jokes are the shortest form of jokes: the first and the second – incongruous script are encountered before long and the joke is processed more quickly than a canned joke.

> "A woman came to ask the doctor if a woman should have children after 35. I said 35 children is enough for any woman" (Dynel, 2009:15).
> "When I asked the bartender for something cold and full of rum, he recommended his wife" (Coulson et al., 2006: 232).

For the study, 10 one – liner joke sentences and 10 non - joke sentences were used. Non – joke sentences were formed by changing the word at the end of the joke sentence, i.e., punchline, to render it not funny. An example of both joke and non – joke sentence is given below:

Küçükken bana yaramaz diyorlardı artık büyüdüm ve yarabiliyorum (one liner).

(They told me I was naughty when I was little, now I'm grown and I can split)

Küçükken bana yaramaz diyorlardı artık büyüdüm ve uslandım (non – joke sentence).

(They told me I was naughty when I was little, now I'm grown and sober)

3.3.1. Jokes

One – liner jokes were used as the main materials of the study. One – liner jokes rather than the canned jokes, famous examples of which are Temel and Nasrettin Hodja jokes, were preferred because of these reasons:

a) Monitoring the eye movements of the participants reading one - liners was thought to be easier than the canned jokes. Collecting data from a relatively long paragraph is more difficult, so one – liners provide the researcher with more robust measurements.

b) Perhaps, more importantly, as the study examines the set effects, i.e., automatic vs. strategic control, in getting a joke, one – liners provide more naturalistic data. If participants encountered with the canned jokes, they would be attuned beforehand until they reached the punch line since most of these canned jokes start in the same way (One day, Temel was …). Therefore, one – liners are more successful in surprising the readers.

c) One – liners are isolated from discourse and contextual factors. This makes the readers enjoy these kinds of jokes across different situations.

Ritchie (2004: 15) defines jokes as "a relatively short text which, for a given cultural group, is recognizable as having, as its primary purpose, the production of an amused

reaction in its reader/hearer, and which is typically repeatable in wide range of contexts". He then goes on to explain the reasons why jokes are methodologically convenient for humor studies:

> "1. There is a ready source of attested examples, since collections of jokes abound, and there seems to be relatively little dispute about the status of such items as jokes.
> 2. Jokes are relatively self-contained and are typically re-used in a wide range of settings. This is not to deny that there are certain requirements before a joke is appropriate in a particular context. However, we believe that these constraints between joke and setting are probably less, and more easily described, than the rich connections involved in general amusing incidents that happen in everyday life.
> 3. Jokes are small, which renders them more manageable for the analyst. Also, if we should succeed in developing a range of formal descriptions of types of jokes, such data will be a potentially useful resource for psychological experiments on human reaction to humor where presenting a subject with a lengthy text might be inconvenient in practical terms" (*ibid:* 15).

3.4. DESIGN AND PROCEDURE

Participants were divided into two groups and they were named as Group 1 and Group 2. Each group included 18 participants. Recording the eye movements of these participants were carried out in two different sessions: the first session was allocated to Group 1 and the second session to Group 2.

Group 1 referred to the participants who did not know anything about what to read. They were just told that they would read paragraphs as they did in their everyday life; as if they were reading these paragraphs from an Internet web – site or social media sites. That's why; this group was also referred as the "automatic control group". The participants were told to read for comprehension and the importance of comprehension was stressed again before starting the experiment.

Group 2 included the participants with “strategic control”. They were told that they were going to read one – liner jokes along with some non-joke sentences. Since the equivalence of the term “one – liner” does not exist in Turkish, they were told that the passages they were going to read are no longer than two sentences in order not to cause any ambiguities. Similarly, these participants were asked to read for comprehension and it is stressed again before starting the experiment. For both two groups, comprehension questions were asked just after every joke and non – joke sentences to make sure that they understood the sentences they had read and the data obtained from them were used in the analysis.

On entering the lab, the participants in each group were seated behind the table mounted eye – tracker. They were instructed about the procedure: they were told that they would see only one paragraph and after reading the paragraph they were instructed to push the ‘space’ button to pass to the comprehension question and then to the next sentence. There were no limitations about timing, so they were told that when they comprehended the paragraph, they could push the button. Then, they followed the instruction on the screen for eye position and calibration. After the calibration is done, the experiment started. The participants in both group read 20 sentences, i.e., 10 one – liners and 10 non – joke sentences. Two lists of stimuli were prepared in order to prevent the participants from reading both the joke and its non – joke counterparts. If a participant reads a joke sentence, he/she will not see its non – joke counterpart or vice versa.

Table 4

Participants and Control Types

	Number	**Control Type**	**Paragraphs read**
Group 1	18	Automatic Control	20 (10 non - joke + 10 one liners)
Group 2	18	Strategic Control	20 (10 non – joke + 10 one liners)

After the first experiment, reading patterns obtained from 36 participants were also used in the second experiment while comparing the one - liners and the non – joke control sentences.

3.5. DATA ANALYSIS

Based on the incongruity – resolution theories developed by Raskin (1985), Attardo and Raskin (1991), Attardo (1997; 2001), and frame shifting proposed by Coulson (2001), the study rests on the script overlapping and opposition. The first script is activated after the participants read the first sentence and this firstly activated script is left after the punch line or the second script is encountered and the participants are forced to reevaluate the text in order to get the joke.

After the experiments, areas of interest, which include the second script (opposed script), were determined using the software *Studio 2 Enterprise Recording Edition*™. What the study was mainly interested was analyzing the *total fixation time* on incongruous words and *the number of regressions* that the participants made upon encountering the incongruous script and then comparing the differences via these metrics in two groups in order to see to whether meaning activation in jokes subject to automatic or strategic control.

Secondly, the study examines the differences between jokes and non – joke sentences via same metrics mentioned above. Do joke sentences require more cognitive resources than non – joke sentences in processing? This question is tested measuring the total fixation duration on the opposed script (second script) and the number of regressions when the participants encountered this opposed script. This test was designed to determine whether jokes necessitate the overlapping and opposition of the scripts proposed by Raskin (1985), Attardo and Raskin (1991) and Attardo (1997;2001) in order to be comprehended.

Studies dealing with the total fixation time are reported to include *the spillover time*, which is measured as the fixation time on the word following the target word in the analysis (Rayner and Pollatsek, 2006). Therefore, area of interest for each joke included the second script / joke meaning carrying word(s) and also the word following this word.



Figure 3: Measuring total fixation time and the number of regressions on a joke sentence.

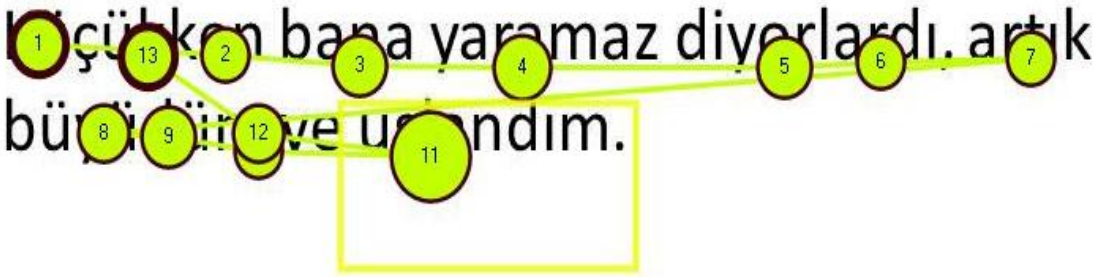


Figure 4: Measuring total fixation time and the number of regressions on a non-joke sentence.

In this joke sentence which can be roughly translated as *"They told me I was naughty when I was little, now I'm grown and I can split"* the joke is caused by the words *"yaramaz"* which is an adjective meaning *"naughty"* and *"yarmak"* a verb which means *"to split* or *to slit".* In the first sentence, when the reader encounters with the word *"yaramaz",* he/she is most likely to activate the adjective meaning of the word. However, in the second part, this word is used as a verb *"yar-mak"* (to split/slit) causing an ambiguity and making the reader leave the first interpretation of the word, in this case, the adjective meaning of the word.

While measuring the total fixation duration, an area of interest which covers the joke meaning carrying word is determined as can be seen in Figure 3 and Figure 4 (the boxes are the areas of interest). In Figure 3, there are a number of fixation points numbered around 13 and 19 in the area of interest. The sum of all the fixation time, including the regressions, was calculated in order to measure total fixation time. The number of regressions is measured by counting the regressions after the participant arrives and fixates on the incongruous word, in this case, *yarabiliyorum*. Since the first sentences of the jokes do not include anything funny, or they do not cause participant to change scripts, regressions that were made in this section were not taken into account. In Figure 3, there are 5 regressions, for example. The first one starts with number 20. Numbers 21, 22, 23 and 24 are the other regressions that the participant made.

Figure 4 illustrates the eye movements for a non – joke sentence. Area of interest is defined similar to the joke sentence. In order to measure the processing difference between a joke sentence and its non – joke counterpart, total fixation duration and the number of regressions were examined. This example shows that the participant fixated on the word “uslandım” and as can be seen from the figure, he/she also made 2 regressions: number 12 and 13.

After getting the raw data from 36 participants, quantitative method was used to discuss the results. Total fixation duration and the number of regressions of both groups (automatic vs. strategic) and sentences (jokes vs. non – jokes) are compared via t-tests for independent samples using SPSS 17.0™ in order to find out whether the different scores for total fixation duration and the number of regressions between these independent variables were significantly different from each other in joke comprehension.

Below is the table summarizing the independent and dependent variables of the study.

Table 5

Variables in the experiment

Variables of the Second Test	
Independent Variables (Joke sentence vs. Control sentence)	**Dependent Variables**
Jokes *Non – Jokes*	*Total Fixation Duration* *The Number of Regressions*

Variables of the First Test	
Independent Variables (Set Effects)	**Dependent Variables**
Automatic Control Group *Strategic Control Group*	*Total Fixation Duration* *The Number of Regressions*

CHAPTER 4

ANALYSIS AND DISCUSSION

Humor is reason gone mad.

Groucho Marx (Comedian)

The data collected from the reading patterns of strategic and control group will be presented via tables and charts and will be discussed using quantitative method in this chapter. Total fixation duration on the punchline and the number of regressions upon encountering the joke meaning of the sentence of both groups will be analyzed and discussed by following the method that is explained in the previous chapter.

4.1. AUTOMATIC VS. STRATEGIC CONTROL

The first independent variable that the study analyzed was processing differences between the strategic and the automatic control group in terms of two dependent variables: total fixation duration and the number of regressions. An example of reading patterns for a joke sentence is given below.



Figure 5: Reading patterns of a participant in the automatic control group.



Figure 6: Reading patterns of a participant in the strategic control group.

The sentences – 2 aydır kanal tedavisi gören Sanem Gülçen (28) tüm müdahalelere rağmen yine Flash TV'yi açtı - which can be translated as *"Sanem Gülçen (28) who had been getting a root canal therapy for two months switched on Flash TV again despite all interventions"* include a rectangular shape known as the area of interest. In these examples, there are 27 fixations that the participant in the automatic control group made while there are 32 fixations made by the participant in the strategic control group. The software measured the fixations in the area of interest and gave the total fixation duration for each sentence in milliseconds or seconds. As for the number of regressions, they were counted when the participant arrived at the area of interest since he/she saw

the joke meaning at that point. In Figure 7 – the automatic control group – there are instances of regressions after the fixation number 25 while in Figure 8 – the strategic control group – the regressions starts with the fixation number 23.

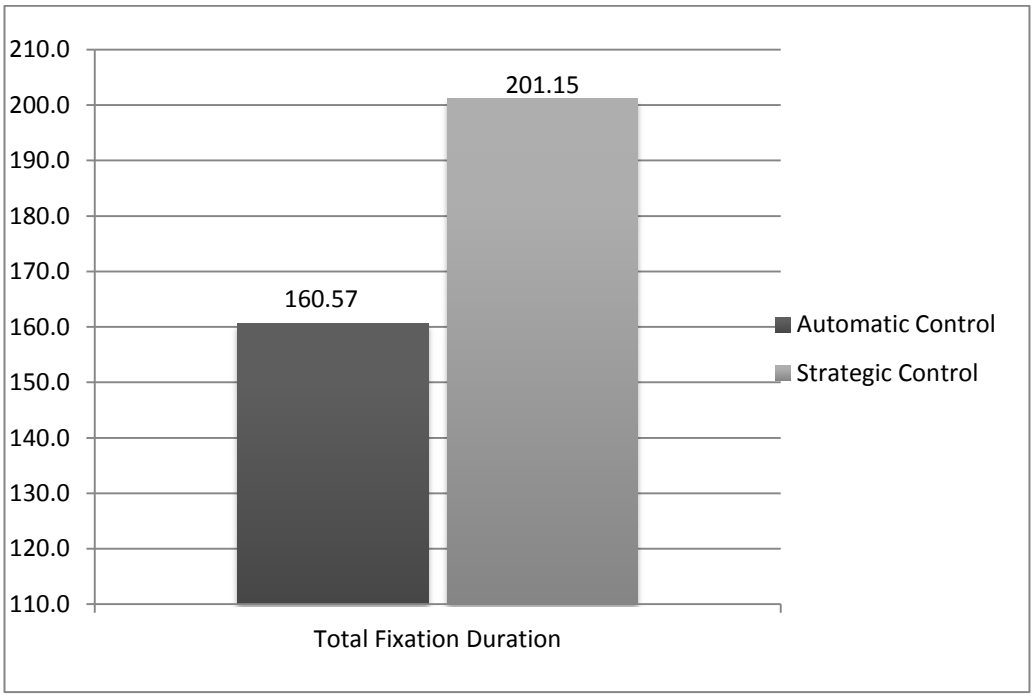
4.1.1. Total Fixation Duration

While measuring the total fixation duration of both groups, all the fixations including regressions in the area of interest were calculated with the software then the data were gathered and compared quantitatively using t- test on SPSS 17.0™.

The chart below shows the total fixation durations of both groups in a comparative fashion: Upon reading 10 one –liners, total fixation durations on ambiguous words and the word following that ambiguous word – spillover - were calculated and the difference between these groups is, at least, from this perspective is obvious since, in total, automatic control group spent **160, 57** seconds whereas strategic control group spent **201, 15** seconds in order to comprehend the joke. This raw data is further supported by statistical t- tests to determine whether this difference is significant.

Chart 1

Comparison between automatic and strategic control for Total Fixation Duration (Sum)



In order to carry out a statistical test on the data, a normality test was applied to the raw data which were obtained individually from the participants' scores on total fixation durations on the area of interest to make sure that the data from total fixation durations is suitable for a statistical test:

Table 6

Results of the Normality Test Scores (Strategic vs. Automatic)

	Kolmogorov-Smirnov		
	Statistic	df	Sig.
SA_total_fixation	.100	36	.200*

This test of normality shows that the raw data are suitable for further statistical analysis since sig. number is **0,200** and **p > 0,05,** the distribution of the data for automatic and strategic control groups can be observed below.

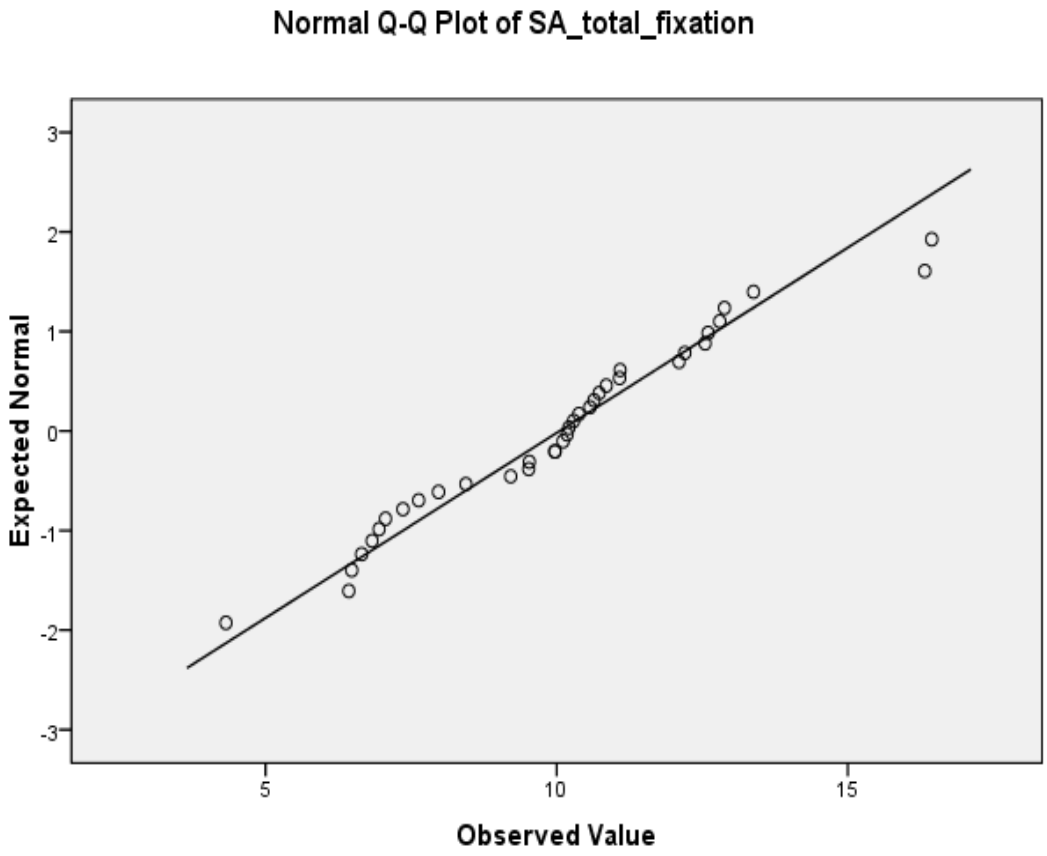


Figure 7: Distribution of raw data for strategic and automatic control groups (total fixation duration).

As can be seen from the figure, the data obtained from 36 participants in the strategic and automatic group were gathered around the line, suggesting that the distribution of the data allows the researcher to carry out a statistical test on this group.

Upon making sure that the raw data can be further analyzed using t – tests, a statistical analysis was carried out by placing the variables which were the independent – automatic vs. strategic and the dependent – total fixation durations into the software. The tables below demonstrate the mean numbers calculated from the raw data and the t-test results for total fixation duration on ambiguous words.

Table 7

Total Fixation Duration in Seconds (Mean)

	groups	N	Mean	Std. Deviation
SA_total_fixation	strategic	18	11.1750	2.49387
	automatic	18	8.9206	2.44261

This table demonstrates the mean numbers in seconds in automatic and strategic control groups. Having read 10 one – liner jokes, participants in strategic group spent *11, 1750* seconds whereas the automatic control group spent *8, 9206* seconds in average. There seemed to be differences between these groups in terms of mean numbers and the statistical t – test was applied to determine whether this difference is significant across these groups. The tables below shows t- test results.

Table 8

T – Test Results for Total Fixation Duration (Strategic vs. Automatic)

		Levene's Test for Equality of Variances		t-test for Equality of Means	
		F	Sig.	t	df
SA_total_fixation	Equal variances assumed	.221	.641	2.740	34
	Equal variances not assumed			2.740	33.985

		t-test for Equality of Means		
		Sig. (2-tailed)	Mean Difference	Std. Error Difference
SA_total_fixation	Equal variances assumed	.010	2.25444	.82279
	Equal variances not assumed	.010	2.25444	.82279

This table indicates that there **is a significant difference** between automatic and strategic control groups since **p < 0,05** and ***p*** is **0,010** here. To sum up, statistical analysis found significant difference between these two groups during processing the joke sentences, meaning that the participants who did not know anything about the content of the sentences, i.e. automatic control processed the jokes faster than the participants who knew that they were going to read joke sentences, i.e. strategic control.

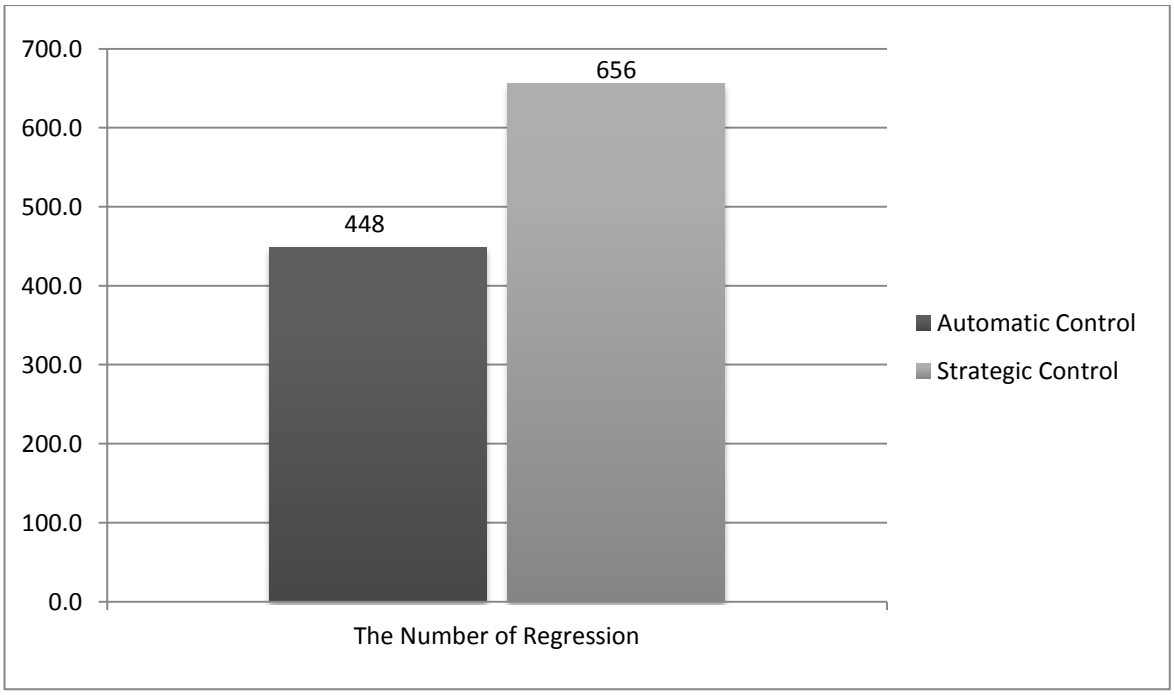
4.1.2. The Number of Regressions

The second dependant variable that the study dealt with was the number of regressions when the participants encountered with the ambiguous word. As stated before, the study was not interested in the number of regressions in the first part of the sentences since it did not give any clues about the type of the paragraph – one liner joke or non- joke sentence – so what the study was mainly interested in was all the regressions that were made after the participants encountered with the joke meaning carrying word of the text.

The chart below shows the total number of regressions in two groups after they read 10 one – liner joke sentences.

Chart 2

Comparison between automatic and strategic control for Number of Regression (Sum)



According to this chart, the number of regression across two groups differs significantly. After the participants read 10 joke sentences, total number of regression was calculated as 448 for automatic control group and 656 for strategic control group. Upon analyzing the individual regressions numbers, a test of normality was carried out to start the t-test as in the total fixation duration.

Table 9

Test of Normality for the Number of Regressions (Strategic vs. Automatic)

	Kolmogorov-Smirnov		
	Statistic	df	Sig.
SA_reg	.175	20	.109

This test of normality indicates that there occurred no problems to continue with the t-test since p > 0,05 and p= 0, 109 here. Below is the figure showing the distribution of the raw data.



Figure 8: Distribution of raw data for strategic control group (the number of regressions).

It is clear from the figure that the data obtained from 36 participants in both groups were gathered around the line and it suggests that the distribution of the data for the number of regressions allows the researcher to carry out a statistical test on this group.

Table 10

The Number of Regressions for Strategic vs. Automatic (Mean)

	groups	N	Mean	Std. Deviation
SA_reg	strategic	10	65.6000	13.47590
	automatic	10	44.8000	13.35665

According to this table, after 10 one – liners, it has been observed that the group with the strategic control has an average of **65, 6** regressions and the number of regressions that the automatic control group made is **44, 8.** This table clearly suggests that the strategic control group made more regressions upon encountering the joke meaning than the automatic control group. Again, there seemed to be differences between the groups in terms of mean numbers and the statistical t – test was applied to determine whether this difference is significant across these groups. The tables below shows t- test results.

Table 11

T - Test Results for the Number of Regressions (Strategic vs. Automatic)

		Levene's Test for Equality of Variances		t-test for Equality of Means	
		F	Sig.	t	df
SA_reg	Equal variances assumed	.240	.630	3.467	18
	Equal variances not assumed			3.467	17.999

		t-test for Equality of Means		
		Sig. (2-tailed)	Mean Difference	Std. Error Difference
SA_reg	Equal variances assumed	.003	20.80000	6.00000
	Equal variances not assumed	.003	20.80000	6.00000

Here, Sig. 2, which is about the results for t- test, shows that there **is a significant difference** between automatic and strategic control groups since **p < 0,05** and ***p*** is **0,003** here. To sum up, statistical analysis found a significant difference between these two groups in terms of the number of regressions parallel with the raw data, which also gave a significant difference. According to this statistical analysis, it is clear that the group with the strategic control exerted more cognitive efforts to comprehend the joke sentences than the group with the automatic control.

4.2. JOKE VS. NON-JOKE COMPREHENSION

The second independent variable that the study aimed to shed light on was the difference between one – liner jokes and their non – joke counterparts *(küçükkken bana yaramaz diyorlardı artık büyüdüm ve yarabiliyorum/küçükken bana yaramaz diyorlardı artık büyüdüm ve uslandım)* in terms of two dependent variables: total fixation duration and the number of regressions.

Two examples provided here illustrates how the metrics were used while comparing the joke and the non – joke control.



Figure 9: An example of a reading pattern for a joke sentence.

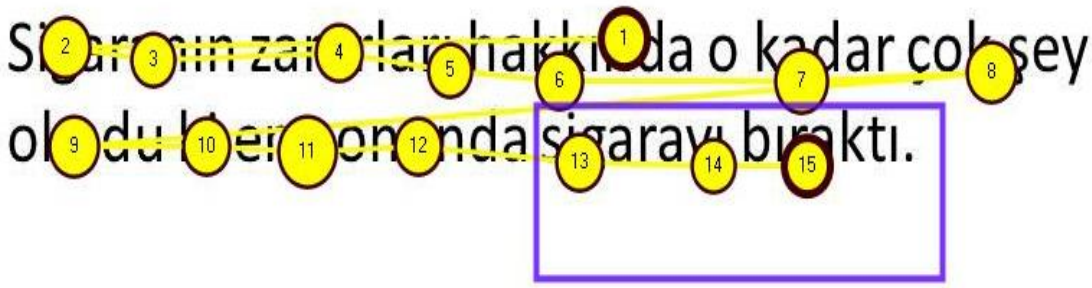


Figure 10: An example of a reading pattern for a non - joke sentence.

The sentences – sigaranın zararları hakkında o kadar şey okudu ki en sonunda sigarayı/okumayı bıraktı - which can be translated as *"she read so much about the bad effects of smoking she decided to give up the reading/habit"* include a rectangular shape known as the area of interest. In these examples, there are 17 fixations on the joke sentence while there are 15 on the non – joke control. The software measured the fixations in the area of interest and gave the total fixation duration for each sentence in milliseconds or seconds. As for the number of regressions, they were counted when the participant arrived at the area of interest since he/she saw the joke meaning at that point. In Figure 9 – the joke sentence – there are two regressions while in Figure 10 – the non-joke control – there is no regression.

4.2.1. Total Fixation Duration

The chart below shows the total fixation durations of both groups in a comparative fashion. After 20 sentences (one liners and their controls) read by 36 participants, total fixation durations were calculated. As can be seen from the chart, participants spent

361, 41 seconds (sum) on the punchline of the one - liners while they only needed **318, 07** seconds for the control sentences.

Chart 3

Comparison between joke and non – joke sentences for total fixation duration (Sum in seconds)

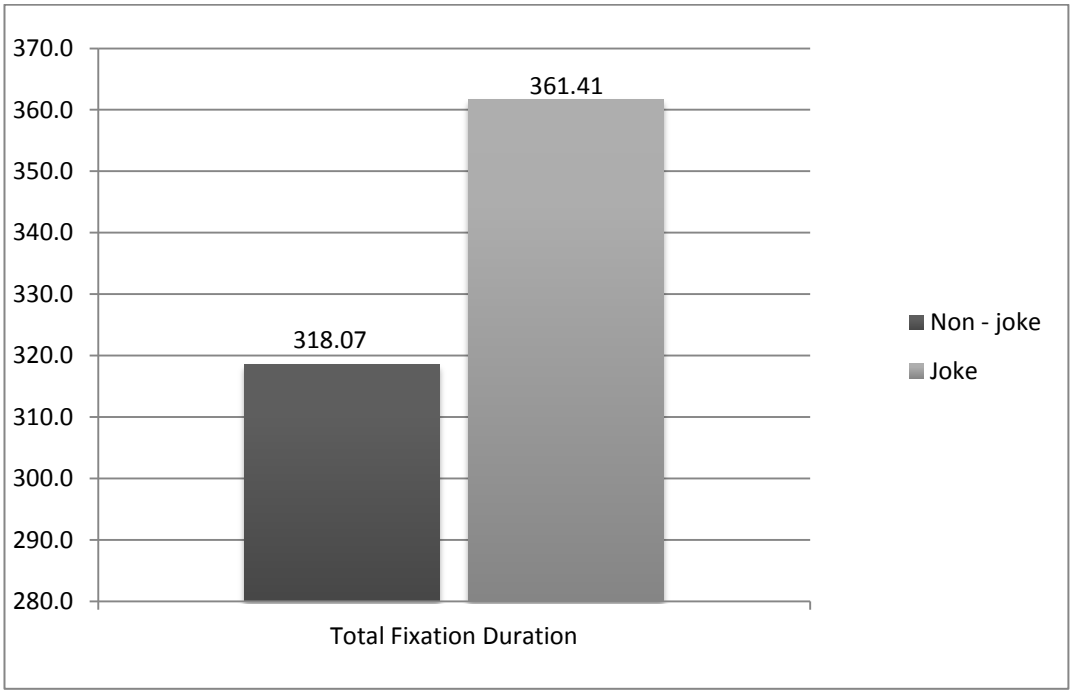


Table 12

Test of Normality for Total Fixation Duration (Joke vs. Non-joke)

	Kolmogorov-Smirnov		
	Statistic	df	Sig.
joke_nonjoke_total_fix	.080	72	.200*

This test of normality suggests that it is possible to continue with the t-test since p > 0,05 and p= 0, 200 here. Below is the figure showing the distribution of the raw data.

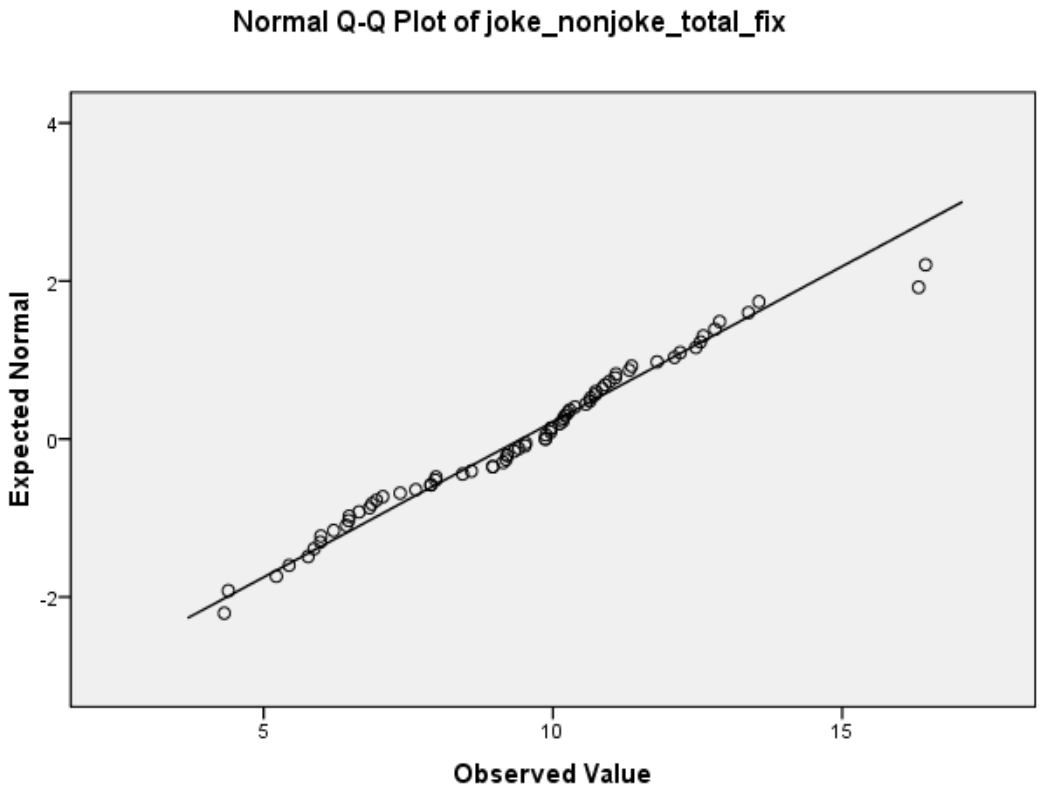


Figure 11: Distribution of raw data (total fixation duration for joke vs. non – joke).

The data taken from 36 participants are equally distributed across the participants according to this figure.

Table 13

Total Fixation Duration for Joke vs. Non – joke (Mean in Seconds)

	groups	N	Mean	Std. Deviation
joke_nonjoke_total_fix	joke	36	10.0478	2.68807
	nonjoke	36	8.8486	2.26556

Table 13 provides mean numbers obtained from total fixation durations for joke and non – joke sentences in seconds. It has been observed that jokes required an average of **10.04** seconds and non – joke required **8, 84** seconds for the participants. This table indicates that the differences between joke and non – joke controls are robust. The tables below shows t- test results.

Table 14

T - Test for total Fixation Duration (Joke vs. Non - joke)

		Levene's Test for Equality of Variances		t-test for Equality of Means
		F	Sig.	t
joke_nonjoke_total_fix	Equal variances assumed	.235	.629	2.047
	Equal variances not assumed			2.047

		t-test for Equality of Means		
		df	Sig. (2-tailed)	Mean Difference
joke_nonjoke_total_fix	Equal variances assumed	70	.044	1.19917
	Equal variances not assumed	68.048	.045	1.19917

Results indicate that there **is a significant difference** between one – liner jokes and non – joke controls since **p < 0,05** and ***p*** is **0,044** here. Statistical analysis found significant difference between jokes and controls, meaning that the participants needed to exert more efforts and fixated longer in order to comprehend the joke sentences than their non – joke controls.

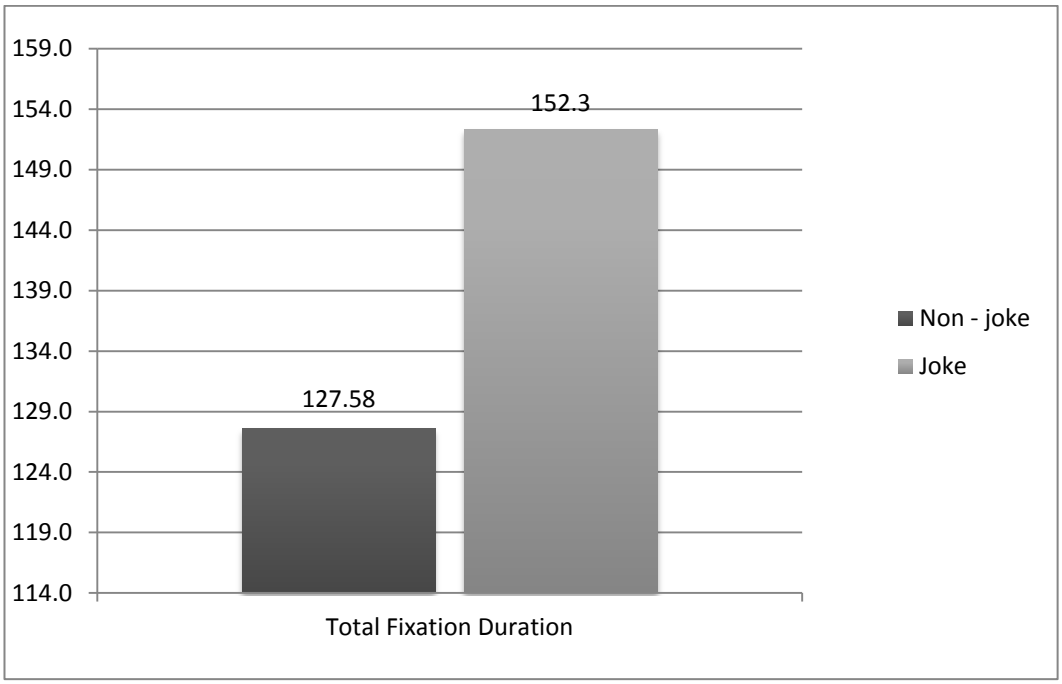
4.2.1.1. Total Fixation Duration for Jokes and Controls in Automatic Control Group

In general, when the sum of all fixation duration for the automatic and strategic control group was measured, it was found out that jokes needed more cognitive resources than non – joke controls.

When the automatic control group was analyzed separately, that is, without adding the values obtained from the strategic group, the results were not different. Similarly, participants in the automatic group spent more time in order to comprehend joke sentences as can be seen from the Chart 4. While the participants in this group fixated 152.3 seconds on the joke sentences, they only spent 127.58 seconds on the non – joke sentences.

Chart 4

Total fixation duration for jokes and non – jokes (automatic control group - sum)



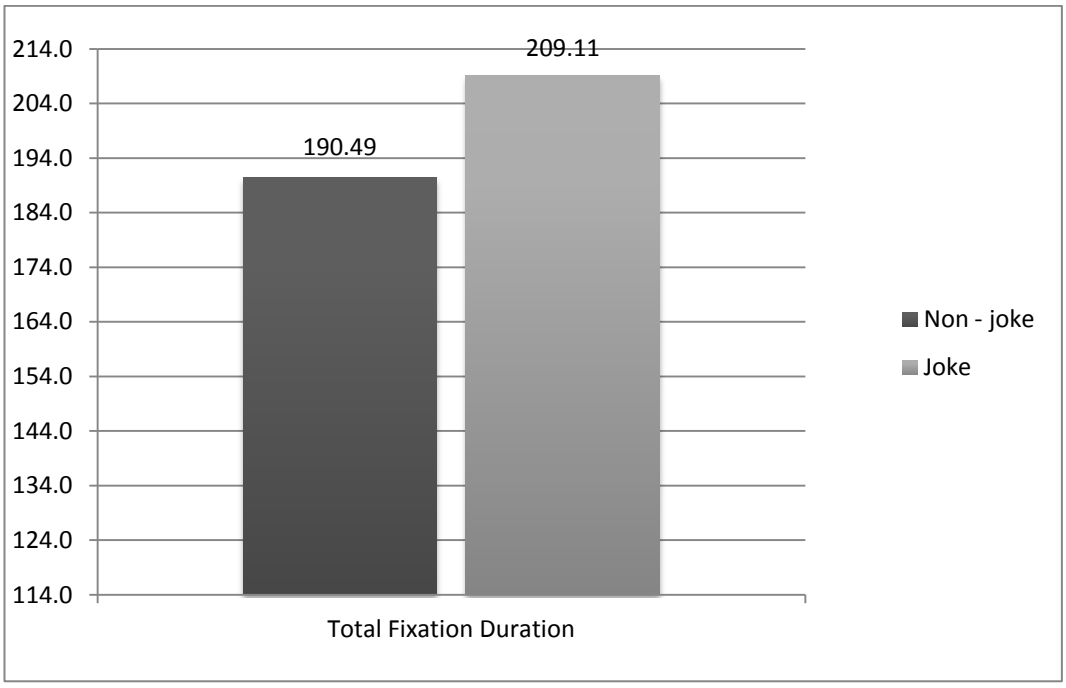
T-test results revealed a **significant difference** between joke and non – joke sentence total fixation duration for the automatic control group: t (34) = 2.75, p = 0.009.

4.2.1.2. Total Fixation Duration for Jokes and Controls in Strategic Control Group

Total fixation duration for joke and control sentences showed a significant difference in automatic control group. Will this trend be similar for the strategic control group? Similarly, total fixation duration favored non-joke control advantage over the joke sentences as can be seen from the Chart 5. Participants in the strategic control group spent 209.11 seconds in joke sentences and 190.49 seconds in non – joke control sentences.

Chart 5

Total fixation duration for jokes and non – jokes (strategic control group - sum)



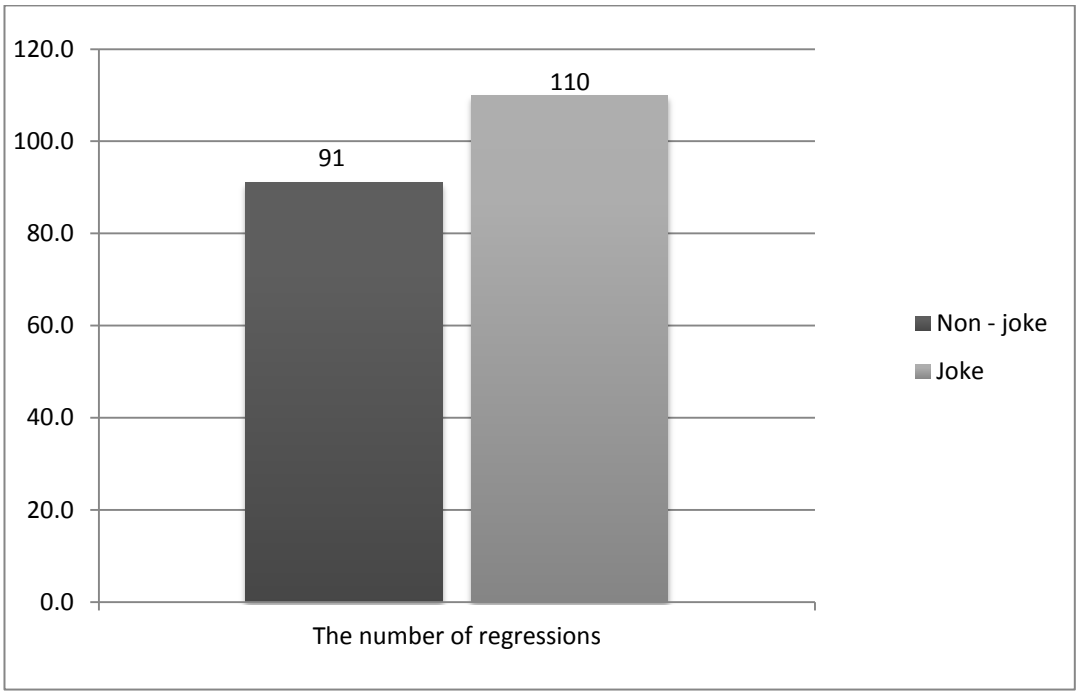
As for the T test, results were **not significant** since t(34)=1.86, p = 0.071.

4.2.2. The Number of Regressions

Similarly, as in the case of the first experiment, the regressions which the participants made after they encountered the punchline were counted. As for the non – joke controls, the regressions after the replaced word were taken into account *(... artık büyüdüm ve yarabiliyorum/....artık büyüdüm ve uslandım)* – the number of regressions after reading the word *"yarabiliyorum"* vs. *"uslandım"*

Chart 6

Comparison between joke and non – joke sentences for the number of regressions after 10 joke and 10 non – joke sentences (Mean)



This mean value represents the number of regressions for joke and non – joke sentences obtained from 36 participants. Participants made **110** regressions (mean number) after 10 one – liners and **91** regressions after 10 non – joke controls. The raw data for the number of regressions suggest that the partiipants, while reading one – liners, returned and fixated on earlier parts more often than they did while they were reading non – joke controls.

Table 15

Test of Normality for the Number of Regressions (Joke vs. Non-joke)

	Kolmogorov-Smirnov		
	Statistic	df	Sig.
Joke_nonjoke_reg	.173	20	.119

This normality test result shows that there is no problem conducting the statistical test on the data since p > 0,05 and p= 0, 119 here. And Figure 12 below shows that the data are equally distributed across the participants.

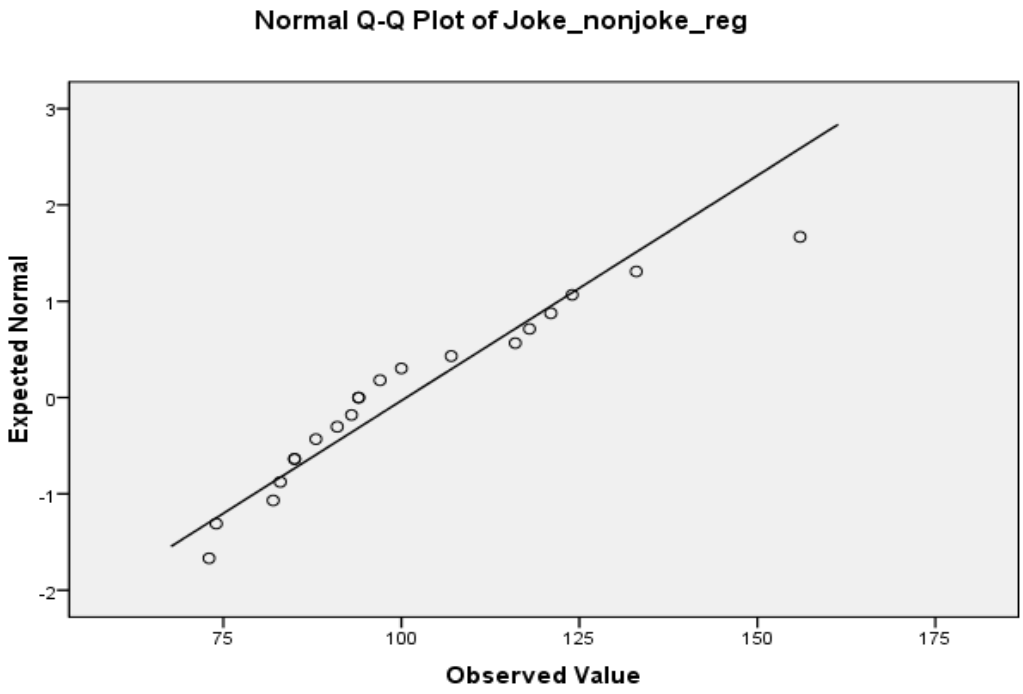


Figure 12: Distribution of raw data (the number of regressions for joke vs. non – joke).

Table 16 shows the statistical results for the number of regressions for joke and non – joke sentences. Sig. 2, which is about the results for t- test, indicates that there **is a significant difference** between the joke and the non - joke sentences since **p < 0,05** and

p is **0,039** here. To sum up, statistical analysis found a significant difference between these two types of sentences in terms of the number of regressions parallel with the raw data, which also gave a difference. According to the analysis, it is obvious that the jokes needed more cognitive efforts since the participants were forced to read and fixate on the earlier parts in order to get the joke.

Table 16

T- Test Results for the Number of Regressions (Joke vs. Non - joke)

		Levene's Test for Equality of Variances		t-test for Equality of Means
		F	Sig.	t
Joke_nonjoke_reg	Equal variances assumed	2.628	.122	2.231
	Equal variances not assumed			2.231

		t-test for Equality of Means		
		df	Sig. (2-tailed)	Mean Difference
Joke_nonjoke_reg	Equal variances assumed	18	.039	19.40000
	Equal variances not assumed	15.078	.041	19.40000

4.2.2.1. The Number of Regressions for Jokes and Controls in Automatic Group

The data regarding the number of regressions obtained both from strategic and automatic control group revealed a significant difference in general. When the groups were separately analyzed, it was found out that the participants in the automatic control group made more regressions while reading the joke sentences. T - test result gave a **significant difference** in terms of the number of regressions in automatic control group for both jokes and non – joke controls: $t(34) = 2.47$, $p = 0.019$.

4.2.2.2. The Number of Regressions for Jokes and Controls in Strategic Group

Secondly, the number of regressions made by the participants in the strategic control group were compared to determine whether there was a significant difference between jokes and non – jokes in terms of number of regressions. Similarly, t - test results gave a **significant difference**: $t(34) = 3.01$, $p = 0.005$.

4.3. DISCUSSIONS

The present study adopted the eye tracking paradigm which has been commonly used in psycholinguistic research to (1) study ambiguity resolution in one – liner jokes to explore the set effects, i.e., automatic vs. strategic control, in meaning activation in jokes and (2) to determine whether there were processing differences between these one – liners and their non – joke controls. In the study, there were two independent – strategic control/automatic control and joke/control sentences - and two dependent variables – total fixation duration and the number of regressions. The table below provides a summary for the statistical test results and as can be seen from this table all the between – subject statistic results showed **a significant difference** except for one: total fixation duration for jokes and non – joke controls in the strategic control group.

Table 17

Summary of the Statistical Test Results

	Total Fixation Duration	The Number of Regressions
Automatic vs. strategic control groups	*.010*	*.003*
Joke vs. control (general/sum) - ***Automatic control group*** - ***Strategic control group***	*.044* *.009* *Not significant*	*.039* *.019* *.005*

4.3.1. Discussions for the Set Effects

The results demonstrate a strong automatic control advantage over strategic control in joke comprehension. The strategic control group fixated longer on the punchlines of the jokes and made relatively more regressions than the automatic control group did.

Although the participants in the strategic control group knew that they were going to read one – liners and they attuned themselves to read a joke before the experiment, it is interesting that they processed the sentences slower than the automatic control group. One could think that the strategic control group has an advantage over the automatic control group since they know what kind of sentences they are going to read and thus cognitively be prepared beforehand. However, the present study and the relevant studies offering hypothesis on the topic seem to refute the expectations.

It has been an established fact that there are two types of cognitive processes: automatic and controlled or in our study strategic (Shiffrin and Schneider, 1977). It is the automatic processes that do not tax cognitive resources very much because of the fact that they are parallel and unconscious processes, not subject to capacity limitations, and always triggered in. Besides, these processes do not require very careful attention. Controlled or strategic processes, in contrast, require more cognitive resources and they are slower and can be subject to strategic effects (Cowles, 2011). In other words, controlled processes are assumed to be voluntary, to require attention, and to be relatively slow. They are subject to the capacity limitations of short-term memory and they allow the subject's expectancies and strategies to exert an effect (Posner and Snyder, 1975; Shiffrin and Schneider, 1977).

Similar to the relevant hypothesis, the study showed that the group adopting strategic control had more difficulty in processing the jokes since they were attuned and pre-conditioned to read a joke and they might be said to have adjusted their mind for the other interpretations of the words beforehand and thus paying more attention to every

single word and phrase while trying to comprehend the joke. Strategic or controlled processing caused the working memory to be more activated than normal (Grunert, 1996). This activation was done by strategic processes developed by the participant's aims such as conscious thinking (knowing that he/she is going to read a joke sentence), goal-setting (getting the joke), problem solving (resolution of the joke etc.) in order to comprehend the joke. This explains why even weak stimuli were attended to even if it was not necessarily important for the joke meaning of the sentence. It could be stated that the strategic control group, as opposed to the automatic control group, needed to exert more efforts in order to process and comprehend the joke meaning. Both total fixation durations on the punchlines and the number of regressions reflected the extra efforts exerted by the strategic control group. Therefore, it can be claimed that the participants in strategic group paid a lot of attention to every word they read in order not to miss the joke meaning as the participants in this group had always considered every word as a potential joke meaning word. That might be one of the main reasons behind higher total fixation duration time.

As for the number of regressions, the automatic control group made fewer regressions as they did not need very careful attention on words beforehand, thus they were thought to process the sentences unintentionally, fast and involuntarily. On the other hand, participants in the strategic control group made more regressions due to the fact that they needed to reflect that extra cognitive load to other words in order to disambiguate the ambiguity. Therefore, making regressions would be a good way for the participants in strategic group to match the second or joke meaning with the first or default meaning of the word and comprehend the joke. Extra cognitive efforts are needed to be

compensated and regressions and the words in the areas where incongruity was resolved helped the participants in the strategic group process the joke, making the participants direct all their attention and cognitive efforts into the joke meaning and release the extra attention that they paid on words which they thought were unnecessary anymore. In order to be sure about the joke meanings of the sentences, strategic control group made more regressions and tried to match this joke meaning with other possible interpretations that he/she read before.

With automatic stimulus recognition, memory is conceived as a network of nodes and links and these nodes represent cognitive categories related to words such as phonemes, word category etc. The complete set of nodes and links is also called cognitive structure, which is the organization of knowledge in memory and this process of spreading activation is automatic, that is, unconscious, parallel, and not subject to capacity limitations (Grunert, 1996). In strategic control group, this automatic activation is delayed by interfering the participants' cognitive structures. Faster comprehension times for the automatic control group could also be due to "spreading activation" (Collins and Loftus, 1975) which is an automatic, attention – free process. Pereyra et al. (1999:813) explains spreading activation as:

> "Presentation of a word activates the corresponding node of this word in semantic memory. Part of this activation automatically spreads to words that are related in memory. As a consequence, the activated nodes representing related words use less time for subsequent processing."

Another reason explaining the automatic control group advantage could be that the participants in this group did not encounter with any obstacles that would hamper

spreading activation. With the help of nodes and links that the words in the joke sentences created, they processed the jokes faster than the strategic control group. Strategic control group, on the other hand, had to deal with all the words in the joke sentence separately.

In short, the participants in the strategic control group had the disadvantage of conscious thinking, that is, they seemed to have paid great attention to every word in the joke sentences and consequently, all the stimuli – related to joke meaning or not - seemed important for them to get the joke. Pre – conditioning to comprehend the joke sentences made the strategic group exert more efforts and therefore spend more time comprehending the joke sentences.

4.3.2. Discussions for Joke vs. Control Results

This time, jokes and controls have been compared and the results show that one – liner jokes take more time to process than their non – joke controls. Readers were more likely to make regressions after they encountered the punchline of the one – liners and this difference was robust across the subjects. When they made regressive eye – movements, they usually tended to go back and re – fixate on the previously fixated words before punchline and then fixate again on the word(s) in punchline in order to make sure about the opposition that he/she observed between the firstly activated script and the second one. This reading pattern might have effects on the longer fixation duration on the punchline and more regressive eye movements after the punchline, making the sentences that ended as a joke require more time to process than their non – joke controls and thus causing the readers spend reliably longer reading time for one – liners.

Joke effects were usually observed in the punchline of the sentences where the readers made subsequent fixations in order to comprehend the jokes. However, non – joke controls did not require a lot of attention and they were comprehended much easier than the jokes. Since the words in non – joke sentences were context – dependent, that is, their meanings could be retrieved with the help of context and the surrounding words, readers did not need to construct new meanings or frames in order to process the sentences. In non – joke controls, context helped readers process individual words in the sentence – level representation. One important reason for longer time for jokes is that readers did not have to deal with the message – level representation and thus create new scripts/frames that would account for the opposition. The difference between jokes and non – jokes is that understanding a single word in a joke sentence may have effects on the overall construal of the discourse event (Coulson et al., 2006).

This finding is consistent with the linguistic and psychological humor theories developed by Raskin (1985), Attardo and Raskin (1991), Attardo (1997;2001) and Coulson (2001), and it suggests that the participants literally revisit aspects of the preceding context in order to activate a new frame/script so as to better comprehend the jokes (Coulson, 2001; Coulson et al., 2006). Similarly, Attardo and Raskin's (1991) General Theory of Verbal Humor – the GTVH (see sections 2.3.1 and 2.3.2) – makes the prediction that the second script which the readers saw in the punchline is unexpected and so presumably, the reader would need to look at longer at the script – switch trigger (known as the word which causes the joke) and potentially backtrack and look at it again. As predicted by the GTVH and the frame shifting (Coulson, 2001), the

readers in the experiment both spent longer times on the script – switch trigger / new frame and made more regressive eye movements after the punchline. Therefore, the findings in this study match up with the theories developed in this field.

To see how the GTVH and the frame – shifting are consistent with the finding obtained from the present study, theories and their steps/predictions are compared with the reading patterns of the participants.

Table 18

Set up, Incongruity and Resolution – the SIR – and its correspondences to the GTVH (After Attardo, 1997)

Phase	SSTH/GTVH	Function
Setup	Script overlap	sets up expectations
Incongruity	SO	notes divergence from expectations
Resolution	LM	resolves the incongruity

As the reading patterns demonstrated, there was no significant difference between the joke and the non – joke set – up since, both created expectations in readers' mind *(iki şey yıkar insanı….- two things destroy/wash people…)*. Having established a set – up, readers, this time, encountered with the second script which divers from the expectations *(biri sabun, biri su. - one is soap, the other is water).* At this point, readers realize that they are reading something different from their expectations that they formed in the set - up and this causes them to look at the words longer at this phase, as it was shown in the reading patterns. After they realize that this is not what they have

thought in the beginning, they start to resolve the incongruity created in the second phase and now they need to go back, revisit and look at the previously fixated words again in order to disambiguate the word(s).

After, the GTVH, the finding in this study is also consistent with the frame – shifting proposed by Coulson (2001). When the one – liner "When I asked the bartender for something cold and full of rum, he recommended his wife" (After Coulson and Kutas, 2001) is analyzed, it is clear that rather than recommending a drink, the bartender in this sentence has just reviled his wife. The semantic and pragmatic reanalysis that reorganizes existing elements in the message-level representation is known as frame – shifting and with the activation of background knowledge and the establishment of mappings between counterpart structure in the old and new frame, the bartender's wife is accused of being a frigid lush (Coulson, 2001; Coulson et al, 2006).

The present study also confirmed the reality of frame – shifting or script overlapping and opposition under more natural reading conditions. Moreover, the eye movement data suggested that difficulty was not seen in word recognition but rather the difficulty was observed with the higher-level processing attained by the total fixation duration on the words in the punchline. Also, it was found that the participants made more regressive eye movements when they read the joke than the non – joke sentences, in order to reexamine the previous parts of the sentence for clues.

While getting a joke, processing the words in a sentence is not enough to comprehend it. Rather, as opposed to a non – joke sentence which is more context – dependent,

"perceptual input, language input, social context, and the speaker's current cognitive state all contribute to the construction of cognitive models of the discourse situation". (Coulson et al, 2006:230). This clearly has an effect on the fixation times and the number of regressions. The present study supports that the relationship between a word and its surrounding context is multifold. "This relationship involves the ways that individual words add to the cognitive models active in working memory and how individual words can prompt the construction of new models" (*ibid,* 2006:246).

In the statistical analysis, only one result was not significant, that is, total fixation duration for jokes and non – joke sentences in the strategic control group. The main reason for this could be related to the participants' pre – conditioning to read a joke as explained in detail above. All the stimuli – even the weak ones that were not directly relevant to the joke meaning - were potential joke meaning carrying word for these participants since they were pre – conditioned to read a joke. Each sentence – both jokes and non – jokes – was presented randomly and they did not know beforehand whether they were going to read jokes or non – jokes, therefore, they paid great attention to each sentence, phrase and word, making both the jokes and non – jokes possible joke sentences. That was the main reason behind similar amount of time spent at the end of each sentence.

CHAPTER 5

CONCLUSION

Humor is by far the most significant activity of the human brain.

Edward de Bono (Maltese Physician)

This study has aimed to answer the questions regarding verbal humor comprehension by comparing two groups – automatic control vs. strategic control – and two kinds of sentences – one – liner jokes vs. non – joke controls. The study started with the complexity of humor and language and stated the general problems in the field in the introduction section. Later, it dealt with the surveys which have been carried out to date with a specific focus on experimental studies on verbal humor comprehension thus preparing a ground for the present study. Methodology, data analysis and discussions were presented in the following chapters. To this end, the study experimentally tested (1) the set effects in joke comprehension to determine whether joke meaning activation is subject to automatic or strategic control and (2) it also analyzed the processing differences between jokes and non – joke controls using the eye tracker at METU – HCIRAL. To understand this, participants were divided into two groups and they were tested individually: automatic control group had no idea about what to read while strategic control group knew that they were going to read one – liner jokes. The results of the test, then, presented and discussed. In this chapter, conclusions regarding the

research questions and sub – questions will be presented and possible answers to these questions will be provided.

The first research question has addressed the importance of set effects in general. This specific question has aimed to find whether joke comprehension is subject to automatic or strategic control:

> **"Will expecting to read a joke make one more attuned to alternate readings earlier on in joke processing than if one does not expect to encounter a joke? To put it in a different way, is meaning activation in joke processing subject to strategic control or automatic control?"**

The simple answer to this question: yes, it will, as far as the results showed. Therefore, meaning activation in joke processing is subject to automatic control. Expecting to read a joke made one more attuned to alternate readings earlier on since participants with strategic control group paid more attention to every word in order to catch the joke meaning and this required more cognitive resources. They had to keep other interpretations of the words in mind so that they would not miss the joke. On the other hand, with spreading activation (Collins and Loftus, 1975), participants in the automatic control group processed the jokes due to their attention – free memory condition. Therefore, the answer is: meaning activation in joke processing is subject to **automatic control.** This finding is consistent with the studies on automatic vs. strategic control (Collins and Loftus, 1975; Pereyra et al., 1999; Posner and Snyder, 1975; Shiffrin and Schneider, 1977). The present study also contributes to the topic by analyzing set effects in the **context of jokes.**

This research question has been supported by two sub questions: total fixation duration and the number of regressions. These sub questions have aimed to find the answers for

the main question using these two metrics. The first metric measured the total fixation durations on the punchlines and compared these durations in both groups. The second metric was applied to the number of regressions and both metrics *did* provide a significant difference across two groups.

To sum up, these two sub questions showed considerable differences across two groups and revealed that joke processing could be subject to automatic control since the participants in the strategic group spent more time on the punchline and made more backward movements to process the joke.

The second question was interested in monitoring eye movements with one – liners and their controls to see whether there were processing differences between them and to test whether reading patterns show similarity to the proposed theories:

> **Is it possible to observe differences in terms of processing between one-liners and their non-joke counterparts? Are the reading patterns for the jokes similar to the incongruity – resolution models developed by Attardo and Raskin's (1991) GTVH and Coulson's (2001) frame - shifting?**

The answer is straightforwardly yes. There were processing differences between jokes and their non – joke controls and the reading patterns demonstrated that the second script/frame was unexpected so the readers had difficulty in resolving and processing the sentences. They fixated on the second/incongruous script longer and they made more regressive eye movements after the punchline. This result is consistent with the linguistic and psychological humor theories: the GTVH and the frame shifting which propose that readers/hearers need to construct a new frame and relate it to the firstly activated script in order to resolve it. Total fixation duration and the number of

regressions obtained from the joke and non – joke sentences provide consistent data with the proposed theories.

Even when the participants in each group were separately analyzed, the results were similar. The participants in both group spent more time on jokes than non – joke controls and made more regressions while reading joke sentences. Only the results obtained from total fixation duration for jokes and non – joke controls in the strategic control group were not significant due to the reasons explained above: for the participants in this group, all the stimuli were potential joke meaning carrying word since they were pre – conditioned to read a joke. Each sentence – both jokes and non – jokes – was presented randomly and they did not know beforehand whether they were going to read jokes or non – jokes, therefore, they paid great attention to each sentence, making both the jokes and non – jokes possible joke sentences.

5.1. SUGGESTIONS FOR FURTHER RESEARCH AND IMPLICATIONS

Psycholinguistic studies, with the help of new experimental paradigms thanks to the developing technology, contribute to our understanding of the relation between language and mind. Humor, due to its complexity in nature, provides researchers with a source to understand the cognitive processes in human mind. Combined with experimental studies, verbal humor has a lot to say about these processes.

The present study examined one – liners – a type of canned jokes which is generally one sentence long. However, there are other instances of verbal humor such as irony, riddles, puns and conversational joking (see Norrick, 1993). Do these types differ in processing difficulty? If yes, it would be interesting to explore how processing these

types of verbal humor differ from each other or how these sentences differ from normal sentence processing (non – joke sentences).

Secondly, it would also be interesting to study humor comprehension with bilingual people. Does bilinguality have positive or negative effects on comprehension? Are their reading patterns similar to monolinguals? If they are different, at what point do they differ? Many of the studies on processing focus on monolinguals, so bilingualism and humor comprehension could yield significant results to broaden the scope of inquiry.

The experimental design used in this study contributed to both psycholinguistics and humor researches via eye tracking paradigm and examined the importance of set effects in joke comprehension. Only two dependent variables were used: total fixation duration and the number of fixations. The eye tracker used in this experiment (mentioned in methodology) did not have the metrics to calculate the time spent in regressions and the fixation durations of regressions. With other eye trackers, the areas where the regressions are generally made or the time spent in regressions can also be studied to draw firmer conclusions about the importance of set effects in joke comprehension.

Eye – tracking paradigm is extensively used to see on – line processing. However, conducting an experiment with event related potentials (ERP) along with an eye tracker may yield better results. Analyzing brain waves with eye movements could help researchers see the time course of meaning activation in jokes better.

Figurative language comprehension (irony, metaphor, and idiom) and joke comprehension studies poses difficulties for researchers since the scholars in this field need to deal with not only with the literal meaning but also with the figurative meanings/other interpretations of the words and phrases. Therefore, this field

contributes a lot to our understanding of cognition. Some implications of the present study are given below.

First of all, there aren't any experimental studies carried out in Turkish in terms of on – line and off – line humor or joke comprehension. The one – liners and their non – joke controls, thus, can provide a corpus for further studies that will be done in the future. That's why; this humble experimental study could create a path in Turkish humor comprehension.

This study can also contribute to humor comprehension in first and second language both theoretically and practically. In a theoretical way, it has been demonstrated that joke processing in first language is same across languages and the linguistic humor theories and studies that have been developed so far confirm this result (Raskin, 1985; Attardo and Raskin, 1991; Attardo, 1997; 2001; Coulson, 2001; Coulson and Kutas, 2001; Coulson et al, 2006, Vaid et al, 2003). Although these theories tested humor comprehension in English, the findings in this study show that they can also be applied to Turkish humor.

In a practical way, these one – liner jokes can be used for learners of Turkish as a second language to test the processing differences both within the learners themselves and between native Turkish speakers and learners of Turkish as a second language. Since understanding and producing humor appropriately is seen as a hallmark of attaining native – like proficiency in a language (see Hall, 1959 and Vaid, 2006), they can be used as a source of testing advanced learners to see whether they have problems with the sentences – both jokes and non – jokes.

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APPENDIX 1:

NON – JOKE SENTENCES

1. Sigaranın zararları hakkında o kadar çok şey okudu ki en sonunda sigarayı bıraktı.

"She read so much about the bad effects of smoking that she decided to stop the habit."

Kişi artık sigara içmemektedir. (D)/Y - That person no longer smokes. (T)/F

2. Barmenden soğuk bir şey istediğimde bana bir bira önerdi.

"When I asked the bartender something cold, he recommended beer."

Bira barmene göre ideal bir soğuk içecektir. (D)/Y - Beer is an ideal drink for the bartender. (T)/F

3. Küçükken bana yaramaz diyorlardı, artık büyüdüm ve uslandım.

"They told me I was naughty I when I was a child, now I am grown and sober"

Kişi hala yaramazlık yapmaktadır. D/(Y) – The person is still naughty. T/(F)

4. Bu aşk yalanmış, gerçek bir aşk istiyorum.

"This love is a lie, I want a true love"

Kişi yaşadığı aşka inanmamaktadır. (D)/Y – The person does not believe in the love he is in. (T)/F

5. 2 aydır kanal tedavisi gören Sanem Gülçen (28), tüm müdahalelere rağmen yine diş sorunu yaşadı.

"Sanem Gülçem (28), who had been having root canal operation for 2 month, had tooth problems despite all interventions"

Tedavi sonrası bu kişi diş sorunlarından büyük ölçüde kurtulmuştur. D/(Y) – After the treatment, this person got rid of her tooth problems to a great extent. T/(F).

6. Sen hep kolayı seçersin zaten, asıl önemli olan zoru seçmek.

"You always choose the easy; being important is to choose the difficult"

Tümcede yakınılan kişi her zaman zor işleri tercih etmektedir. D/(Y)

7. İki şey yıkar insanı; biri gurur, biri kibir.

"Two things destroy human: one is pride, the other is arrogance"

Gurur ve kibirden insan fazla zarar görmez. D/(Y) – A person is not harmed much by pride and arrogance. T/(F).

8. 22 yıldır babasını görmeyen Selda Şar, sonunda babasına kavuştu.

"Selda Şar, who had not seen her father for 22 years, finally rejoined him."

Selda Şar artık babasıyla birliktedir. (D)/Y – Selda Şar is now with her father. (T)/F

9. İkinci bir emre kadar, birinci emir uygulanacaktır.

"Until the second order, the first one will be implemented".

Yeni bir emir gelmedikçe ilk söylenen yapılacaktır. (D)/Y – Unless a new order comes, the firstly said one will be done. (T)/F

10. Bir insan yedisinde neyse yetmişinde de odur.

"The child is father of the man"

İnsanın huyu sürekli değişmektedir. D/(Y)- A person's habit constantly changes. T/(F)

APPENDIX 2:

ONE-LINER JOKES

1.	Sigaranın	zararları		hakkında	o kadar çok	
	Cigarette-POSS	harm-PL-ACC		about	so much	
	şey	okudu	ki	en sonunda	okumayı	bıraktı.
	text	read-PST-3sng	that	finally	reading	stop-PST-3sng

"She read so much about the bad effects of smoking that she decided to stop reading"

Bu kişi için sigara içmek okumaktan daha önemlidir. (D)/Y – For this person, smoking is more important than reading. (T)/F

2.	Barmenden	soğuk	bir şey istediğimde		bana
	Bartender-ABL	cold	thing	want-PST-1sng-when	I-DAT
	karısını		önerdi.		
	wife-3sng-POSS-ACC		recommend-PST		

"When I asked the bartender something cold, he recommended his wife".

Barmen karısının soğuk kişiliğinden rahatsızdır. (D)/Y – The bartender is uneasy with the unsympathetic personality of his wife.

3.	2 aydır	kanal tedavisi		gören	Sanem Gülçen (28),
	Two months	root channel operation		have	Sanem Gülçen (28)
	tüm	müdahalelere	rağmen	yine	FlashTV'yi
	All	intervention-DAT	though	again	FlashTV-ACC
	açtı.				
	switch on-PST				

"Sanem Gülçen (28) who had been getting a root canal therapy for two months switched on Flash TV again despite all interventions"

Yapılan işlemler kişiyi Flash TV izlemekten kurtarmıştır. D/(Y) - treatments saved the person and she no longer watches Flash TV. T/(F).

4.	Küçükken	bana	yaramaz	diyorlardı,
	Small-when	I-ACC	naughty/not be able to split	say-3pl-PROG-PST
	artık	büyüdüm	ve	yarabiliyorum.
	Now	grow-up-PST-1sg	and	split-ability-PROG-1sg

"*They told me I was naughty when I was little, now I'm grown and I can split"*.

Note: In this sentence, the reader is most likely to active the 'naughty' meaning of the word, however, when he/she reads the punhline, he/she will active the verb meaning.

Bu kişi istediği takdirde çevresine zarar verebilir. (D)/Y – This person can harm its environment whenever he/she wants. (T)/F.

5. Bu aşk yalanmış, yalanmamış bir aşk

This love lie/suck-EVI suck-NEG-EVI one love

istiyorum.

want-PROG-1sg

"This love is licked/a lie; I want a love which is not licked."

Note: In this sentence, when the reader encounters with the word "yalanmış", he/she is most likely to active "lie" meaning, however, the punchline makes him/her to leave that meaning.

Bu kişi yaşadığı aşkın cıvık olduğuna inanmaktadır. (D)/Y – This person believes that the love he is in is saucy. (T)/F

6. Sen hep kolayı seçersin,

You always easy/coke-ACC choose-PRES-2sg

asıl önemli olan fantayı seçmek.

actually important be fanta-ACC choose

"You always choose the coke/easy, being important is to choose Fanta."

Note: In this one-liner, the reader is most likely to active "easy" meaning and then leaves it and understands that here "kolayı"is used as a drink: "coke"

Fanta kişi tarafından kolaya oranla daha çok tercih edilmektedir. D/(Y) – Fanta is preferred more than coke. T/(F)

7. İki şey yıkar insanı; biri sabun, biri su.

Two thing destroy/wash human one soap one water

"Two things destroy/wash a human: one is soap the other is water."

Note: In this sentence, what is meant by the word 'yıkar' is expected to be "to destroy". However, the readers leaves that meaning when he/she sees "one is soap the other is water" and uses "to wash" meaning in order to comprehend the joke.

İnsanın temizliği için sabun ve su yetersizdir. D/(Y) - Water and soap is not enough for human cleanness. T/ (F).

8. 22 yıldır babasını görmeyen Selda Şar,

22 years father-POSS-2sg see-NEG Selda Şar

katarakt ameliyatı oldu.

cataract surgery have-PST

"Selda Şar, who had not seen her father for 22 years, had a cataract surgery"

Selda Şar'ın gözleriyle ilgili sorunu devam etmektedir. D/(Y)- Selda Şar's problems with her eyes still continue. T/(F)

9. İkinci bir emre kadar, birinci Emre

Second one Emre/order-DAT until first Emre

de idare eder.

also be enough

"As the second Emre, the first Emre is enough"

Note: in this sentence, the word 'emre' is activated as the word which means 'order' and then the reader understands that 'emre' here is a name.

İlk Emre ikinci Emre'nin yerine kullanılabilir. (D)/Y – The first Emre can be used instead of the second Emre. (T)/F.

10.	Bir	insan	yedisinde	neyse	yetmişinde	de
	One	human	age-seven	what-if	seventy	also
	neydir.					
	reed flute-PRES					

"If a person is a reed flute when he/she is seven, he/she is also a reed flute when he/she is seventy."

Note: In this one – liner, when the reader reads "bir insan yedisinde neyse" part, he/she is most likely to active the proverb: a child is father of the man". However, when he/she reads "neydir", he/she is forced to leave the proverb and active the "ney /reed flute" meaning.

İnsan üflemeli bir çalgı olan neye benzemektedir. (D)/Y – The person resembles a reed flute which is a wind instrument. (T)/F.

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