Hacettepe University Graduate School of Social Sciences
Department of English Linguistics

CUMULATIVE AND COLLECTIVE READINGS IN THE SENTENCES CONTAINING PLURAL AMBIGUITY IN TURKISH: A PRIMING STUDY

Zahide Kübra AYANOĞLU

Master's Thesis

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KABUL VE ONAY

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Zahide Kübra AYANOĞLU tarafından hazırlanan "Çok Anlamlı Çoğul Tümcelerde Kümülatif ve Kolektif Yorumlamalar: Bir Hazırlama Çalışması," başlıklı bu çalışma, 24/05/2022 tarihinde yapılan savunma sınavı sonucunda başarılı bulunarak jürimiz tarafından Yüksek Lisans Tezi olarak kabul edilmiştir.

[redacted]

Doç. Dr. Emine YARAR (Başkan)

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Doç. Dr. Duygu ÖZGE (Üye)

Yukarıdaki imzaların adı geçen öğretim üyelerine ait olduğunu onaylarım.

Prof. Dr. Uğur ÖMÜRGÖNÜLŞEN

Enstitü Müdürü

YAYIMLAMA VE FİKRİ MÜLKİYET HAKLARI BEYANI

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ETİK BEYAN

ETİK BEYAN

Bu çalışmadaki bütün bilgi ve belgeleri akademik kurallar çerçevesinde elde ettiğimi, görsel, işitsel ve yazılı tüm bilgi ve sonuçları bilimsel ahlak kurallarına uygun olarak sunduğumu, kullandığım verilerde herhangi bir tahrifat yapmadığımı, yararlandığım kaynaklara bilimsel normlara uygun olarak atıfta bulunduğumu, tezimin kaynak gösterilen durumlar dışında özgün olduğunu, **Dr. Öğr. Üyesi, Taylan AKAL** danışmanlığında tarafımdan üretildiğini ve Hacettepe Üniversitesi Sosyal Bilimler Enstitüsü Tez Yazım Yönergesine göre yazıldığını beyan ederim.



Zahide Kübra AYANOĞLU

ACKNOWLEDGEMENTS

It makes me feel as if it was yesterday when I started this Master journey. It took longer than it is expected but I enjoyed every single moment. There are so many wonderful people who have encouraged and helped me in several ways during this period. This thesis would not have been possible without their precious contribution.

First and foremost, I would like to express my deepest gratitude to my advisor, Asst. Prof. Taylan Akal. I am sincerely indebted to him for his constant support since even when I was an undergraduate student. His academic guidance and solid work ethics have been tremendously inspiring. I am thankful to him for his patience, kindness, and faith in me throughout this thesis. I feel privileged to have worked with him.

I would like to thank Assoc. Prof. Emine Yarar and Assoc. Prof. Duygu Özge for their academic support and kindness during the thesis defence exam. I am thankful for their precious comments and contribution to this thesis.

I would also like to thank Asst. Prof. Zeynep Doyuran and Dr. Ruhan Güçlü for their supports. Sümeyye Büyükbirer, my brilliant friend, I am indebted to you for your constant support. You always backed me up and believed in me. You always know how to cheer me up when I am moody. You were there with me at every step, I cannot thank you enough.

Special thanks to my brother Ömer Faruk Özkan for his technical helps especially during the analysis of the thesis. Moreover, I would like to thank my cousin Rabia Özkan, my sister Ayşe Kandil and my grandfather Mehmet Özkan.

There are special people who always encouraged and supported me since the time we met. I would like to express my gratitude to Ayanoğlu family; especially Hakan Ayanoğlu and Funda Ayanoğlu. They were always there whenever I need them. Thank you for being my family.

Last but not least, my endless gratitude is to my husband, Mert Ayanoğlu. I am deeply grateful to you for being there for me and with me whenever I need. Your presence makes my life better and easier. You have always believed in me. Thank you for your constant support, great patience, and unconditional love. You tolerated me during those stressful days; you always find a way to make me laugh with your brilliant humour. You also helped me with several aspects of the thesis especially technical settings. Words cannot describe how I am lucky to be with you. Thank you for being with me in all of time and space; everything that ever happened or ever will.

ABSTRACT

AYANOĞLU, Zahide Kübra. *Cumulative and Collective Readings in the Sentences Containing Plural Ambiguity in Turkish: A Priming Study,* A Master's Thesis, Ankara, 2022.

Some sentences, which contain more than one plural expression, namely numerical expressions, bring about lexical ambiguities. For example, the sentence '*İki çocuk üç kitap taşıdı.' (Two boys carried three books)* contains more than one meaning. This sentence can be read as there are two boys and one of the boys keeps one of the books and the other boy keeps two books (*cumulative reading*). The other interpretation of the sentence is that there are two boys and three books, and three books were carried by those two boys at the same time (*collective reading*). In this study, the results of three experiments were reported. These results indicate that whether priming can affect the participants' choice, regarding cumulative/collective contrast. Sentence-picture matching tests were used to investigate whether native speakers of Turkish are influenced by priming one of the interpretations. In the prime trials, participants carried out a sentence-picture matching task which gives rise to a strong bias against one of the two types of readings to different participants, in experiment 1 collective prime, in experiment 2 cumulative prime and in experiment 3 (control experiment) no prime. In the target trials, participants' preferences were analysed to see whether there is a relation between collective/cumulative prime and collective/cumulative responses. Results of three experiments show that there is a symmetrical relation between collective prime and collective responses while there is an asymmetrical relation between cumulative prime and cumulative responses. It seems that native speakers of Turkish are prone to choose collective interpretation of the ambiguous sentences that contain more than one plural expression.

Keywords

Psycholinguistic, priming, plural ambiguity, cumulative reading, collective reading

ÖZET

AYANOĞLU, Zahide Kübra. *Çok Anlamlı Çoğul Tümcelerde Kümülatif ve Kolektif Yorumlamalar: Bir Hazırlama Çalışması,* Yüksek Lisans Tezi, Ankara, 2022.

Birden fazla çoğul ifade özellikle sayı ifadeleri içeren bazı tümceler çok anlamlılığa yol açmaktadır. Örneğin; *'İki çocuk üç kitap taşıdı.'* tümcesi birden fazla anlam içermektedir. Bu tümce; iki çocuktan biri bir kitap taşıdı ve diğeri iki kitap taşıdı *(Kümülatif anlam)* olarak ya da iki çocuk ve üç kitap var ve bu üç kitabı iki çocuk birlikte taşıdı *(Kolektif anlam)* olarak yorumlanabilir. Bu çalışmada, üç deneyin sonuçları bildirilmiştir. Bu sonuçlar hazırlamanın kolektif/kümülatif zıtlığının katılımcıların seçimlerini etkileyip etkilemediğini göstermiştir. Anadili Türkçe olan katılımcıların bu yorumlamalardan birinden etkilenip etkilenmediğini araştırmak için tümce-resim eşleştirme testleri uygulanmıştır. Hazırlama aşamasında farklı katılımcılar iki yorumlamadan birine güçlü bir ön yargıya yol açan bir tümce-resim eşleştirme testi - deney 1'de kolektif hazırlama, deney 2'de kümülatif hazırlama ve deney 3'te (kontol deneyi) hazırlama olmadan- uygulanmıştır. Hedef aşamasında kolektif/kümülatif hazırlamanın katılımcıların tercihlerinde etkisi olup olmadığı analiz edilmiştir. Üç deneyin sonuçları, kolektif hazırlamayla kolektif yorumlama arasında simetrik bir ilişki olduğunu gösterirken, kümülatif hazırlama ile kümülatif yorumlama arasında asimetrik bir ilişki olduğunu göstermiştir. Türkçe anadili konuşurları birden fazla çoğul ifade içeren çok anlamlı tümceleri kolektif olarak yorumlamaya yatkın gibi görünmektedir.

Anahtar Sözcükler

Psikodilbilim, hazırlama, çoğul çok anlamlılık, kümülatif yorumlama, kolektif yorumlama

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LIST OF ABBREVIATIONS

ACC	: Accusative
D	: Determiner
DIST	: Distrubutor marker
DP	: Determiner phrase
EVID	: Evidence
GEN	: Genitive
IMP	: Imperative
L1	: First language
L2	: Second language
LF	: Logical form
LOC	: Locative
MSC	: Minimal semantic commitment
N	: Noun
NEG	: Negative
NP	: Noun phrase
NOM	: Nominative
PAST	: Past
PL	: Plural
POSS	: Possessive
PROG	: Progressive
SPSS	: Statistical Package for Social Sciences
VP	: Verb phrase
QP	: Quantifier phrase
SG	: Singular
STD	: Standard
VN	: Verbal noun
VPL	: Verbal plural
1	: First person
3	: third person

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INTRODUCTION

Psycholinguistics is a field that tries to understand and analyse language processing, language comprehension and production, vocabulary access, language acquisition, priming, linguistic impairments, and ambiguity resolution. Human brain tries to resolve ambiguity whenever it encounters with ambiguity.

There are two types of ambiguity: namely, lexical ambiguity and syntactic ambiguity. When a word contains more than one meaning such as; bat or bank, lexical ambiguity arises while due to the sentence structure, syntactic ambiguity arises, such as; John said he fell yesterday. Sentences with more than one plural expression can bring about ambiguity (May, 1985). Those sentences can be interpretated as cumulatively, collectively or distributively. However, sentences containing more than one plural expression in Turkish do not seem to have distributive interpretation since, Turkish has an overt distributive marker '-şer', therefore, that suffix is used to give distributive interpretation.

Using priming as an experimental method, whether priming native speaker of Turkish with one of the interpretations affects their choices of ambiguous sentences has analysed. Following chapters are going to give more information about the background, aim of the study, methodology, analyses, and conclusion.

CHAPTER 1

THE STUDY

1.1. OVERVIEW ON STRUCTURAL PRIMING IN PSYCHOLINGUISTIC RESEARCH

Mental representation of Linguistic knowledge and how that knowledge is handled in production and comprehension in combination with nonlinguistic knowledge is always interesting for the psycholinguists. Mental representation of language is a crucial element of a theory of language processing. Priming can make available an experimental method to study mental representation (Branigan et al. 1995). Pickering and Ferreira (2008) explain priming as being affected by the specific form that is currently repeated. In psycholinguistics, the frequent form of priming is 'structural priming' also known as 'syntactic priming' or 'persistence' (e.g. Pickering & Branigan, 1999). Bock, (1986b, 1989); Bock & Loebell, (1990); Bock, Loebell & Morey, (1992); Branigan, et al., (1995); Potter & Lombardi, (1998); Pickering and Branigan, (1998) shows experimental evidence that repeatedly employed syntactic structures are observed during language production. Bock (1986, 1989) defines structural priming as speakers tend to use the same or related syntactic forms that are repeatedly occurred across utterances.

Experimental studies on syntactic priming date back to Levelt and Kelter (1982). They established and conducted some experiments to attain that speakers are prone to recur forms from previous conversation. It is shown that speakers' answers to the question are affected by the formation of the question as seen in (1) below (Levelt and Kelter, 1982):

(1) Question: To whom lets Paul his violin see?
Answer: To Toos.

Question: Whom lets Paul his violin see?
Answer: Toos.[1]

Speakers' answers to those questions vary according to whether the preposition is included or not. Another experimental study was conducted by Bock (1986). In those experiments, on each

[1] The questions and answers with and without prepositions were originally in Dutch. "*(Aan)wie laat Paul zijn viool zien?*" was the question with or without the preposition "*Aan*", and "*(Aan) Toos*.", was the corresponding answer, again with or without the preposition "*Aan*".

priming trial, participants generated a priming sentence that could be one of the syntactic forms that were given. After that, in a picture, participants were shown a scene that is semantically irrelevant, and they were asked to describe that picture by using only one sentence. When a certain syntactic form was used in the prime trial, the probability of participants' generating that syntactic form increased. Some of the priming sentences are given below from the Bock's (1986) experiments:

(2) A gunshot shattered the forest's stillness. / The forest's stillness was shattered by a gunshot.

(3) The computer outsmarted the chess master. / The chess master was outsmarted by the computer.

Sentences (2) and (3) are transitives and participants uttered either the active or passive form of the sentences in the prime trials.

(4) The governess made a pot of tea for the princess. / The governess made the princess a pot of tea.

(5) The foundation is giving several million dollars to the university. / The foundation is giving the university several million dollars.

As it is seen above, (4) and (5) are datives and participants uttered either the prepositional or double object form of the sentence in the prime trials.

According to Bock's experiments (1986), priming had effects specifically on not the sentence content but the sentence structure.

Branigan, Pickering et al. (1995) defend syntactic priming assists experimental work on the mental representation of grammatical knowledge. Exposing a certain syntactic structure can affect the following constructions as the same or similar structures due to that structure. After considering of corpora findings for syntactic priming, experimental outcomes for priming in comprehension, as well as bidirectional priming between comprehension and production were carried out by Branigan et al. (1995). The conclusion of this research shows syntactic priming can be used as a tool to investigate that language is represented mentally. Furthermore, bidirectional syntactic priming helps us to reach the knowledge of language.

Branigan and Pickering (1998) report five experiments using a written completion task to investigate syntactic priming. The first two experiments show that when the prime and target contain different verbs, priming occurs, however; when the same verb is repeated, a stronger

priming effect has been observed. In the other experiments, they observe whether the tense, aspect, or the number of the verb has changed or remain the same in both target and prime. As a result, the priming is not affected in these experiments. In their research there is significant evidence that during language production, accessing semantic and syntactic properties of lexical entries are different from phonological and morphological properties.

Chang et al. (2000) proposed that structural priming is a form of implicit learning in their study. Connectionist model of language production was carried out to test and developed their hypothesis. To pretend implicit learning, this model of language production use combined mechanism. The result of the study shows that for generalization of the model, production comprehension-based representations are significant. Moreover, non-atomic message representations have a better adaptation to existing data on structural priming.

Another example of the studies that investigate whether structural priming is an implicit learning or transient action is tested by Bock and Griffin (2000). Their major concern is to reveal whether structural priming includes short-term activation from a memory representation of certain structure or long-term adaptation for generating sentences as a form of procedural learning. The results of the two experiments show that structural priming maintains longer than standards of normal limitations on explicit memory for sentence form. Therefore, they interpret those results as structural priming is a form of implicit learning.

According to one point of view, it is possible that speakers do the repetition on purpose. People repeat themselves or others due to stylistics, sociological and rhetorical intentions. (Giles and Powesland (1975); Tannen (1987); cited in Bock, 2003).

> ‘Repeating is a wonderful thing in being, everything, everyone is repeating then always the whole of them and so sometime there surely will be an ordered history of everyone.'
>
> -Gertrude Stein, *The making of Americans* (284) in Tannen (1987).

Speaker 1: ‘‘Repeating patterns is what you have to check for when you buy your paper.’’

Speaker 2: ‘‘Yes ... that’s what I needed and I didn’t think about that. I got a Mickey Mouse print is what I got.’’

The given example was from the Switchboard corpus (Godfrey et al. 1992 in Bock, 2003).

Structural priming effect is also observed to be effective on the utterances of bilinguals. Bock (2003) submitted that priming effect on bilinguals and experimentally tested it between English and German. In the conclusion of his study, even when the probabilities for semantic transfer are minimum, structural priming increases the number of similar outputs; therefore, there is a possibility that structural priming is a form of implicit learning.

There are other studies, which propose that structural priming is a form of implicit learning. The evidence suggests that in general structural priming has features of learning and implicit learning (Bock and Ferreira, 2006). Moreover, they suggest that structural priming increases fluency (only some evidence advocate that aspect), and also it is alignment among collocutors.

Shin and Christianson (2012) state that in the form of long-lag structural priming, while implicit instruction affects just implicit learning, explicit instruction with structural priming fastens short-term improvement. They found out the mentioned outcome through the application of a structural paradigm by comparing explicit instruction to implicit instruction, considering the long-term effects of instruction on L2 generating and the complexity of structures. Moreover, the results of the study show that (a) structural priming in L2 learners contains both explicit memory representation and implicit learning of abstract structural representation and (b) in the long-term, implicit learning is helpful for L2 production especially in complex structures.

While some studies claim that structural priming is a form of implicit learning within the language production system (e.g Chang et al. 2000), some others propose that it is a kind of temporary spreading of activation (e.g., Pickering & Branigan, 1998), or a combination of both mechanisms (e.g., Reitter, Keller, & Moore, 2011). Kaschaki, Kutta and Jones (2011) revealed two aspects of the claim that long-termed structural priming effects are the examples of implicit learning. By biasing the participants to the certain structures, which are prepositional object constructions, participants show stronger cumulative priming effect rather than when they biased the participants toward the double object construction.

One of the recent studies about priming is priming plural ambiguities, which is scrutinized by Maldonado, Chemla & Spector (2017). Sentences that involve two or more plural expressions give rise to systematic ambiguities and three experiments show that distributive/cumulative ambiguity can cause the priming effect (Maldonado, Chemla, & Spector, 2017). A sentence-picture matching task, which creates a strong bias to one of the two types of interpretations is performed by English native speakers. The result of the study shows that cumulative-distributive ambiguity causes priming effect across different sentences.

1.2. PRIMING STUDIES ON TURKISH

Various languages have been studied in terms of priming effects such as; Persian, Spanish, Korean, Turkish, Thai, Mandarin Chinese, Dutch (e.g., Ameri-Golestan et al., 2012; Hartsuiker et al., 2004; McDonough et al., 2008; Bahadır 2012; Stabile et., 2015; Vasilyeva, Waterfall, Gámez, Gómez, Bower, & Shimpi, 2010; Kim et al., 2008; Hartsuiker, Kolk, & Huiskamp, 1999). Studying on structural priming is relatively new on Turkish.

The pioneer study in structural priming research in Turkish investigates "structural priming" in the processing of two types of Turkish genitive-possessive (GEN-POSS) constructions (Bahadır, 2012). The structures, which were used in the study, are possessive noun phrases as given in (6) below:

(6) Korsan, [prenses-in(GEN) öykü-sün(POSS.3SG)]-ü hatırladı.
The pirate remembered [the princess's story].

and embedded noun clauses as predicates with nominalized verbs:

(7) Korsan, [prenses-in(GEN) gül-düğ(VN)-ün(POSS.3SG)]-ü hatırladı.
The pirate remembered [that the princess (had) laughed/was laughing].

3 groups of experiments were carried out in the study. Written sentence completion task was used in the first experiment to analyse structural priming in production. In the second experiment, series of comprehension to production completion task were carried out. In the last experiment, to understand structural priming in comprehension, self-paced reading and eye-tracking method were applied.

The results of this study show that it appears that priming is sensitive to the distinction between the phrasal *vs*. clausal nature of structures.

Another priming study that Karakaplan Hanoğlu (2016) conducted investigates priming effect in L2 English. The aim of the study is to analyse whether grammatical and ungrammatical priming affects on L1 Turkish – L2 English learners in the production of the third person singular -s in English. The results of the study state that no significant difference has been found by using the correct form of -s. Therefore, in inflectional morphology, the interlanguage grammar of L2 learners cannot be changed based on priming.

A masked priming study on Turkish analysed the second language processing of nominal compounds (Çelikkol Berk, 2018). The aim of the study is to investigate how the nominal (noun noun) compound words are processed by L2 English learners whose native languages are

Turkish. 4 masked priming experiments were performed to analyse the compound words' processing of L2 English learners. In two experiments, first constituent priming (e.g. bedroom – BED) was used to examine both high and low proficiency of English L2 learners. The second component of noun-noun compound words (e.g. bedroom – ROOM) were used in the final two experiments to investigate not only high proficiency but also low proficiency of English L2 learners whose mother tongue are Turkish. The outcomes of the study indicate that both high and low proficiency of L2 English learners have similar mechanism when they process the noun noun compound words; on the other hand, during the processing of compound words, low proficiency L2 learners rely more upon the declarative memory system. Moreover, regardless of semantic information and orthographic overlap, morphological decomposition starts at the beginning of visual word recognition and lexical representation of the first constituent has a notable role.

One of the recent studies about priming in Turkish investigates the effect of syntactic priming on passive structures of Turkish English bilingual's production (Ergin Arman, 2019). Both participants and the researcher described a picture one by one to each other. Half of the participants were given English primes. The other half was presented with Turkish primes. Each half was divided into two groups and prime types were altered as active or passive. The results of the study point out that in the production of passives, the direction of the primes did not play a role; nevertheless, both in Turkish-English and English-Turkish conditions priming effect was observed. Participants uttered a passive sentence in English even when they heard a passive sentence in Turkish or vice versa. Therefore, regardless of the direction of priming, there is a symmetrical relation between in Turkish-English bilinguals with respect to priming effect.

Structural priming is drawn upon to understand the representation of the language in mind and language processing. It is used with many topics and methods such as; Bock's (1986) picture-description paradigm, written sentence completion (Pickering & Branigan, 1998), and spoken sentence completion (Branigan, Pickering, Stewart, & McLean, 2000) and with other languages; Dutch (Hartsuiker & Kolk, 1998b) and German (Scheepers, 2003), Collocational Priming in Turkish (Cangır, Büyükkantarcıoğlu, Durrant, 2017) with a range of constructions; order of subject and locative (Hartsuiker, Kolk, & Huiskamp, 1999), the order of verb and auxiliary (Hartsuiker & Westenberg, 2000), and the form of complex noun phrases (Cleland & Pickering, 2003), Genetive-Possessive (GEN-POSS) constructions (Bahadır, 2012), plural ambiguities effect (Maldonado, Chemla, & Spector, 2017), and production; Turkish English bilinguals' passive production (Ergin Arman, 2019). In short, structural priming is related to wide range of topics in psycholinguistics. It provides us to discover mental representation of grammar. It has proven that structural priming is a multifaceted long-lasting phenomenon; therefore, it is a very

useful tool in understanding the mental representation of grammar and how it functions in both comprehension and production.

1.3. STATEMENT OF THE PROBLEM

Sentences that contain more than one meaning create ambiguity. When sentences have plural expressions such as numerical expressions they may have 'Collective', 'Cumulative' or 'Distributive' interpretations as given in (8) below from Sternefeld (1998);

(8) Five men lift two pianos.

Cumulative reading of the sentence is that each of the five men and each of the pianos are involved in some lifting, so there are two pianos lifted.

Kratzer, (2005) shows that DPs with plural agreement features in English can cause to distributive/cumulative interpretations:

(9) Twenty children ate ten pizzas.

Cumulative reading of (9) is ten pizzas were eaten and twenty children did it. It is not important how the ten pizzas were shared among the children.

Another example is;

(10) Two boys carried three books.

This sentence contains more than one reading: it can be read as: there are two boys and one of the boys keeps one of the books and the other boy keeps two books (cumulative reading). The other interpretation of the sentence is that there are two boys and three books, and three books were carried by those two boys at the same time (collective reading).

Since the ambiguities deriving from cumulative or collective interpretation in Turkish have not been studied in detail, to analyse them by using structural priming with experimental data may assist us in comprehending the resolution of such kinds of ambiguities as well as the mental representation of language.

This study aims at using priming experiments with ambiguous sentences containing plural expressions, which have either 'cumulative' or 'collective' meaning. Structural priming can influence participants' choice of meanings. To put it in a different way, when a sentence is ambiguous with these two interpretations, namely cumulative and collective, priming

experiments try to figure out whether priming can lead to participants to one of those interpretations.

As in all priming research, this study also contributes to the understanding of the relation between mind and language. Moreover, it contributes to cross-linguistic variation by focusing on one specific language. No priming study exists on investigating the plural expressions that cause to ambiguity in Turkish. As a result, this study is notable in that it uses priming studies to examine cumulative and collective interpretations in ambiguous sentences in Turkish.

1.4. AIM OF THE STUDY

This present study constitutes a psycholinguistic exploration of processing of language and employs 'structural priming' in the investigation of a specific construction of Turkish; namely ambiguous sentences containing plural expressions such as numerical expressions. The specific constructions chosen for the study have multiple readings: either 'cumulative' or 'collective' interpretations since they involve numerical expressions.

This current study aims to figure out whether priming participants with cumulative/collective interpretations influence the choice of native speakers of Turkish in ambiguous sentences. Also, it aims to determine such priming effect is symmetric or asymmetric if the priming effect is found regarding cumulative/collective contrast.

This study tries to answer the following questions:

1.4.1. Research Questions

This study aims to answer the questions below, which corresponds with the aims of the study:

1) Can priming affect Turkish native speakers' comprehension of ambiguous sentences regarding collective-cumulative interpretations?

2) If priming effect is found, would it be symmetric or asymmetric with respect to cumulative/collective contrast?

1.5. OUTLINE OF THE CHAPTERS

This study contains 5 chapters. The first chapter includes overview on structural priming in psycholinguistic research, statement of the problem, aim of the study and research questions.

The second chapter includes background to the study with related topics. General information about the plurality in Turkish, quantifiers and scope relations, ambiguity in quantifier interpretation, and ambiguity resolution in quantifier interpretation.

The third chapter includes methodology; pilot study and present study. It provides how to collect data, procedure, data analysis and limitations of the study.

The fourth chapter includes analysis, discussion of the findings related to the research questions.

The fifth and the last chapter is the conclusion of the study.

CHAPTER 2

BACKGROUND TO THE STUDY

2.1. PLURALITY IN TURKISH

In Turkish dictionary which is published by Turkish Language Society defines plurality as; opposite of singularity, togetherness, word forms that show more than one entity or person (Akalın etc., 2011 cited in Alyılmaz, 2017).

The definition and examples of plural/plurality are shown below from different studies:

Underhill (1976) states that plurality occurs when the suffix -lEr is added at the end of the noun.

(11) At - At-lar
Horse - *Horse**s***

Lewis (2000) expresses numbers as plurals, by adding -lEr to the singular noun to form plural. While denoting a category or an individual from that category, the noun is number neutral such as; polis/the police, bir polis/a policeman, polisler/the policemen.

(12) Öğrenci - Öğrenci-ler
Student - *Student**s***

According to Sağ (2019), both in Turkish and English nouns are shown in two ways; unmarked for number and marked plural. In English unmarked nouns are considered as singular but Turkish has no clear distinction. Unmarked nouns sometimes can be regarded as singular and sometimes as plural. Examples from Sağ (2019):

(13) Ali kitap oku-du.
Ali-NOM book read-PAST
'Ali read one or more books.'

(14) Oda-da fare var.
room-LOC mouse exist
'There is a mouse/are mice inside.'

On the contrary, sometimes unmarked noun is considered as singular when a noun in object position marked with accusative case:

(15) Ali kitab-**ı** oku-du.
Ali-NOM book-ACC read-PAST
'Ali read the book.'

2.1.1. Plurality of Verbs in Turkish

The idea that verbs are born as plural is suggested by Krifka (1992). He concentrates on the atelic and telic expressions that are about accomplishment. If a verbal expression denotes no terminal points it is atelic (e.g., run) while if it contains a terminal point such as *run a mile*, the verbal expression is telic. Krifka (1992) gives some examples that show atelic expressions enable durative adverbials (e.g., in an hour) but not time-span adverbials (e.g., in an hour), whereas the situation of the telic expressions is vice versa. Examples given by Krifka (1992) are shown below:

(16) a. John ran (for an hour) / (*in an hour).

b. John ran a mile (*for an hour) / (in an hour).

Kratzer (2005) also mentions the plurality of verbs. She gives the verb *fall* as an example, which denotes a relation between individuals and events. The individuals are related to their falls. Therefore, *fall* might connect plural individuals to plural events because there is a weak notion of plurals suggesting that singularities are special cases of pluralities (Link, 1983).

Cabredo (2010) discriminates event plurality as 'the expression of the multiple events' from 'verbal plurality', which is the expressions of multiple events by markers on the verb (also called pluractional markers). She studies verbal plurality and event plurality in different perspectives and classifies different languages such as; the semantic field of verbal plurality, types of event plurality. She also looks at a few analyses of pluractional markers that are influential in the semantic literature in some languages: Papago, West Greenlandic and Chechen etc.

There is limited number of studies on the plurality of verbs in Turkish. One of the significant research projects on verbal plurality is studied by Aksan & Aksan (2006). They report that the nature of plurality in nominal and verbal categories is supposed to be the same: both domains

have equally mass/count and bounded/unbounded distinctions. In the general sense, verbal plurals can be observed when first, multiple agents perform actions; second, actions are performed multiple times; and third, and when actions are temporarily or locationally extended through time.

In Turkish, the two most common verbal plurality affixes are '-ala-' and '-akla-' (Aksan & Aksan, 2006). Those affixes are often considered as compound morphemes; -a and -ak are followed respectively by denominal verbalizer -la. Banguoğlu (1956) claims that there is no distinction between -iştir and -ala in terms of meaning and context of use. Examples from Banguoğlu (1956) are shown below:

(17) serp-iştir / serp-ele
Sprinkle repeatedly

(18) it-iştir / it-ele /it-ekle
Push repeatedly / do small pushes

(19) oğ-ala /ov-ala
Break something into small pieces / Scrub repeatedly

(20) çit-ile
Rub while washing

Banguoğlu (1956) also mentions about different verbal plurality affixes such as; -erle-, -mele-, -işle- -iktir- etc. But those affixes are not used in Modern Turkish anymore.

Cusic (1981) distributes verbal plurality into four parameters considering that verbal plurality as a semantic category; (1) the event ratio parameter, (2) the relative measure parameter, (3) the connectedness parameter, (4) the distribution parameter (cited in Aksan & Aksan, 2009).

Aksan and Aksan (2009) consider that in Turkish both morphological and postverbal event pluralities are repeated actions. Event pluralities in Turkish do not indicate phrase repetition; moreover, they show plural events on a single occasion, which expresses an event-external repeated action. Table 1 and the following examples given below from Aksan & Aksan (2009) show markers of verbal plurality summarizing the parameters and explicating them:

Table 1: Markers of Verbal Plurality (Aksan & Aksan, 2009)

Parameters	Morphological verbal plurality (-ala/-akla) (micro) action 1,2,3…n	Postverbal plurality (-ıp dur-) ACTION 1,2,3,…n
The event ratio parameter	Event-external, Single occasion	Event-external, Single occasion
The relative measure parameter	Decrease -diminutive -tentative -incassative Increase -intensive Augmentative - Excessive - Durative Continuative	Decrease N/A Increase - Durative continuative
The connectedness parameter	Precise count	Imprecise count

As shown in table 1, there are some markers to indicate verbal plurality parameters. Examples are shown below:

Single event:

(21) Ali Hasan-ı dürt-tü
Ali-NOM Hasan-ACC prod-PAST-3SG
'Ali prodded Hasan.' (once)

Micro events of the same type repeated:

(22) Ali Hasan-ı dürt-ükle-di.

Ali-NOM Hasan-ACC prod-VPL-PAST-3SG

'Ali prodded Hasan repeatedly.' (once or multiple times)

Sequence of identical event repeated:

(23) Ali Hasan-ı dürt-üp dur-du.

Ali-NOM Hasan-ACC prod-CV-stand-Past-3SG

'Ali kept on prodding Hasan.'

Diminutive meaning:

(24) Bisküvi-ler-i kır-ıkla-yın

Biscuit-PL-ACC break-VPL-IMP

'Crumple the biscuits.'

Tentative meaning:

(25) Herkes ağz-ın-da birşey-ler gev-eli-yor.

Everybody-NOM mouth-POSS.3SG-LOC something-PL mumble-VPL-PROG.3SG

'Everybody mumbles something in his mouth.'

Incassative meaning:

(26) Bütün gün boş boş gez-ele-di.

All day empty empty wander-VPL-PAST-3SG

'He wandered all day (long) aimlessly.'

Intensive meaning:

(27) kov-ala-mak

To pursue incessantly

Augmentative meaning:

(28) Tavuğ-u küçük parça-lar halinde did-ikle-yin.
Chicken-ACC small part-PL in the state of Pick-VPL-IMP
'Cut up the chicken into tiny pieces.'

In the conclusion of the study by Aksan & Aksan (2009), two types of verbal plurality, namely morphological verbal plurality and postverbal plurality, have been discussed. The study shows similar results in Turkish in terms of cross-linguistically attested meanings of plurality.

2.1.2. Plurality of Nouns in Turkish

According to Hatiboğlu (1982) plural means 'The way of stating multiple existences with specific suffixes or words: Evler *(houses)*, elmalar *(apples)*, ordular *(armies)*, evlerimiz *(our homes)*, biz *(we)*, onlar *(they)* etc.'

Banguoğlu (2007) defines plurality as; –lEr suffix is added at the end of a noun to indicate more than one entity: insanlar *(people)*, çocuklar *(children)*, dağlar *(mountains)* etc.

According to Demir and Yılmaz (2010:206), the plurality suffix shows plurality at the end of countable words and with non-countable words, it shows exaggeration when it is used at the end of that uncountable word. For instance, evler *(houses)*, çocuklar *(children)*, sular *(waters)*, soğuklar *(colds)* etc.

Alyılmaz (2017) argues that suffixes/morphemes are linguistic elements that express the formation of plurality. They are not plurality itself. She also suggests that /+lar/ affix is not the only linguistic element for making plural in Turkish. But most of the affixes had lost their functions of plurality due to the historical processes.

As many studies show, in Turkish, to indicate plurality the suffix *-lAr* is used mainly as in the example of plural nouns (Lewis; 2000, Göksel & Kerslake; 2005, Korkmaz; 2009):

(29) Köpekler *'dogs'*

(30) Şunlar *'these'*

Two forms of plural suffix are: [lar] (as in Kitap-lar *'books'*) and [ler] (as in kalem-ler *'pencils'*). The alternation occurs due to the vowel harmony in Turkish (Csato & Johanson, 1998). Examples that are allomorphs of -lAr are presented in table 2 (Önem, 2016):

Table 2: Allomorphs of -lAr

Turkish Word	English Word	Phonetic Transcription
Köpekler	Dogs	köpekleɾ
Arabalar	Cars	aɾabalaɾ
Kediler	Cats	kedileɾ
Kuşlar	Birds	kuʃlaɾ

Vowel harmony with preceding syllable plays an immense role in deciding which allomorph of -lAr is used. [ler] is used when the preceding syllable is a front vowel, while [lar] is used when the preceding syllable is a back vowel (Önem, 2016).

In Turkish, when numeral+noun construction is used, all numerals linked with morphologically singular nouns, even numerals that are different from 1 (Bale, Gagnon & Khanjian 2011a):

(31) Bir { çocuk | *çocuk-lar}
one boy.SG boy-PL
'One boy'

(32) İki {çocuk | *çocuk-lar}
two boy.SG boy-PL
'Two boys'

Underhill (1976) states that *-dır* is added at the end of a third person plural. Yet, omitting that suffix is common. Generally, *-lEr* is used when the subject is animate especially human, while *-lEr* is omitted when the subject is inanimate. Examples are shown below from Underhill (1976):

(33) Kızlar çalışkan.
The girls are hardworking.

(34) Kızlar çalışkandırlar.
Girls are hardworking.

There is no usage of 'Kız**lar** çalışkan**lar**'.

Lewis (2000) states that a singular noun follows the numerals such as; kırk harami (*forty thieves)*, üç silahşör (*three musketeers)*, however; there are some exceptions that are well-known and distinct entity such as, Kırk Haramiler *(The Forty Thieves)*, Üç Silahşörler *(Three Musketeers)*.

Plurals can be interpreted inclusively in negative statements and exclusively in positive sentences in some languages. In Turkish, Bale et al. (2010), Bale & Khanjian (2014) argue that plurals are interpreted inclusively, while Kan (2010) and Sağ (2018) discuss that in Turkish, plurals do not give rise to the same exclusive vs. inclusive variation as in English. Görgülü (2012) argues that Turkish plural nouns are not inclusive, on the other hand; Sağ (2016, 2017) suggests that they can be. Sağ (2018) shows that the Turkish plural can receive inclusive and exclusive denotation, as opposed to Bale et al. (2010), Bale & Khanjian (2014).

Examples given by Sağ (2018):

(35) Çocuk-lar sokak-ta top oynu-yor. EXCLUSIVE
child-PL street-LOC ball play-PROG
'Children are playing ball on the street.'
[More than one child is playing ball on the street]

(36) Çocuk-lar sokak-ta top oyna-mı-yor. INCLUSIVE
child-PL street-LOC ball play-NEG-PROG
'Children aren't playing ball on the street.'
[No child is playing ball on the street.]

In the numeral+noun construction in Turkish, when morphologically singular nouns are used without the numerals, they give rise to a number-neutral semantics; therefore, they are number-neutral semantically (Bale, Gagnon & Khanjian 2011a).

Bliss (2004), Göksel & Kerslake (2005), Görgülü (2012) argue that in Turkish, morphologically singular bare noun phrases are semantically number-neutral. Examples from Martí (2020):

(37) Kitap al-dı-m.
book buy-PAST- 1SG
'I bought a book/books.'

(38) Ali-yi **arı** sok-tu.
Ali-ACC bee sting-PAST
'Bees stung Ali' / 'Ali got bee-stung.'

(39) **Çocuk** gel-miş.
child come-EVID
'There was one or more children coming.'

In the given examples above, highlighted noun phrases are interpreted as number neutral as hypothesized in Bale, Gagnon & Khanjian (2011a). The reason is in these sentences noun phrases have a number neutral denotation. On the other hand, Sağ (2016, 2017) and Martí (2017) show that number neutrality in the examples depends on the incorporation of the related noun to the verb. When the noun is not incorporated, number neutrality is not observed.

The plural suffix that attaches to nominals should not be mixed up with the 3rd person plural marker *–lAr*, which is added on predicates to show subject agreement (Göksel & Kerslake; 2005):

(40) gid-iyor-lar
Go-CONT-3PL
'They're going.'

They also suggest that when an overt subject such as *millet* (*nation), aile (family)* that denote collectivity of human beings is used, the predicate does not have plural person marking:

(41) Onun ailesi hayvanları sever.
'His/her family loves the animals.'

Korkmaz (2009) shows that collective nouns can be attached to plural suffix:

(42) Milletler, ordular, sürüler etc.
'Nations, armies, herds etc.'

2.2. QUANTIFIERS AND SCOPE RELATIONS

Expressions, which denote number and quantity are called quantifiers (Peters & Westerståhl, 2006). The quantifier category is one of the subcategories of determiners, a distinction of part of speech (Carnie, 2013). Determiners modify the NPs. In English, they appear at the beginning of

noun phrases (NP). Articles *(the, a, an)*, deictic articles *(this, that, these, those)*, quantifiers *(every, some, many, most, few, all, each, any, less, fewer, no*), (cardinal) numerals *(one, two, three, etc.)*, possessive pronouns *(my, your, his, her, etc.)* and some wh-question words *(which, whose)* are subcategories of determiners. In phrases like *two books*, numerals look like to function as quantifiers like *all* or *few* regarding their function as counting elements.

There are two types of quantification; determiner quantification; *some, every, few* as in (43) and adverbial quantification; *always, usually* as in (44). Examples from Tunstall (1998) are shown below.

(43) Every child smiled.

(44) The cat usually sleeps during the daytime.

The syntactic structure of (43), a quantified determined phrase (QP) is shown below in Figure 1:

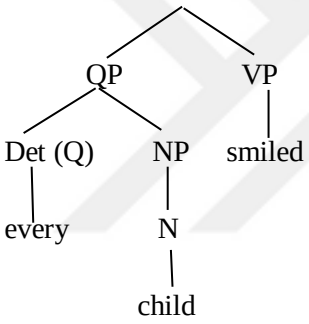


Figure 1: Syntactic Structure of Sentence (43)

The term ‘quantifier’ is sometimes used interchangeably with the term ‘determiner’ within the QP in the literature on quantification. In this present study both terms are used interchangeably as well.

Chierchia and Ginet (1993) assume that semantic interpretation is driven by the syntactic structure. They investigate the interpretation of quantificational expressions. They also define the QP’s scope is what it c-commands, which means node A c-commands node B if every node dominating A also dominates B, and neither A nor B dominates each other. Heim and Kratzer (1998) state that the denotation of proper names, definite descriptions, pronouns, and traces are individuals, therefore, they are elements of ‘D’. They also mention that there are several DPs

such as ‘that’, ‘a(n)’, ‘every’, ‘no’, ‘many’, ‘few’ etc. However, some DPs are not individuals such as ‘only John’.

2.3. AMBIGUITY IN QUANTIFIER INTERPRETATION

In the field of sentence comprehension, ambiguity resolution is one of the central topics in psycholinguistics. When human brain comes across with ambiguity, it tries to resolve it. Ambiguity can arise both at the lexical level (some words that have more than one meaning such as; bat) and at the syntactic level (it occurs because of the structure of the sentence such as; Mary said that the tree fell yesterday). In a sentence, when there is more than one quantifier, the sentence might be interpreted as ambiguous (May, 1985). There are some examples of scope ambiguities. For instance, sentences like (45) are semantically ambiguous:

(45) Everyone loves someone.

The two interpretations of these sentences can be shown with two formulas:

(45a) ∀ x ∃y [love(x,y)]

(45b) ∃ y ∀x [love(x,y)]

The syntactic structures of both readings are shown below in Figure 1 and Figure 2:

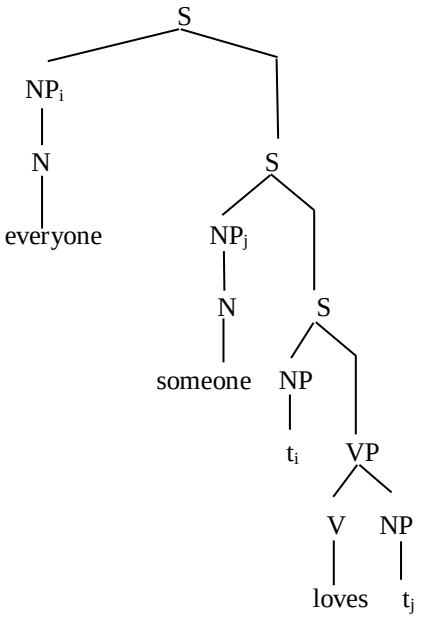


Figure 2: ∀ x ∃y [love(x,y)]

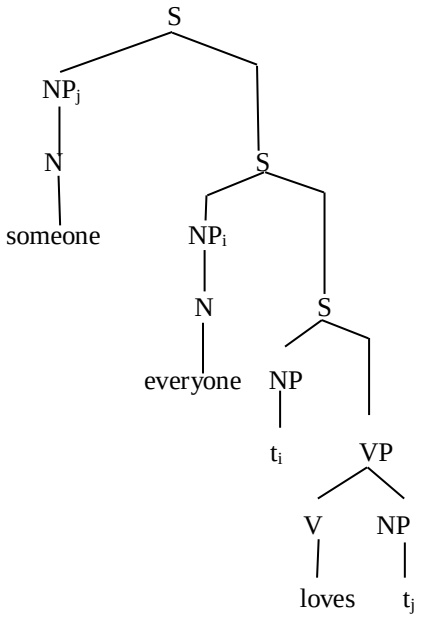


Figure 3: ∃ y ∀x [love(x,y)]

According to these formulas of the interpretations, Chierchia & Ginet (1993) state that in (45a) universal quantifier has wide scope because it is associated with the subject in (45); moreover, the existential quantifier has narrow scope because it is associated with the object in (45). To put it in a different way, (45a) means that everyone loves some person or other. On the contrary, in (45b) the existential quantifier has wide scope while the universal quantifier has narrow scope. The interpretation of (45b) is that everyone loves the same person.

Sentences with multiple quantifiers, give rise to several interpretations. As opposed to Scha (1981), Link (1984; 1987) assumes that every plural NP brings about either collective or distributive interpretations (cited in Verkuyl and Van der Does (1991)). Human brains try to solve ambiguity whenever runs into it. There are some psycholinguistic works on the resolution of the quantifier scope ambiguities focusing on declarative sentences (e.g. Kurtzman & MacDonald, 1993; Tunstall, 1997). On the other hand, Villalta (2003) investigates the resolution of quantifier scope ambiguities and presents experimental results using interrogative sentences. The study focuses on English and French interrogative sentences, which contain *'how many'* questions with a universally quantified subject '*every N'.* An example from the study is given (46):

(46) How many pieces did every musician play?

In the experiments, questionnaires in English and French and self-paced reading study in English show that context has an important role in the processing of scope ambiguity.

Tunstall (1998) focuses on the role, which individual quantifiers play in determining the quantifier scope preferences. The study's major goal is to establish a theory of the processing the doubly quantified sentences and in such sentences how the scope ambiguity is resolved. 3 experiments are conducted in the study. The results of the study show that *each* and *every* do not generally opt for the wide scope over another quantifier. Additionally, the evidence demonstrates that *each* only wants wide scope more than *every* under specific circumstances.

Another study about doubly quantified sentences investigates ambiguous sentences containing *a* and *every.* An example from Filik et. al. (2004) is shown in (47):

(47) Kelly showed a photo to every critic.

It can be understood that there is at least one instance of an entity; 'a photo'. On the other hand, the universal quantifier 'every' marks multiple entities or events. Moreover, it is clear that the number of the 'critic' is more than one. However, it is still ambiguous how many 'photos' there are. If 'every' takes the wide scope, the interpretation of the sentence will be 'Kelly showed a

different photo for each critic'. On the contrary, if 'a' takes the wide scope, it can be understood that 'There is only one photo and Kelly showed it to every critic'. Filik et. al. (2004) employs an eye-tracking experiment by manipulating the linear order (*a* or *every* first), grammatical order (direct object or indirect object first) and noun phrase (NP) anaphor continuation (singular or plural) in their study. The findings suggest that relative quantifier scope computed during normal reading can have an impact on the ambiguity processing. Moreover, competition between alternative interpretations may guide the scope ambiguity resolution.

Some sentences containing quantifiers such as 'all', 'each', 'every' and 'a' may have either 'collective' or 'cumulative' interpretations while some like (48a) have neither collective nor distributive meaning. However, (48b) has distributive reading. Examples from Verkuyl and van der Does (1991):

(48a) All men lifted three tables.

(48b) Each men lifted three tables.

Frazier, Pacht and Rayner (1999) developed the Minimal Semantic Commitment (MSC) hypothesis and they predicted that if the sentences have collective/distributive distinction then it is a matter of vagueness (the vagueness hypothesis), not ambiguity. But if a sentence has ambiguity rather than collective/distributive distinction, then MSC hypothesis predicts that selection of distributive reading or collective reading is an obligatory choice. Examples follow as:

(49a) David and Rose saved $1000 each to pay for their travel. (ambiguous, distributive)

(49b) David and Rose saved $1000 together to pay for their travel. (ambiguous, collective)

(49c) David and Rose each saved $1000 to pay for their travel. (unambiguous, distributive)

(49d) David and Rose together saved $1000 to pay for their travel. (unambiguous, collective)

According to Frazier et. al, (1999), the distributive/collective distinction is about ambiguity rather than vagueness. In the absence of evidence for a distributive interpretation, the processor commits itself to a collective reading sometime during the processing of the predicate.

2.3.1. Collective Interpretation of Quantifiers

Collectivity can be defined as the existence of entailments about a plural entity or the lack of distributivity (Champollion, 2015), which will be discussed in section 2.3.3. Collectivity (a plural entity as a whole) is also accepted as the opposite of distributivity (individuals from this entity).

Collective examples from Champollion (2015):

(50) The men met.

(51) The men are sharing a pizza.

It can be understood that the men are eating a pizza together, not each man is eating individually.

When more than one quantifier exists in a sentence, the sentence may be interpreted as ambiguous. Some sentences containing two or more quantifiers can have collective interpretation.

Another example from Sytett and Musolino (2013):

(52) Two boys lifted a box.

Collective reading of sentence (52) is 'There is only one box, and the box was lifted by a group of two boys together'. In their study, Syrett and Musolino (2013) investigate the collective/distributive distinction in regards of children's understandings and its meaning for the acquisition of the numerical expressions. The results of the study show that children tend to comprehend both interpretations; namely, collective and distributive.

Masolo et al. (2020) claim that group nouns are applied by collective predicates, such as; 'The deck (of cards) is scattered on the floor.' and 'The committee met in the cafeteria.' However, not all group nouns refer to collectivity. Collective predicates demonstrate a kind of unity. To put it in a different way, it does not mean that more than one musician set up an orchestra nor more than one tree form a forest, they are required to play together or bound to each other. What Masolo et al. (2020) propose is that not every plural predicate contains collectivity; an orchestra is a collective of musicians, a forest is a collective of trees and so on.

In Welsh, collective nouns have been studied whether they are a noun category or a plural allomorph by Nurmio (2017). After investigating several theoretical approaches about

distinctive features of morphological collectives and cognitive studies, Nurmio (2017) has found that when frequencies of the collectives are compared with their singulative forms, the most frequent ones are the collectives; however, the most frequent member is the singular when comparing the nouns of the singular/plural category. Therefore, the conclusion of the study supports that morphological collective can be considered a distinct noun category in Welsh. Moreover, no single criterion can determine whether morphological collectives are a noun category. Several different criteria such as agreement, suffixation vs non-suffixation etc. should be taken into consideration.

Another theoretical study indicates how different interpretations of plural and reciprocal sentences can be derived from syntactic surface structures, in that, inserting different logical operators at Logical Form (LF) causes the interpretations of the sentences (Sternefeld, 1998). He shows how plural predications can be represented at LF by giving an example with its formulas below:

(53) Five men lifted two pianos.

a. (∃X) (**five**(*X*) ^ ***man**(*X*) ^ ∃*Y*) (**two**(*Y*) ^ ***piano**(*Y*) ^ **lift**(*X*, *Y*)))
b. (∃*X*) (**five**(*X*) ^ ***man**(*X*) ^ *X* ∈ *λ*x*[(∃*Y*) (**two**(*Y*) ^ ***piano**(*Y*) ^ **lift**(*x*, *Y*))])
c. (∃*X*) (**five**(*X*) ^ ***man**(*X*) ^ (∃*Y*) (**two**(*Y*) ^ ***piano**(*Y*) ^ *Y* ∈ *λ*y*[**lift**(*X*, *y*)]))
d. (∃*X*) (**five**(*X*) ^ ***man**(*X*) ^ (∃*Y*) (**two**(*Y*) ***piano**(*Y*) ^ *X* ∈ *λ*x*[**lift**(*x*, *Y*)]))
e. (∃*X*) (**five**(*X*) ^ ***man**(*X*) ^ (∃*Y*) (**two**(*Y*) ^ ***piano**(*Y*) ^ *X* ∈ *λ*x*[*Y* ∈ *λ*y*[**lift**(*x*, *y*)]]))
f. (∃*X*) (**five**(*X*) ^ ***man**(*X*) ^ (∃*Y*) (**two**(*Y*) ^ ***piano**(*Y*) ^ ⟨*X*, *Y*⟩ ∈ ***λ*xy*[**lift**(*x*, *y*)]))

Sternefeld (1998) interprets (53a) as five men lift two pianos that one on the top of the other collectively. (53b) may be interpreted as there might be subsets of a set of five men and they lifted two pianos that is one stacked on top of the other. (53c) may be interpret as five men together lift two pianos, to put it in a different way, two pianos are lifted by five men at a time. (53d) is like (53b) but it is scopeless. In (53d), the number of the pianos does not have to match with the number of the men, therefore; two pianos are lifted by the men at a time. (53e) could be interpreted as distributively; there are subsets of men and subsets of pianos so, each of the subsets of men lifted each of the subsets of the pianos. Last but not least, (53f) has merely cumulative interpretation. There are five men, and two pianos involve some lifting, but it is not clear how many men jointly lift how many pianos.

2.3.2. Cumulative Interpretation of Quantifiers

Cumulativity is look-alike collectivity except former one does not have a scopal dependency. To put it in a different way, there are two entities in a symmetric non-scopal relation. Examples from Scha, (1981) cited in Verkuyl and Van der Does (1991):

(54) a. 600 Dutch firms use 5000 American computers.
b. Three boys saw two girls.

The cumulative interpretation of (54a) is that there are 600 Dutch firms and 5000 American computers. Each of the Dutch firms uses at least one American computer and each of the American computers is used by at least one Dutch firm. (54b) can be understood collectively as; there are two girls and three boys. Each of the girls was seen by at least one of the three boys. Moreover, one of the three boys saw at least one of the girls.

As it has been stated above, cumulativity and collectivity are similar to each other. Thus, some authors do not mark that cumulative reading and collective reading are different from each other (Roberts, 1987; Link, 1998), while some indicate that they are ambiguous (Landman, 2000):

(55) Three boys invited four girls.

Cumulative interpretation of (55) is that four girls each of whom was invited by at least one of the boys and three boys each invited at least one of the girls. On the other hand, collective interpretation is that a group of four girls were invited a group of three boys.

Champollion (2010) claims that in natural languages, events and thematic roles are not necessary components of the logical representation of sentences, while Kratzer (2000) claims that they are moreover, cumulative readings of *every* can be shown merely with these components. On the contrary to Kratzer (2000), Champollion (2010) suggests that due to the scope-splitting accounts, cumulative readings of 'every' can be represented in an eventless framework. Champollion gives a representation of (54a) that Kratzer uses as well without events or thematic roles:

(54) $\exists X.\ [600\text{-firms}(X) \wedge \exists Y.\ [5000\text{-computers}(Y) \wedge **\text{own}(X, Y)]]$.

In (54), Champollion (2010) uses uppercase letters for variables and constants, which denote either atoms or sums, while lowercase letters are used for those, which denote atoms.

Champollion (2015) studied connection with the theoretical concepts of distributivity, collectivity and cumulativity. Cumulative interpretations include two plural NPs or definite plurals (Champollion, 2015) as in the example:

(56) 'The men in the room are married to the girls across the hall. (Kroch, 1974).

Cumulative interpretation of (56) is each man in the room is married a girl across the hall, moreover; each girl across the hall is married a man in the room.

With respect to using *all,* Zweig (2008, 2009) indicates that it cannot bring about cumulative interpretation:

(57a) Four teachers at school saw twenty students.

(57b) All the teachers at school saw twenty students.

In (57a), cumulative reading is available- four teachers saw at least one student each and all twenty students were seen-; on the contrary, example (57b) is unavailable for cumulative interpretation. In spite of this, Zweig (2008) states that when dependent-plural reading exists, cumulative reading can be seen:

(58a) Four teachers at school saw students.

(58b) All the teachers at school saw students.

Both (58a) and (58b) are available for cumulative readings. Cumulative interpretation of (58a) is four teachers at school saw at least one student each, and at least two students were seen. Besides, (58b) can be interpreted cumulatively as; each teacher saw at least one student, and at least two students were seen overall.

Furthermore, the word 'each' is not matched with cumulative readings; yet, only with distributive readings:

(59a) Each teacher at school saw twenty students.

(59b) Each teacher at school saw students.

Neither (59a) nor (59b) is available for cumulative readings.

2.3.3. Distributive Interpretation of Quantifiers

Masolo et al. (2020) describe plurality as referring several things at once and they gave the example; 'Alice and Bob are students.' This sentence involves two separate sentences, and this is distributivity: 'Alice is a student.' and 'Bob is a student.'. Champollion (2015) proposes that predicates like 'smile' and 'laugh' are the instances of distributive predicates. Such predicates are applied by the members or subsets of a group individually. Examples are shown from Champollion (2015):

(60) The ten girls smiled. => every one of the ten girls smiled.

(61) Kim and Sandy laughed. => Kim laughed, and Sandy laughed.

(62) a. John and Bill carried a suitcase.

b. They carried a suitcase.

c. The men carried a suitcase.

d. Three men carried a suitcase.

In the given examples, it can be understood that there is more than one suitcase. In other words, each person carried only one suitcase and in (62d) there are three suitcases that are carried by three different men.

Zweig (2009) also mentioned distributive interpretation giving the example presented in (63):

(63) Simon, Garfunkel and Prince wrote songs called 'America' (Zweig, 2009).

When it is read as distributively, it means that Simon wrote a song called 'America', and Garfunkel wrote a different song with the same title and Prince wrote a third song which is also called 'America'.

Multiple interpretations of ambiguous sentences have been studied in language acquisition as well (see Syrett and Musolino 2013, Pagliarini, Fiorin and Dotlačil, 2012*).* Pagliarini et al. (2012) investigate the acquisition of distributivity in plural expressions whether children can discriminate the multiple readings in those expressions or not.

Adults can easily observe collective readings of non-quantificational noun phrases however, it is difficult to discern their consideration of distributive reaindgs. Pagliarini et al. (2012) try to understand why distributive readings with non-quantificational noun phrases degraded and how they are acquired. In their study, they suggest that in an actual conversation in a sentence like;

(64) The boys lifted two boxes.

(64) has both collective and distributive interpretation- the person who uttered (64) makes clear that there was some lifting process, and the boys were included. But no further information exists. Therefore, when the receiver hears (64) s/he may think that more informative sentence such as could have been used to emphasis the collective reading:

(65) Each boy lifted two boxes.

However, the sender did not say (65). Receiver assumes that trying to give information as required, sender follows Grice's Maxim of Quantity. Furthermore, results demonstrate that distributive interpretation is not picked firstly since if the speaker wanted to give the expression to distributive meaning s/he would prefer 'each boy' the unambiguous option. Therefore, distributive readings' degraded is about the conversational implicature.

Some languages such as Turkish have overt distributive marker to indicate distributive interpretation.

(66) Her çocuk **ikişer** **sosis** aldı.
Each child two-Dist sausage bought.
'Every child bought two sausages.' (Champollion, 2015)

Covert distributive examples sometimes may be considered as marginal. Examples 67a, b, c, and d (repeated 62) are from (Champollion, 2015):

(67) a. John and Bill carried a suitcase.

b. They carried a suitcase.

c. The men carried a suitcase.

d. Three men carried a suitcase.

There are some other studies about sentences like (67) across languages. (Dotlačil, 2010) states that according to truth-value judgment tasks in sentences like (67), distributive interpretation is limited but it exists. Pagliarini et al. (2012) find that adult Italian speaker accept collective reading more than distributive reading. In the study of Syrett & Musolino (2013), English speakers choose the collective scenario all the time, while they prefer distributive scenario less. In the second experiment, participants prefer collective reading to distributive when similar questions are asked.

CHAPTER 3

METHODOLOGY

3.1. PILOT STUDY

3.1.1. Data Collection Tool

In the pilot study, two different experiments were conducted to collect data via Google forms and forms.app online platforms. Those two experiments were administrated to different participants (called Group 1 and Group 2). In other words, the participants who attended the first experiment did not attend the second experiment. A sentence-picture matching task was used to collect data. Participants saw one sentence followed by two pictures. They chose a picture that matched with the sentence.

3.1.2. Participants

Table 3: Ages of the participants who attended the first experiment of the pilot study

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	17,00	1	5,0	5,0	5,0
	21,00	3	15,0	15,0	20,0
	22,00	2	10,0	10,0	30,0
	23,00	2	10,0	10,0	40,0
	24,00	2	10,0	10,0	50,0
	25,00	4	20,0	20,0	70,0
	26,00	3	15,0	15,0	85,0
	28,00	1	5,0	5,0	90,0
	30,00	1	5,0	5,0	95,0
	40,00	1	5,0	5,0	100,0
	Total	20	100,0	100,0	

22 native speakers of Turkish volunteered to participate in the first experiment. 16 of them (80%) were females and 6 of them (20%) were males. 2 of the participants were eliminated because they did not provide the appropriate conditions (Participants' native language must be Turkish, they had to be primed in the previous trial and they must answer the fillers correctly to make sure that they do not make up) to attend the questionnaire. 20 of the participants were either graduated from a university or still university students, one of them graduated from high school and one of them was a post-graduate student. The youngest participant was 17 years old and the oldest was 40 years old.

Table: 4: Ages of the participants who attended the second experiment of the pilot study

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	21,00	2	13,3	13,3	13,3
	22,00	1	6,7	6,7	20,0
	23,00	3	20,0	20,0	40,0
	24,00	4	26,7	26,7	66,7
	26,00	1	6,7	6,7	73,3
	27,00	1	6,7	6,7	80,0
	28,00	1	6,7	6,7	86,7
	31,00	1	6,7	6,7	93,3
	32,00	1	6,7	6,7	100,0
	Total	15	100,0	100,0	

As can be seen in table 4, 22 native speakers of Turkish volunteered to participate in the second experiment. 7 of the participants were not considered because they did not have the appropriate conditions -as mentioned above- participate the experiment. 11 of the participants were female and 4 of them were male. The youngest participant of the second experiment was 21 years old and the oldest participant was 32 years old.

3.1.3. Procedure

The data were collected from online survey websites called forms.app and google forms. The first experiment contains only collective prime. The data were collected to analyse whether collective prime gives rise to priming effect to participants or not. In the second experiment,

same procedure was applied except this time instead of collective prime, cumulative prime sentences and pictures were used. In each experiment, a sentence-picture matching task was used. There were 30 items in each experiment including ten prime sentences, ten target sentences and ten filler sentences. In each set, participants were shown a sentence and two pictures. Participants chose a picture that matches the sentence according to their comprehensions.

3.1.4. Data Analysis and Findings

To analyse the collected data of the pilot study, in target sentences, frequency and percentage of the collective pictures and cumulative pictures that are chosen by the participants were considered. The reason why frequency and percentage were important in pilot study is that sentences which contain more than one plural expression bring about ambiguity; therefore, native speakers of Turkish can differentiate between two readings namely, cumulative, and collective. It is important what extend native speakers of Turkish think those sentences are ambiguous and whether priming one of those interpretations has an effect of participants' choices. Moreover, before the main study, it can be seen whether priming has an effect on comprehending plural ambiguous sentences; thus, the validity and the reliability of the main study will increase.

3.1.4.1. Data Analysis of Experiment 1 (Collective prime)

Frequencies and percentages of the sentences that are used in the first experiment of pilot study are given below in table 5:

Table 5: iki itfaiyeci iki yangın söndürdü. (2 fire fighters quenched 2 fires.)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	collective	11	55,0	55,0	55,0
	cumulative	9	45,0	45,0	100,0
	Total	20	100,0	100,0	

The sentence 'İki itfaiyeci iki yangın söndürdü.' *(2 fire fighters quenched 2 fires.)* was presented to the participants with two pictures one of which contains cumulative interpretation and the other collective interpretation. As can be seen in table 5, out of 20, 11 participants chose

the collective reading and 9 cumulative reading. Percentage of the collective reading is 55% and collective reading 45%.

Table 6: İki çocuk dört kitap taşıdı. (Two children carried four books.)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	collective	14	70,0	70,0	70,0
	cumulative	6	30,0	30,0	100,0
	Total	20	100,0	100,0	

As can be seen in table 6, 14 participants preferred collective interpretation of the sentence while 6 of them cumulative interpretation. Therefore, the percentage of the collective reading is 70% and cumulative 30%.

Table 7: İki polis iki suçlu yakaladı. (Two policemen arrested two convicts.)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	collective	14	70,0	70,0	70,0
	cumulative	6	30,0	30,0	100,0
	Total	20	100,0	100,0	

In table 7, frequency of collective reading is 14 while collective reading is 6. 70% of the participants chose collective interpretation while 30% cumulative interpretation.

Table 8: İki öğretmen altı sınav okudu. (Two teachers assessed six papers.)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	collective	19	95,0	95,0	95,0
	cumulative	1	5,0	5,0	100,0
	Total	20	100,0	100,0	

In table 8, 19 participants selected collective reading and 1 participant selected cumulative reading. Thus, 95% of the participants opted for collective interpretation while 5% cumulative interpretation.

Table 9: İki işçi üç bina inşa etti. (Two workers built three constructions.)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	collective	19	95,0	95,0	95,5
	cumulative	1	5,0	5,0	100,0
	Total	20	100,0	100,0	

As shown in table 9 above, the number of the participants who selected collective reading is 19 (with 95%), while it is 1 (with 5%) for cumulative reading.

Table 10: İki tamirci iki araba tamir etti. (Two mechanics repaired two cars.)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	collective	17	85,0	85,0	85,0
	cumulative	3	15,0	15,0	100,0
	Total	20	100,0	100,0	

As table 10 shows, 17 of the participants preferred collective interpretation of the sentence, which means 85% of them chose collective meaning while 3 of them preferred cumulative interpretation with 3%.

Table 11: İki öğrenci üç makale yazdı. (Two students wrote three articles.)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	collective	18	90,0	90,0	90,0
	cumulative	2	10,0	10,0	100,0
	Total	20	100,0	100,0	

Frequency of the collective interpretation in table 11 is 18 with 90%. On the other hand, cumulative reading was chosen by 2 participants with 10%.

Table 12: İki pilot iki uçak sürdü. (Two pilots flew two planes.)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	collective	16	80,0	80,0	80,0
	cumulative	4	20,0	20,0	100,0
	Total	20	100,0	100,0	

In table 12, frequency of the collective reading is 16 and cumulative reading is 4. So, collective percentage is 80% while cumulative 20%.

Table 13: İki çocuk üç balon tuttu. (Two children held three balloons.)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	collective	18	90,0	90,0	90,0
	cumulative	2	10,0	10,0	100,0
	Total	20	100,0	100,0	

In the first experiment of the pilot study, as can be seen in table 13, 18 participants chose the collective reading of the sentence. 2 participants selected cumulative reading. Therefore, 90% of the participants preferred collective meaning while 10% cumulative meaning.

3.1.4.2. Data Analysis of Experiment 2 (Cumulative prime)

In this section, the outcomes of the second experiment in the pilot study are given in the following tables.

Table 14: İki polis iki suçlu yakaladı. (Two policemen arrested two convicts.)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	collective	10	66,7	66,7	66,7
	cumulative	5	33,3	33,3	100,0
	Total	15	100,0	100,0	

Table 14 shows that 10 participants selected collective interpretation out of 15, while 5 of the participants preferred cumulative interpretation. The percentage of collective meaning can be seen in table 14 as 66,7%, and cumulative 33,3%.

Table 15: İki itfaiye iki yangın söndürdü. (2 fire fighters quenched 2 fires.)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	collective	10	66,7	66,7	66,7
	cumulative	5	33,3	33,3	100,0
	Total	15	100,0	100,0	

As can be seen in table 15, 10 participants opted for collective interpretation, while 5 of them cumulative interpretation. Thus, 66,7% of the participants chose collective reading while 33,3% chose cumulative interpretation.

Table 16: İki çocuk üç balon tuttu. (Two children held three balloons.)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	collective	14	93,3	93,3	93,3
	cumulative	1	6,7	6,7	100,0
	Total	15	100,0	100,0	

In table 16, it is shown that 14 of the participants preferred collective reading. However, only 1 participant preferred cumulative reading. Therefore, 93,3% of the participants selected collective interpretation and 6,7% of them preferred cumulative interpretation.

Table 17: İki tamirci iki araba tamir etti. (Two mechanics repaired two cars.)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	collective	12	80,0	80,0	80,0
	cumulative	3	20,0	20,0	100,0
	Total	15	100,0	100,0	

Table 17 shows that the frequency of the collective meaning is 12, while the frequency of cumulative meaning is 3. So, it means that 80% of the participants thought pictures that were shown had collective meaning, on the other hand, 20% of them thought that sentence had cumulative meaning.

Table 18: İki işçi üç bina inşa etti. (Two workers built three constructions.)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	collective	15	100,0	100,0	100,0

As can be seen in Table 18, all 15 participants that attend the second experiment thought that the sentence '*İki işçi üç bina inşa etti.' (Two workers built three constructions.)* had collective meaning rather than cumulative.

Table 19: İki öğrenci üç makale yazdı. (Two students wrote three articles.)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	collective	13	86,7	86,7	86,7
	cumulative	2	13,3	13,3	100,0
	Total	15	100,0	100,0	

Frequency of the collective meaning in table 19 is 13. Therefore, 86,7% of the participants chose collective interpretation. Moreover, frequency of the cumulative meaning is 2. The percentage of the participants that selected cumulative interpretation is 13,3%.

Table 20: İki çocuk dört kitap taşıdı. (Two children carried four books.)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	collective	13	86,7	86,7	86,7
	cumulative	2	13,3	13,3	100,0
	Total	15	100,0	100,0	

Table 20 demonstrates that the number of the participants who preferred collective reading is 13, which means that 86,7% of the participants chose collective interpretation. When it comes to the cumulative reading, the frequency is 2; therefore, 13,3% of the participants preferred cumulative interpretation to collective interpretation.

Table 21: İki öğretmen altı sınav okudu. (Two teachers assessed six papers.)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	collective	10	66,7	66,7	66,7
	cumulative	5	33,3	33,3	100,0
	Total	15	100,0	100,0	

As can be seen table 21 collective reading was selected by 10 participants, while cumulative was selected by 5 participants. The percentage of the collective reading is 66,7% and cumulative reading is 33,3%

Table 22: İki pilot iki uçak sürdü. (Two pilots flew two planes.)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	collective	8	53,3	53,3	53,3
	cumulative	7	46,7	46,7	100,0
	Total	15	100,0	100,0	

Frequencies and percentages are demonstrated in table 22 of the sentence *'İki pilot iki uçak sürdü.' (Two pilots flew two planes.)* 8 participants considered that the sentence had collective meaning, but 7 participants considered that it had cumulative reading. The percentage of the collective interpretation is 53,3% while cumulative percentage is 46,7%.

3.1.5. Outcomes of the Pilot Study

After running two experiments in the pilot study, the results are demonstrated below:

3.1.5.1. Outcomes of the First Experiment in Pilot Study

Frequencies and the percentages that are gathered through the first experiment of the pilot study were calculated via SPSS and One-Sample T-Test was performed to compare means.

Table 23: Output of the first experiment in Pilot Study

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Collective	146	81,1	81,1	81,1
	Cumulative	34	18,9	18,9	100,0
	Total	180	100,0	100,0	

As can be seen in table 23, there are 180 answers in total in the first experiment. Participants were primed with collective interpretation of the given sentences then they were asked to choose the picture that makes the sentence true. According to results, the frequency of the collective responses is 146 and the frequency of the cumulative responses is 34. Therefore, the percentage of the collective reading is 81,1% while cumulative 18,9%.

Table 24 shows the result of One-Sample T-Test of Experiment 1 in pilot study:

Table 24: One-Sample Test of Experiment 1 in Pilot Study

	Test Value = 1.5					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Pilot Study Experiment 1	-10,634	179	,000	-,31111	-,3688	-,2534

In the first experiment, participants were primed with collective readings, and they are asked in the target trials to choose the picture that makes the sentence true. As table 24 reports, using collective primes for ambiguous sentences give rise to priming effect, which is statistically significant ($p=0,000 < 0,5$).

3.1.5.2. Outcomes of the Second Experiment in Pilot Study

In the pilot study, the data were analysed to determine whether priming the participants with cumulative reading influences on their comprehension. So that it can be seen that priming has an impact on resolving ambiguous sentences. Also in experiment 2, One-Sample T-Test was performed in order to observe whether there is significant difference between the means.

Table 25: Output of the Second Experiment in Pilot Study

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	collective	105	77,8	77,8	77,8
	cumulative	30	22,2	22,2	100,0
	Total	135	100,0	100,0	

Table 25 demonstrates the frequency and the percentage of participants' responses in terms of collective cumulative contrast. There are 135 responses in the second experiment. The number of the collective responses is 105 while the number of the cumulative responses is 30. Therefore, 77,8% of the answers are collective and 22,2% cumulative.

The result of One-Sample T-Test of experiment 2 in pilot study is shown below:

Table 26: One-Sample T-Test of Experiment 2 in Pilot Study

	Test Value = 1.5					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Pilot Study Experiment 2	-7,734	134	,000	-,27778	-,3488	-,2067

In experiment 2, participants were primed with cumulative reading. In the target trials, they are asked to select a picture that makes the sentence true. As table 26 reports the results of One-Sample T-Test, there is an asymmetric relation between cumulative prime and cumulative response. This asymmetrical relation is statistically significant ($p=0,000 < 0,5$).

3.2. THE PRESENT STUDY

3.2.1. Data Collection Tool

In the present study two different experiments, which have four combinations for each were conducted to collect data. Those two experiments were administrated to different participants. To put it in a different way, the participants who joined the first experiment did not attend the second experiment. The reason why four combinations are used for each experiment is because not all the participants see the same orders of the sets. Each combination, which consists of ten

sets were applied to every ten participant. Two images and one sentence were given to the participants in each set. Participants were asked to choose one picture to make the sentence true. The pictures that were used in the study were drawn by the researcher and some of the pictures were edited with 'paint' program. Google forms and forms.app websites/ online platforms were used to collect data. Informed consent form, participants' information and explanations about the questionnaire were included on the given platforms.

3.2.2. Participants

241 native speakers of Turkish volunteered to participate in this study. 71 of the participants attended the first experiment (Collective Priming) and 87 of them volunteered to the second experiment (Cumulative Priming). Moreover, there were 83 people in control experiment (No Priming). Since participants' age, gender and socioeconomical status are not taken into consideration, the age range is 18-60 years old.

In the first experiment with collective prime, the youngest participant was 19 and the oldest was 50 years old. There were 52 female and 19 male participants in experiment 1. The percentage of the female participants is 73% and male participants 17%. 64 of the participants were either university students or graduated from university. The number of the post-graduate people was 5 and 2 participants were either high school students or graduated from high school.

In the second experiment, 87 participants volunteered. The youngest of them was 18 and the oldest was 54 years old. There were 61 female (70%) and 26 (30%) male participants in experiment 2. 70 of the participants were either university students or graduated from university, 12 of them were post-graduate, 2 of them were either high school students or graduated from high school and 2 chose the 'other' option in the education background section.

Finally in control experiment, there were 83 people, 53 (64%) of them were females and 30 (36%) were males. The youngest participant was 18 years old and the oldest was 60 years old. 76 (92%) of them were undergraduate or graduate, 5 (6%) of them were post-graduate and 2 (2%) people were either high school graduate or high school students.

All the participants in all groups were native speakers of Turkish. Participants whose native languages are different from Turkish were not taken into consideration in all groups.

3.2.3. Procedure

3.2.3.1. Experiment 1

A sentence-picture matching task was used for collecting data via Google form and forms.app. Experiment 1 included 30 items (10 prime sentences, 10 target sentences and 10 filler sentences) based on the Collective interpretation. The prime sentences were ambiguous between a 'cumulative' and 'collective' interpretation (e.g., İki çocuk dört kitap taşıdı.). The NPs of the prime sentences were always plural such as: iki çocuk *(two children)*, üç kitap *(three books)* etc. Two images were given to the participants. They were asked to choose one picture to make the sentence true. In prime trials, one of the images corresponded to just one of the readings: in the first experiment, one of the pictures was related to 'collective interpretation' (called the 'correct picture') while the other image was incompatible with both readings (called 'foil picture', e.g.; Bir pastacı bir pasta yaptı. *(One pastrycook made a cake.)*). Participants did not have an option of selecting the pictures in each prime section. They had to choose the correct picture. When the correct picture had collective reading, participants chose collective picture, which gives the priming effect. The participants who did not select the correct picture were eliminated. Due to the fact that they were not considered as being primed. 71 participants attended the first experiment. After eliminating the participants who did not comply the criteria (Participants who were not primed and participants whose native languages were different from Turkish were not taken into consideration), the total number was 59.

In the target sentences, all sentences were ambiguous between a 'cumulative' and a 'collective' interpretation (e.g., İki çocuk dört kitap taşıdı. *(Two children carried four books.)*). The NPs of the target sentences were always plural such as: iki çocuk *(two children)*, üç kitap *(three books)* etc. Two images were given to the participants. They were asked to choose one picture that matches the sentence. One of the pictures has cumulative reading and the other one has collective reading. In the target trials, participants have an option.

In experiment 1, all the participants were primed with 'collective interpretations'. One of the expected results is that participants' interpretations would be affected by the priming sentences. To put it in a different way, whether collective prime has an impact on participants' choice of selecting the picture that has collective meaning.

All the prime and target sentences were simple, declarative, and formed with past tense in the same word order; subject-object-verb (example is given below):

Subject - Object - Verb

İki/Üç [NP1] - iki/üç/dört/beş/altı [NP2] - [VP]

(Two/three [NP1] – two/three/four/five/six [NP2] – [VP])

İki çocuk üç balon tuttu. / *Two children hold three balloons.*

Subject - Object - Verb

In the prime trials, the participants saw the sentences and pictures as shown below in Figure 4:



Figure 4: *Collective Prime Sentence and Pictures*

As can be seen in figure 4, participants saw two pictures preceded by the sentence 'İki oyuncu iki oyun oynadı.' *(Two gamers played two games.)*. They were asked which picture is corresponded with the given sentence. Option 1 *(seçenek 1)* is the foil picture because it does not match with the sentence. Therefore, participants were expected to select option 2 *(seçenek 2)*. Thus, by choosing option 2 *(seçenek 2)*, participants were primed with collective interpretations of the given ambiguous sentence.

In the target trials, the participants saw the sentences and pictures as shown below in Figure 5:



Figure 5: *Collective Target Sentence and Pictures*

Figure 5 shows the target trial that was given in experiment 1. One sentence (İki çocuk dört kitap taşıdı. *(Two children held four books.)*) followed by two pictures were shown to the participants. Which picture explains the sentence better was asked to the participants. Option 1 *(şeçenek 1)* contains cumulative meaning while option 2 *(şeçenek 2)* contains collective meaning. Since participants were already primed with the collective meaning of the sentence, in the target trials, they were expected to select the picture that contains collective interpretation.

There were 10 filler sentences that were all unambiguous; simple, declarative sentences; which do not include any plural ambiguity in the first experiment.

The options of the sentences were randomised by running a code on the website https://www.onlinegdb.com/online_c_compiler.

Importantly, using different numbers and different subjects and objects disallows for the possibility of an equal or different combination. Moreover, options and sets were ordered randomly to avoid forming a pattern.

3.2.3.2. Experiment 2

The procedure of experiment 2 is the same with the experiment 1 except experiment 2 is based on 'cumulative interpretation' using cumulative prime pictures.

A sentence-picture matching task was used to collect data via forms.app. Experiment 2 included 30 items (10 prime sentences, 10 target sentences and 10 filler sentences) based on cumulative interpretation. Both prime sentences and target sentences were ambiguous between a 'cumulative' and a 'collective' interpretation (e.g., iki araştırmacı iki sunum yaptı. *(Two researchers gave two presentations.)*). Plural NPs were used in prime and target sentences (e.g., iki pilot *(two pilots)*, iki işçi *(two workers)*). Participants saw one ambiguous sentence followed by two pictures in prime trials. Participants were asked to select which picture makes the sentence true. One of the pictures was irrelevant with the given sentence (called foil picture (e.g., Bir şarkıcı bir şarkı söyledi. *(A singer sang a song)*)). The other picture was corresponded with cumulative meaning of the sentence (called correct picture).

Participants that selected the correct picture were taken into consideration. Those who chose the foil picture were not taken into account. After participants had been primed, they came across with the target trial. The number of the people that participated in the second experiment was 87; however, 16 of them were not included in the analysis because they were not primed, so, they did not comply the criteria. That is to say, only 71 of the participants' answers were taken into consideration.

In the target trial, there were an ambiguous sentence followed by two pictures and NPs that were used were always plural (e.g., iki tamirci iki araba tamir etti. *(Two mechanics fixed two cars.)*). One of the pictures was related with cumulative reading while the other one with collective reading. As the procedure required, participants were asked to choose one of the pictures that makes the sentence correct. In the target sets, participants had an option between choosing collective and cumulative contrast.

In the second experiment, all the sentences in prime and target trials were simple, declarative, and formed with past tense in the same word order; subject-object-verb. Examples are shown below:

Subject - Object - Verb

İki/Üç [NP1] - iki/üç/dört/beş/altı [NP2] - [VP]

(Two/three [NP1] – two/three/four/five/six [NP2] – [VP])

İki çocuk üç balon tuttu. / Two children held three balloons.

Subject - Object - Verb

In the prime trials, the participants saw the sentences and pictures like below in Figure 6:



Figure 6: *Cumulative Prime Sentence and Pictures*

As can be seen in figure 6, one of the pictures was related with cumulative interpretation of the sentence 'İki arkadaş üç ağaç dikti *(Two friends planted three trees)*).', in this set: option 1 *(seçenek 1)*. Option 2 *(seçenek 2)* does not correspond to the sentence. The interpretation of the picture in option 1 (has cumulative meaning) is as follows; there are two friends and one of them planted two trees and the other planted one tree. In total they planted three trees. By selecting option 1, participants were primed with cumulative interpretation. After prime trials, target trials were shown up. In the target trials, participants saw the sentences and pictures as given below in Figure 7:



Figure 7: *Cumulative Target Sentence and Pictures*

In figure 7, the ambiguous sentence 'İki çocuk üç balon tuttu. *(Two boys held three balloons.)*' has two different meanings. Option 1 *(seçenek 1)* shows the collective interpretation while option 2 *(seçenek 2)* shows the cumulative interpretation of the sentence. In option 1, there are two boys, and they are holding three balloons collectively. However, in option 2, there are two boys one of whom is holding two of the balloons and the other boy is holding one balloon. In total, three balloons are being held by two boys.

10 filler sentences were all unambiguous; simple, declarative sentences; which do not include any plural ambiguity were used in experiment 2.

Options of the questions were randomised by running a code on the website https://www.onlinegdb.com/online_c_compiler.

Different numbers and different subjects and objects were used to avoid from the possibility of an equal or different combination. Sets and options were randomized to avoid forming a pattern.

3.2.3.3. Experiment 3

Sentences with more than one plural NP bring about ambiguity. They may have either collective meaning or cumulative meaning in Turkish. In order to investigate the relationship between priming and ambiguous sentences, two different experiments were run. A sentence-picture matching task was used to collect data. In the first experiment, participants were primed with collective meaning of the sentences while in the second experiment participants were primed with cumulative meaning of the sentences. One sentence followed by two pictures were presented to the participants. Participants were asked to choose one picture that explains the sentence best. To control whether priming works, a third experiment was run. Experiment 3 is the control experiment. In the control experiment, no prime trials were shown to the participants (only target and filler sentences were presented) to analyse when there is no prime, which interpretation of the sentences was chosen. Thus, comparing the first experiment with the control group and the second experiment with the control group can help us to understand whether participants are influenced by priming. 83 people, all of whom are native speakers of Turkish participated to the control experiment. As in all experiments, control experiment was a sentence-picture matching task that was carried out on google forms. Firstly, participants saw an ambiguous sentence, which had both collective and cumulative meaning, then, they were requested to select a picture that explains the sentence better. 10 target sentences and 10 filler sentences were demonstrated to the participants. However, 9 of the target sentences were analysed because one sentence of target sentences had spelling mistake in previous experiment; therefore, that sentence was removed from the experiment. Every target sentence had an ambiguous sentence followed by two pictures. One of the pictures is corresponded to collective interpretation while the other is cumulative interpretation. Sentences and pictures were the same with the ones that were used in experiment 1 and experiment 2. All the target sentences were ambiguous (collective and cumulative meanings), simple declarative and formed with past tense. The subjects and the objects of the sentences were always plural. The same word order was used in all sentences; subject-object-verb. e.g., (İki işçi üç bina inşaa etti. (*Two workers built three constructions.)*)

Examples from the control experiment were shown below in Figure 8:



Figure 8: *Target Sentence and Pictures*

In figure 8, the sentence 'İki öğretmen altı sınav okudu. *(Two teachers assessed six papers.)* was shown to the participants with two pictures. Participants chose one of the pictures that matches with the sentence. Option 1 *(1. seçenek)* demonstrates the cumulative interpretation of the sentence. It can be interpretated as there are two teachers and six papers to assess. One of the teachers assessed 3 papers and the other teacher assessed the rest 3 papers. In total, six papers were assessed by two different teachers. Option 2 *(2. seçenek)* has collective reading. There were six papers, and two teachers together assessed those six papers collectively.

There were 10 filler sentences which were unambiguous, simple, declarative and formed with past tense in the control experiment. 83 people attended the experiment, and all the sentences were randomised for each participant to avoid forming a pattern. Example from fillers is shown below in Figure 9:



Figure 9: *Filler Sentence and Pictures*

Figure 9 shows a filler sentence with two pictures. The sentence 'Bir dalgıç denizde yüzdü. *(A diver swam in the sea.)*' was shown to the participants. As can be seen in the figure, no plural expression used in the filler sentences.

3.2.4. Data Analysis

After collecting data, all analyses were carried out via IBM SPSS Statistic Package 26.0. More than one statistical measurement was used. Firstly, frequencies and percentages, secondly T-Test Analyses and finally Chi-Square analyses have been carried out.

In each experiment, there were 10 prime sentences, 10 target sentences and 10 fillers. However, one of the target sentences had a spelling mistake. Therefore, that sentence was not taken into consideration in data analysis of all 3 experiments. Since all the participants were primed in the prime trials, only the target responses of those participants were taken. Totally, frequencies and percentage of 9 sentences per each experiment were analysed according to participants' answers. Frequency and percentage tables of each sentence were formed. T-Test Analysis was used to detect whether the proportions are meaningful or not. To compare experiments to each other, Chi-square statistical measurement was used. Statistical significance level (p-value) was accepted as 0.05. It means that ratios will be statistically meaningful when they are less or equal to 0.05. This type of analysis has been previously used to test similar priming effects (Maldonado et al., 2017).

To sum up, 3 T-Test Analyses and two Chi-square analyses were carried out in total to find out whether results of the study are significant or not. Findings and results will be reported in chapter 4.

3.3. LIMITATIONS OF THE STUDY

In the present study, 213 participants attended in total. When it comes to the materials that are used in the experiments, sentence-picture matching task was administered, and all the pictures used in the experiments were drawn by the researcher. The numbers of the sentences and the pictures that are used in data collection are 30. Increasing the number of the participants and items makes the study more reliable, therefore this might be used for further research.

The prime and target sets were presented in a fixed order, due to the fact that prime pictures and sentences should be given in that order to actualise the prime. In other words, to make the priming effect works participants saw the prime sets first, then they saw the target sets. Fillers were interspersed among the sets. When all the sentences and pictures were assigned randomly the participants do not habituate to repeated patterns, which increases the reliability. However, when we assigned the items randomly, not always participants see the prime sets before the targets. Therefore, to make the participants see the target fragments always immediately follow the prime sentences, 4 different questionnaires were prepared for each 10 participants to avoid the participants do not get habituated to the repeated patterns.
Further research might prepare the experiments as every participant sees the items randomly.

CHAPTER 4

ANALYSIS AND DISCUSSION OF THE FINDINGS

4.1. ANALYSIS OF EXPERIMENT 1

In experiment 1, participants were primed with collective reading. After that, participants saw 9 target sentences that were all ambiguous. The sentences have cumulative interpretation and collective interpretation. After seeing a sentence, participants were given two pictures one of which has cumulative reading of the sentence, the other has collective reading. Only target sentences were coded to analyse data. When participants chose collective pictures, those responses were coded as 1 while when they chose cumulative pictures they were coded as 2. Percentages and frequencies of participants' answers were given sentence by sentence below:

Table 27: iki itfaiyeci iki yangın söndürdü. (2 fire fighters quenched 2 fires.)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	collective	49	83,1	83,1	83,1
	cumulative	10	16,9	16,9	100,0
	Total	59	100,0	100,0	

The sentence 'İki itfaiyeci iki yangın söndürdü.' (2 fire fighters quenched 2 fires.) were given to the participants with two pictures one of which contains cumulative interpretation and the other collective interpretation. As can be seen in table 27, out of 59, 49 participants chose the collective reading and 10 cumulative reading. Percentage of the collective reading is 83,1% and cumulative reading 16,9%.

Table 28: İki çocuk dört kitap taşıdı. (Two boys carried four books.)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	collective	45	76,3	76,3	23,7
	cumulative	14	23,7	23,7	100,0
	Total	59	100,0	100,0	

Table 28 shows that, 45 of the participants selected cumulative reading of the sentence while 14 participants chose cumulative reading. Therefore, the percentage of the collective meaning is 76,3% and the percentage of cumulative meaning is 23,7%.

Table 29: İki polis iki suçlu yakaladı. (Two policemen arrested two convicts.)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	collective	41	69,5	69,5	69,5
	cumulative	18	30,5	30,5	100,0
	Total	59	100,0	100,0	

As can be seen in table 29, 59 participants attended the first experiment. Collective frequency is 41, on the other hand, cumulative frequency is 18 out of 59. Thus, collective percent is 69,5% and cumulative percent is 30,5%.

Table 30: İki öğretmen altı sınav okudu. (Two teachers assessed six papers.)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	collective	51	86,4	86,4	86,4
	cumulative	8	13,6	13,6	100,0
	Total	59	100,0	100,0	

In table 30, 51 participants preferred collective reading and 8 participants cumulative reading. 86,4% of the participants opted collective interpretation while 13,6% of the participants opted cumulative interpretation.

Table 31: İki işçi üç bina inşa etti. (Two workers built three constructions.)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	collective	53	89,8	89,8	10,2
	cumulative	6	10,2	10,2	100,0
	Total	59	100,0	100,0	

The number of people who chose collective meaning is 53, and cumulative meaning 6. Therefore, in table 31, collective reading percentage is 89,8%, and cumulative reading percentage is 10,2%.

Table 32: İki tamirci iki araba tamir etti. (Two mechanics repaired two cars.)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	collective	52	88,1	88,1	88,1
	cumulative	7	11,9	11,9	100,0
	Total	59	100,0	100,0	

As table 32 shows that, 52 participants selected collective interpretation of the sentence with 88,1%. Moreover, 7 participants selected cumulative interpretation with 11,9%.

Table 33: İki öğrenci üç makale yazdı. (Two students wrote three articles.)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	collective	53	89,8	89,8	89,8
	cumulative	6	10,2	10,2	100,0
	Total	59	100,0	100,0	

The frequency of the collective reading in table 33 is 53, while the frequency of cumulative reading is 6. Thus, 89,9% of the participants chose collective interpretation while 10,2% of them chose cumulative interpretation.

Table 34: İki pilot iki uçak sürdü. (Two pilots flew two planes.)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	collective	36	61,0	61,0	100,0
	cumulative	23	39,0	39,0	39,0
	Total	59	100,0	100,0	

It is demonstrated that in table 34, collective meaning of the sentence was chosen by 36 people with 61,0%. Besides, cumulative meaning was chosen by 23 people, in this case 39,0% of participants selected cumulative interpretation.

Table 35: İki çocuk üç balon tuttu. (Two children held three balloons.)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	collective	58	98,3	98,3	98,3
	cumulative	1	1,7	1,7	100,0
	Total	59	100,0	100,0	

As can be seen in table 35, almost all participants (58) with 98,3% thought that sentence had collective meaning rather than cumulative. Only one participant thought it had cumulative meaning with 1,7.

All the sentences that were taken part in the first experiment were demonstrated in the tables above. Frequencies and percentages were shown sentence by sentence. The analysis of One-Sample T-Test result are given below in table 36:

Table 36: Frequency and Percentage of Collective Responses

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Collective	438	82,5	82,5	100,0
	Cumulative	93	17,5	17,5	17,5
	Total	531	100,0	100,0	

As can be seen in table 36, there are 531 data in total. The number of collective responses is 438 while the number of cumulative responses is 93. Therefore, 82,5% of the answers is collective and 17,5% is cumulative.

Table 37: One-Sample Statistics of Experiment 1

	N	Mean	Std. Deviation	Std. Error Mean
Collective Responses	531	,8249	,38045	,01651

Table 37 shows that, there are 531 responses in total. Standard deviation of the data is 0,38045 and standard error mean is 0,01651.

The result of One-Sample T-Test of experiment 1 is given below:

Table 38: One-Sample Test of Experiment 1

	Test Value = 0.5					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Collective Responses	19,677	530	**,000**	,32486	,2924	,3573

In the first experiment of the present study, participants were primed with collective reading the sentences. As can be seen in table 38, according to the result of one sample T-Test there is a symmetric relation between collective prime and collective responses. This relation is statistically meaningful ($p=0,000 < 0,05$).

4.1.1. Discussion of Experiment 1

59 participants' responses were taken into consideration in experiment 1. Participants whose native languages were not Turkish and participants who were not primed in the priming trials were eliminated. After primed with collective reading, participants were shown an ambiguous sentence with two pictures, one of that corresponds with collective interpretation while the other one corresponds with cumulative interpretation of the sentence. In total, there are 531 responses in the first experiment. 438 of the responses are collective reading while only 93 of them are

cumulative reading. After analysing the collective prime's effects of the participants, the result of the one-sample T-Test shows that when participants are primed with collective reading, in the target trial, they choose the collective interpretation of the sentences. The result of the experiment is statistically significant. Given that the result of the experiment is statistically meaningful in the first experiment, it is possible to say that there is a symmetric relation with collective priming and collective responses. The results of the first experiment may help to answer the research questions of the study: (1) whether priming actually has an effect on native Turkish speakers' choice of ambiguous sentences that have plural expressions or not. And (2) If there is a priming effect, whether it is symmetric or asymmetric regarding cumulative/collective contrast. Due to the fact that the result of the T-Test is statistically meaningful, research questions of the study can be answered as collective priming has an effect on native speakers of Turkish's choices of ambiguous sentences, which contain more than one plural expression. Besides, there is a symmetrical relationship between collective prime and collective responses. This finding may be related to the fact that collectivity has a scopal dependency (Champollion, 2015). This means that neither of the quantifiers distributes over the other in the way they do in 'A girl likes every cat.' Quantifier raising makes available to derive the meaning of the given example. The quantifier 'every cat' emerges as the complement of the verb 'like', then it moves up leaving behind a trace. This movement occurs at the logical form (LF); therefore, it is covert. Hovewer, the sentences that were used in the experiments do not have such kind of scope relation. Similarly, Chierchia and Ginet (1993) suppose that semantic interpretation is operated by the syntactic structure. They define the QP's scope as what it c-commands. Therefore, in Turkish, native speakers are prone to choose collective reading when there are double plural NPs in an ambiguous sentence.

4.2. ANALYSIS OF EXPERIMENT 2

In the second experiment's priming trials, participants saw an ambiguous sentence that has two different meanings namely, collective, and cumulative followed by two pictures. They chose the best picture that explains the sentence better. In experiment 2, participants were primed with cumulative interpretation of the sentences. After priming trials, target trials were shown up. In the second experiment, 71 participants' responses were analysed. The outcomes of each sentence are given below:

Table 39: İki itfaiyeci iki yangın söndürdü. (Two fire fighters quenched two fires.)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	collective	47	66,2	66,2	66,2
	cumulative	24	33,8	33,8	100,0
	Total	71	100,0	100,0	

As can be seen in table 39, 71 people participated in the second experiment. 47 of the participants selected collective meaning of the sentence. On the other hand, 24 participants thought that the sentence had cumulative meaning. Therefore, collective percentage of the sentence is 66,2% and cumulative percentage is 33,8%.

Table 40: İki çocuk dört kitap taşıdı. (Two children carried four books.)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	collective	56	78,9	78,9	78,9
	cumulative	15	21,1	21,1	100,0
	Total	71	100,0	100,0	

Table 40 shows that, out of 71 people, 56 participants preferred collective interpretation of the sentence, while 15 of them preferred cumulative interpretation. Thus, 78,9% of the participant chose collective meaning and 21,1% chose cumulative meaning of the sentence.

Table 41: İki polis iki suçlu yakaladı. (Two policemen arrested two convicts.)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	collective	41	57,7	57,7	57,7
	cumulative	30	42,3	42,3	100,0
	Total	71	100,0	100,0	

In table 41, the number of participants whose answers were collective reading of the sentence is 41. The number of participants who selected cumulative reading is 30. Therefore, 57,7% of the participants selected collective interpretation, while 42,3% selected cumulative interpretation.

Table 42: İki öğretmen altı sınav okudu. (Two teachers assessed six papers.)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	collective	57	80,3	80,3	80,3
	cumulative	14	19,7	19,7	100,0
	Total	71	100,0	100,0	

Table 42 demonstrates that, 57 people preferred collective meaning of the ambiguous sentence, it means that, 80,3% of them thought the sentence had collective meaning. When it comes to cumulative interpretation, 14 participants chose cumulative reading, in other words, 19,7% of them thought the sentence had cumulative interpretation.

Table 43: İki işçi üç bina inşa etti. (Two workers built three constructions.)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	collective	56	78,9	78,9	78,9
	cumulative	15	21,1	21,1	100,0
	Total	71	100,0	100,0	

In table 43, it can be seen that, collective frequency is 56 with 78,9%, while cumulative frequency is 15 with 21,1% out of 71.

Table 44: İki tamirci iki araba tamir etti. (Two mechanics repaired two cars.)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	collective	50	70,4	70,4	70,4
	cumulative	21	29,6	29,6	100,0
	Total	71	100,0	100,0	

As can be seen in table 44, 50 participants selected collective interpretation out of 71. Rest of them (21 participants) preferred cumulative interpretation. 70,4% of the participants chose collective meaning, while 29,6% chose cumulative meaning.

Table 45: İki öğrenci üç makale yazdı. (Two students wrote three articles.)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	collective	64	90,1	90,1	90,1
	cumulative	7	9,9	9,9	100,0
	Total	71	100,0	100,0	

As table 45 shows that, 64 of the participants chose collective reading of the sentence, which means 90,1%. However, only 7 participants preferred cumulative interpretation, which corresponds to 9,9%.

Table 46: İki pilot iki uçak sürdü. (Two pilots flew two planes.)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	collective	40	56,3	56,3	56,3
	cumulative	31	43,7	43,7	100,0
	Total	71	100,0	100,0	

Frequency of the collective reading is 40 in table 46, while frequency of cumulative reading is 31 out of 71. That means that, 56,3% of the participants selected collective interpretation of the sentence; however, 43,7% selected cumulative interpretation.

Table 47: İki çocuk üç balon tuttu. (Two children held three balloons.)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	collective	67	94,4	94,4	94,4
	cumulative	4	5,6	5,6	100,0
	Total	71	100,0	100,0	

As table 47 demonstrates, 67 participants chose collective interpretation of the sentence, thus 94,4% of them thought that the sentence had collective meaning. On the other hand, only 4 participants chose cumulative interpretation, that shows 5,6% of participants thought that the sentence had cumulative interpretation.

Frequencies and percentages of the sentences that were contained within the second experiment were given above. When the total responses are considered, outputs of the second experiments are given below:

Table 48: Frequencies and Percentages of Cumulative Responses

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	collective	478	74,8	74,8	74,8
	cumulative	161	25,2	25,2	100,0
	Total	639	100,0	100,0	

When all the responses were coded to SPSS, frequencies and percentages of collective and cumulative interpretations are shown in table 48. 639 inputs were coded by using SPSS Statistical Package. Cumulative responses were coded as 1 and collective responses were coded as 0. Table 48 shows that there are 478 collective responses while there are 161 cumulative responses out of 639.

Table 49: One-Sample Statistics of Experiment 2

	N	Mean	Std. Deviation	Std. Error Mean
Cumulative Responses	639	,2520	,43448	,01719

As table 49 shows the total input is 639 in the second experiment. The standard deviation is 0,43448 and standard error mean is 0,01719.

Table 50: One-Sample T- Test of the Second Experiment

	Test Value = 0.5					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Cumulative Responses	-14,432	638	**,000**	-,24804	-,2818	-,2143

Table 50 demonstrates the result of One Sample T-Test. As can be seen in the above-given table, there is an asymmetric relation between cumulative primes and cumulative responses. This asymmetric relation is statistically significant ($p=0,000 < 0,05$).

4.2.1. Discussion of Experiment 2

In experiment 2, 71 participants' answers were taken into consideration after eliminating the participants who did not match with the criteria: participants should be native speakers of Turkish and they should be primed in the priming trials. Participants were primed with cumulative interpretation by making them choose the picture that has cumulative reading of a given ambiguous sentence. After prime trial, an ambiguous sentence with two pictures were shown to the participants. One of the pictures has collective reading while the other one has cumulative reading. Participants were asked to choose a picture that represents the sentence best. 161 of the responses were cumulative out of 638 responses. To analyse the results of experiment 2, one-sample T-Test was run. According to the outcomes of the experiment, participants tend to choose the collective interpretation even if they were primed with cumulative interpretation. It is observed that there is a statistically significant asymmetric relation between cumulative prime and cumulative responses.

One of the recent studies about priming plural ambiguities is about distributive/cumulative contrast in English. Results of the study show that priming cumulative-distributive ambiguity causes priming effect across different sentences in English, especially in cumulative reading. However, there was an asymmetry regarding the distributive operator or whatever mechanism is responsible for distributive readings in experiment 1. Thus, native speakers of English can be affected by cumulative priming while native speakers of Turkish are not.

According to Champollion (2015), cumulativity does not have a scopal dependency while collectivity has. The reason why cumulative priming does not affect Turkish speakers' responses may be related to above-mentioned finding. Besides, Champollion (2015) infers cumulative interpretations contain two plural NPs or definite article, which does not exist in Turkish. Turkish uses ACC case marker on the object for definite interpretations (Hedberg, N., Görgülü, E., Mameni, M., 2009). In the present study, no accusative case marking is used, therefore, without ACC case marking, objects get a non-specific reading. The reason why native speakers of Turkish did not prefer cumulative interpretations of the ambiguous sentences even if they were primed with cumulative interpretation may result from sentences that were used in the experiments did not have ACC case marking. Thus, native speakers of Turkish choose

collective interpretation of the ambiguous sentences, which contain more than one plural expression rather than cumulative interpretation.

4.3. ANALYSIS OF EXPERIMENT 3 (CONTROL GROUP)

In the control experiment, no priming trials were shown to the participants and thus the participants were not biased for any type of interpretation. Only target and filler sentences were presented. In the target sets, participants saw an ambiguous sentence that has both collective and cumulative interpretations. They were asked to choose a picture that explains the sentence best. 2 pictures were given for each sentence. One of the pictures is related with one of the readings (e.g., collective). The other picture is related with the other reading (e.g., cumulative). There were 10 target sentences; however, one of the target sets was eliminated because it had a spelling mistake in the previous experiment. Therefore, that set were removed from all of the experiments. Thus, analysis of the 9 target sentences were given below:

Table 51: İki itfaiyeci iki yangın söndürdü. (2 fire fighters quenched 2 fires.)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	collective	61	78,2	78,2	78,2
	cumulative	17	21,8	21,8	100,0
	Total	78	100,0	100,0	

Table 51 shows the frequency and percentage of participants' answer to the sentence '*İki itfaiyeci iki yangın söndürdü. (2 fire fighters quenched 2 fires.)'*. There are 78 people 61 of whom chose collective interpretation of the sentence. 17 participants selected cumulative interpretation of the sentence. Therefore, 78,2% of the participants preferred collective meaning while 21,8% preferred cumulative meaning.

Table 52: İki çocuk dört kitap taşıdı. (Two children carried four books.)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	collective	52	66,7	66,7	100,0
	cumulative	26	33,3	33,3	33,3
	Total	78	100,0	100,0	

As can be seen in Table 52, the number of participants who preferred collective interpretation of the sentence is 52, while 26 of participants preferred cumulative interpretation. Therefore, 66,7% chose collective meaning whereas, 33,3% selected cumulative meaning of the sentence.

Table 53: İki polis iki suçlu yakaladı. (Two policemen arrested two convicts.)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	collective	55	70,5	70,5	70,5
	cumulative	23	29,5	29,5	100,0
	Total	78	100,0	100,0	

As Table 53 shows that, 55 participants decided on collective reading of the sentence, which means that 70,5% of them chose collective option. However, 23 participants decided that the sentence had a cumulative interpretation; thus, 29,5% chose cumulative option.

Table 54: İki öğretmen altı sınav okudu. (Two teachers assessed six papers.)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	collective	64	82,1	82,1	82,1
	cumulative	14	17,9	17,9	100,0
	Total	78	100,0	100,0	

Frequency of the collective reading of the sentence that was given in Table 54 is 64 with 82,1%. When it comes to cumulative frequency, 14 participants with 17,9% selected it.

Table 55: İki işçi üç bina inşa etti. (Two workers built three constructions.)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	collective	66	84,6	84,6	84,6
	cumulative	12	15,4	15,4	100,0
	Total	78	100,0	100,0	

In Table 55, it is shown that 66 participants opted for collective interpretation of the sentence, whereas 12 participants chose cumulative interpretation. It means that, 84,6% of the participants

preferred collective meaning. On the contrary, 15,4% of the participants selected cumulative meaning.

Table 56: İki tamirci iki araba tamir etti. (Two mechanics repaired two cars.)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	collective	60	76,9	76,9	76,9
	cumulative	18	23,1	23,1	100,0
	Total	78	100,0	100,0	

Table 56 shows that, 60 participants (76,9%) thought that the sentence had collective interpretation while 18 participants (23,1%) thought it had cumulative interpretation.

Table 57: İki öğrenci üç makale yazdı. (Two students wrote three articles.)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	collective	70	89,7	89,7	100,0
	cumulative	8	10,3	10,3	10,3
	Total	78	100,0	100,0	

As can be seen in Table 57, the number of the participants whose answers were collective reading is 70. However, only 8 participants selected cumulative reading of the sentence. Thus, 89,7% of the participants chose collective interpretation while 10,8% cumulative interpretation.

Table 58: İki pilot iki uçak sürdü. (Two pilots flew two planes.)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	collective	44	56,4	56,4	56,4
	cumulative	34	43,6	43,6	100,0
	Total	78	100,0	100,0	

Table 58 shows that, the numbers of the participants that selected collective and cumulative meaning of the sentence are close to each other; 44 people (56,4%) preferred collective interpretation, whereas 34 people (43,6%) chose cumulative interpretation.

Table 59: İki çocuk üç balon tuttu. (Two children held three balloons.)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	collective	71	91,0	91,0	91,0
	cumulative	7	9,0	9,0	100,0
	Total	78	100,0	100,0	

In Table 59, the frequencies and percentages demonstrate that collective meaning of the sentence was chosen by 71 participants. On the other hand, cumulative meaning was selected by only 7 participants. Therefore, 91,0% of the participants thought the sentence had collective interpretation while 9,0% cumulative interpretation.

Table 60: Control Experiment T-Test

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	collective	543	77,4	77,4	77,4
	cumulative	159	22,6	22,6	100,0
	Total	702	100,0	100,0	

Table 60 shows the total number of the interpretations of the sentences. There are 702 answers in the control experiment. 543 answers are collective, and 159 answers are cumulative. Thus, 77,4% of the answers is collective while 22,6% of them is cumulative.

Table 61: One-Sample Statistics of Control Experiment

	N	Mean	Std. Deviation	Std. Error Mean
Control Experiment T-Test	702	1,2265	,41886	,01581

Table 61 shows the statistics of control experiment. Total input is 702, moreover; standard deviation is 0,41886 and standard error mean is 0,01581.

Table 62: One-Sample Test of the Control Experiment

	Test Value = 1.5					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Control Experiment T-Test	-17,301	701	**,000**	-,27350	-,3045	-,2425

Table 62 shows the *One Sample T-Test* of the control experiment. In the control experiment no prime set was shown to the participants. Only target sentences and fillers were presented. Target sentences consist of an ambiguous sentence followed by two pictures. Participants were asked to choose a picture that explains the sentence best. One of the sentences demonstrates the collective meaning of the sentence while the other cumulative meaning. The result of the one sample T-Test of the control experiment shows that according to participants those ambiguous sentences had more collective interpretation than cumulative interpretation. The difference between collective and cumulative responses is statistically significant (p=0,000 < 0,05).

4.3.1. Discussion of Experiment 3

In the control experiment, 83 participants' responses were analysed. All the participants were native speakers of Turkish. As in the previous experiments, a sentence-picture matching task was presented to the participants. Two pictures preceded by an ambiguous sentence were shown. Participants were asked to select a picture that explains the sentence correctly. In the third experiment, there were no prime trials. There were only target trials and fillers. The reason why there were not any prime trails is to investigate which interpretation of the sentences participants choose and compare the results with the first and the second experiments. Comparing the control experiment with the other experiments shows whether priming the participants with one of the readings has any effects on participants' choices. The findings demonstrate that native speakers of Turkish are prone to select the collective interpretation of the ambiguous sentences even when there is no prime.

4.4. COMPARISON OF THE OUTCOMES OF THE FIRST EXPERIMENT AND CONTROL GROUP

The results of the first experiment and control experiment were compared to each other to see whether collective priming works on participants. Outcomes of experiment 1 shows that participants choose collective interpretation of the sentences after a collective prime. However, participants also prefer the collective interpretation with no prime. Comparing the first experiment with the control experiment, it can be observed whether priming the participants with collective meaning has an effect on participants. To compare the first experiment and control experiment, chi-square test was run. Results of the test are shown below:

Table 63: Chi-Square Test Results of the First Experiment and Control Experiment

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	,082[a]	1	**,775**		
Continuity Correction[b]	,031	1	,861		
Likelihood Ratio	,082	1	,775		
Fisher's Exact Test				,825	,431
Linear-by-Linear Association	,082	1	,775		
N of Valid Cases	557				

a. 0 cells (0,0%) have expected count less than 5. The minimum expected count is 48,29.
b. Computed only for a 2x2 table

As can be seen in table 63 above, when answers of the first experiments and control experiment were compared using Chi-Square Test, the result is not statistically significant (p=0,775>0,05). As a result, when participants are primed with collective interpretation of the sentences, they select collective reading. However, when there is no prime, they choose the collective interpretation again. The result of the test is not significant since participants choose collective reading whether there is a prime or not. It can be inferred that participants do not differentiate between collective prime and no prime.

4.5. COMPARISON OF THE OUTCOMES OF THE SECOND EXPERIMENT AND CONTROL GROUP

In the second experiment, participants were primed with cumulative interpretation of the ambiguous sentences. Whether priming the participants with cumulative meaning of the sentences has an effect of participants preferences has been analysed in experiment 2. The outcomes of the second experiment show there is an asymmetrical relation between cumulative prime and cumulative responses. Even if participants are primed with cumulative interpretation of the sentences, they choose collective interpretation in the target trials. Comparing the second experiment with control experiment will increase the validity and reliability of the study.

Table 64: Chi-Square Test Results of the Second Experiment and Control Experiment

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	2,534[a]	1	**,111**		
Continuity Correction[b]	2,250	1	,134		
Likelihood Ratio	2,525	1	,112		
Fisher's Exact Test				,120	,067
Linear-by-Linear Association	2,530	1	,112		
N of Valid Cases	639				

a. 0 cells (0,0%) have expected count less than 5. The minimum expected count is 72,31.
b. Computed only for a 2x2 table

Table 64 shows the result of the Chi-square test of the second experiment and the control experiment. According to table 64, the result is not statistically significant (p=0,111>0,05). Consequently, chi-square test is not meaningful statistically as; participants do not choose cumulative reading, even though they are primed with cumulative interpretation. Instead, they prefer collective interpretation rather than cumulative. That is the reason why the result is not meaningful. Participants do not select cumulative interpretation under the circumstances namely, cumulative prime or no prime.

CONCLUSION

Some sentences containing more than one plural expression create ambiguity. Sentences such as, *'İki çocuk üç balon tuttu.' (Two boys held three balloons.)* are ambiguous. This sentence can be interpreted collectively and cumulatively. Collective reading of the sentence is two boys are holding three balloons together at the same time. Cumulative interpretation of the sentence is there are two boys and three balloons. Those three balloons are being held by those two boys, but it is not important how those balloons are being held. It might be one boy is holding just one of the balloons and the other boy is holding the rest two balloons. Two pilot study experiments and three main experiments were conducted to indicate whether priming the participants with one of the interpretations can affect with regard to cumulative/collective contrast. A sentence-picture matching task was used to collect data. Participants saw one sentence followed by two pictures. They were asked which picture explains the sentence better. In the first and the second experiments, 10 prime trials, 10 target trials and 10 filler sentences were used (One set was removed from all experiment since there was a spelling mistake in the sentence). In prime trials, participants were primed with collective reading in the first experiment while they were primed with cumulative reading in the second experiment. In experiment 3, no prime trials were used due to experiment 3 is a control experiment.

In the first experiment, they were primed with collective reading of the sentences. In prime trials one ambiguous sentence was given followed by two sentences (e.g., İki işçi üç bina inşaa etti (Two workers built three constructions)). One of the pictures was related with collective interpretation of the sentence while the other sentence was irrelevant with both readings (e.g., Bir işçi bir bina inşaa etti. (One worker built a construction.)). In prime trials, participants were forced to choose the collective reading of the sentences. By doing that, participants were primed with collective interpretations. In the target trials, two pictures preceded by an ambiguous sentence were used. This time, one of the pictures was related with collective meaning while the other one was related with cumulative meaning. Participants were asked to select a picture that explains the sentence best. Target trials' answers were considered while analysing the data. Inasmuch as participants were already primed with collective interpretation of the sentence, therefore, analysis of the first experiment can indicate whether collective priming can affect participants' choice of an ambiguous sentence.

In the second experiment, the same procedure was used, except participants were primed with cumulative interpretations of the ambiguous sentences. Participants were given one ambiguous

sentence followed by two pictures, however; this time participants were primed with cumulative reading in the prime trials. In the target trials both collective and cumulative interpretations of the sentences were shown, and participants were asked to select a picture that matches the given sentence. In the control experiment, no prime trials were used, only target trails and fillers were used. The purpose of the control experiment is to compare cumulative prime results with no prime and collective prime results with no primes. By conducting control experiment and comparing it with the first experiment and the second experiment, research questions of the study will be tried to be answered: (1) whether priming actually has an effect on Turkish native speakers' interpretation of ambiguous sentences that have plural expressions or not, and (2) if there is a priming effect, is it symmetric or asymmetric regarding cumulative/collective contrast?

In each experiment, T-Test was run to find out whether the difference between the observed interpretation outcomes of target sentences is statistically meaningful or not. Moreover, to compare experiment 1 with control experiment and experiment 2 with control experiment, chi-square test was carried out.

The results show that, in experiment 1, after collective prime, native speakers of Turkish preferred collective meanings of the sentences in the target trials. It means that there is a symmetrical relationship between collective prime with collective interpretation according to people who speak Turkish natively.

The outcomes of the second experiment demonstrate that after cumulative prime, native Turkish speakers did not choose cumulative interpretations. The result shows that cumulative priming does not give rise to priming effect to native speakers of Turkish, therefore; there is an asymmetrical relation between cumulative prime with cumulative interpretation in Turkish.

In the control experiment (experiment 3), when there is no prime, participants selected collective reading of the ambiguous sentences. Comparing the outcomes of the control experiment both with experiment 1 and experiment 2, a statistically significant outcome has not been observed between the interpretations of the participants. The reason why the results are not meaningful is that native speakers of Turkish tend to choose collective interpretations of the ambiguous sentences that have more than one plural expression whether there are collective primes, cumulative primes or even when there is no prime.

In a similar study Maldonado et al., (2017) investigate whether distributive/cumulative ambiguity can give rise to priming effect to native speakers of English by conducting 3 experiments. According to their findings, cumulative - distributive ambiguity leads priming

effect across different sentences. Only in experiment 1, there was an asymmetry on account of the distributive operator or whatever mechanism is responsible for distributive readings in English. However, in the present study, no distributive prime and target trials were used since Turkish sentences, which lack an explicit distributive marker (-şer) and include more than one plural expression, are not interpretated distributively. When it comes to collective/cumulative contrast, native speakers of Turkish interpret ambiguous sentences with more than one plural NP collectively.

This study has reported that and has tried to answer the research questions:

1) *Can priming affect Turkish native speakers' comprehension of ambiguous sentences regarding collective-cumulative interpretations?*

Priming is widely used as an experimental method to study mental representation (Branigan et al. 1995). Bock (1986, 1989) defines structural priming as speakers are prone to use the same or related syntactic forms that are repeatedly occurred across utterances. After priming participants with collective interpretation (experiment 1) and with cumulative interpretation (experiment 2) of the ambiguous sentences with plural NPs, the first research question can be answered as; for experiment 1, collective priming affects participants' interpretations. However, when experiment 1 is compared with the control experiment, the outcome is not statistically significant due to the fact that native speakers of Turkish already prefer collective reading of ambiguous sentences even when there is no prime. When it comes to experiment 2, priming participants with cumulative interpretations of the sentences does not seem to affect participants' choice inasmuch as native Turkish speakers choose collective reading despite the cumulative primes. These results lead to the second research question:

2) *If priming effect is found, would it be symmetric or asymmetric with respect to cumulative/collective contrast?*

There is a symmetrical relationship with collective primes with collective responses while there is an asymmetrical relationship with cumulative primes with cumulative responses.

To sum up, human brain tries to resolve ambiguity whenever it comes across with it. Sentences with more than one plural expression bring about syntactic ambiguity. They can either have collective or cumulative reading in Turkish. Whether priming the participants with one of the interpretations has effects on participants' choice of comprehending the sentences or not has

been discussed in the current study. Additionally, if priming affects the participants choices of ambiguous sentences, such priming effect is symmetric or asymmetric has also been demonstrated. The outcomes of the study indicate that native speakers of Turkish incline toward to select collective interpretation of ambiguous sentences with double plural NPs whether there are collective primes, cumulative primes or even when there is no prime. The reason may result from the fact that cumulativity does not have a scopal dependency while collectivity has. Therefore, native speakers of Turkish seem to comprehend ambiguous sentences with more than one plural expression as collectively. Moreover, Champollion (2015) states that cumulative interpretations include two plural NPs or definite plurals. However, in Turkish there is no definite article (Underhill, R., 1976), yet there are definite interpretations of nominal phrases in specific syntactic position (Hedberg, N., Görgülü, E., Mameni, M., 2009). In addition to this, Turkish marks specific direct objects with accusative case marking, without accusative marking, objects get a non-specific reading. In the current study, no accusatively case marked NP has been used, therefore, this might be the reason why native Turkish speakers are prone to select collective interpretation rather than cumulative interpretation.

Further studies may extend this study using ACC case marked NPs to find out whether native speakers of Turkish comprehend ambiguous sentences which have more than one plural expression cumulatively. Moreover, in this study only +human subject NPs were used. A further study may use -human subject NPs. It could be analysed whether using +human or -human subject NPs affects the comprehension of those kinds of ambiguous sentences. As mentioned in the limitations of the study section, more participants and more ambiguous sentences may increase the reliability and validity of the study.

REFERENCES

Akalin, S. H. etc. (2011). *Turkish dictionary*. Ankara.

Aksan, M. & Y. Aksan (2006). Degree modification and event semantics: Derived verbs and postverb constructions in Turkish. *Workshop in Formal Altaic Linguistics* 3, 22-24 May 2006, Moscow State University.

Aksan M. & Aksan, Y. (2009). The Semantics of event plurality in Turkish. *Dil ve Edebiyat Dergisi/Journal of Linguistics and Literature, 6*(2).

Alyılmaz, S. (2017). On Plurality Category and Teaching in Turkish. *Journal of Education and Training Studies (5)*9. https://doi.org/10.11114/jets.v5i9.2528

Ameri-Golestan, A. & Nezakat-Alhossaini, M. (2012). The application of syntactic priming in second language research. *Journal of Language Teaching and Research, 3*, 898-903.

Bale, A., Gagnon, M. & Khanjian. H. (2011). Cross-linguistic representations of numerals and number marking. In N. Li and D. Lutz (Eds.), *Proceedings of the Twentieth Semantic Analysis and Linguistic Theory*, 582-598.

Banguoğlu, T. (1956). Türkçe'de tekerrür fiilleri. *Türk Dili Araştırmaları Yıllığı- Belleten 1956*, 111-123.

Banguoğlu, T. (2007). *The semantics of the bare noun in Turkish.* Ankara: Dil Tarih Kurumu.

Bliss, H. (2004). Türkçenin Grameri. In I. Mezhevich and M. B. Dobrovolsky (eds.) *Calgary Papers in Linguistics, 25*, 1-65.

Bock, J. K. (1986). Syntactic persistence in language production. *Cognitive Psychology, 18*, 355–387.

Bock, K. (1989). Closed-class immanence in sentence production. *Cognition*, 31, 163–186. [PubMed: 2721134]

Bock, J. K. & Loebell, H. (1990). Framing sentences. *Cognition, 35*, 1–39. [PubMed: 2340711]

Bock, K., Loebell, H. & Morey, R. (1992). From Conceptual Roles to Structural Relations: Bridging the Syntactic Cleft. *Psychological Review, 99,* 150-171. http://dx.doi.org/10.1037/0033-295X.99.1.150

Branigan, H. P., Pickering, M. J., Liversedge, S. P., Stewart, A. J. & Urbach, T. P. (1995). Syntactic priming: Investigating the mental representation of language. *Journal of Psycholinguistic Research, 24,* 489-506.

Branigan, H. P., Pickering, M. J., Stewart, A. J. & McLean, J. F. (2000). Syntactic priming in spoken production: Linguistic and temporal interference. *Memory & Cognition, 28,* 1297–1302.

Cabredo Hofherr, P. (2010). Verbal plurality and event plurality. *Dépendances distributives : pluralité nominale et verbale* (2006-9) of the *Fédération Typologie et universaux du langage* (CNRS, FR 2559).

Carnie, A. (2013) *Syntax: A Generative Introduction*. 3rd edition. Oxford: Wiley-Blackwell.

Chang, F., Dell, G. S., Bock, K. & Griffin, Z. M. (2000). Structural priming as implicit learning: A comparison of models of sentence production. *Journal of Psycholinguistic Research, 29,* 217–229 https://doi.org/10.1023/A:1005101313330

Champollion, L. (in press). Distributivity, collectivity, and cumulativity.

Champollion, L. (2010a). *Parts of a whole: Distributivity as a bridge between aspect and measurement*, PhD thesis, University of Pennsylvania, Philadelphia, PA.

Champollion, L. (2010b). Cumulative readings of *every* do not provide evidence for events and thematic roles. In Maria Aloni, Harald Bastiaanse, Tikitu de Jager & Katrin Schulz (eds.), *Logic, language and meaning: Proceedings of the 17th Amsterdam Colloquium*, 213–222. Springer Berlin Heidelberg. doi:10.1007/978-3-642-14287-1_22

Cusic, David D. (1981). *Verbal plurality and aspect*, PhD dissertation, Stanford University, Stanford, CA.

Çelikkol Berk, N. (2018). *The second language processing of nominal compounds: a masked priming study*, A Master's Thesis, Ankara.

Dotlačil, J. (2010). *Anaphora and distributivity: A study of same, different, reciprocals and others*, PhD dissertation, Utrecht University, Utrecht, Netherlands.

Ferreira, V. S. & Bock, K. (2006). The functions of structural priming. *Language and Cognitive Processes, 21*, 1011–1029.

Frazier, L., Pacht, J. M. & Rayner, K. (1999). Taking on semantic commitments, ii: Collective versus distributive readings. *Cognition, 70*, 87–104.

Filik, R., Paterson, K. B. & Liversedge, S. P. (2004). Processing doubly quantified sentences: Evidence from eve movements. *Psychonomic Bulletin & Review, 11*(5), 953-959.

Godfrey, J., Holliman, E., & McDaniel, J. (1992). Switchboard. Telephone speech corpus for research and development. In *Proceedings of ICASSP-92*, 517–520.

Giles, H. & Powesland, P. F. (1975). *Speech style and social evaluation.* London: Academic Press.

Göksel, A. & C. Kerslake (2005). *Turkish: A Comprehensive Grammar*. London NY: Routledge.

Görgülü, E. (2009). On definiteness and specificity in Turkish."In *MIT Working Papers in Linguistics 58. Proceedings of the 5th Workshop on Formal Altaic Linguistic*s, eds. R. Shibagaki and R. Vermeulen.

Görgülü, E. (2011). Plural marking in Turkish: Additive or associative? *Working Papers of the Linguistics Circle of the University of Victoria, 21*, 70–80.

Görgülü, E. (2012). *Semantics of nouns and the specification of number in Turkish*, PhD dissertation, Simon Fraser University, Canada.

Hartsuiker, R. J. & Kolk, H. H. J. (1998). Syntactic facilitation in agrammatic sentence production. *Brain and Language, 62*(2), 221 254. https://doi.org/10.1006/brln.1997.1905

Hartsuiker, R. J., Kolk, H. H. J. & Huiskamp, P. (1999). Priming Word Order in Sentence Production. *The Quarterly Journal of Experimental Psychology Section A, 52*(1), 129–147. https://doi.org/10.1080/713755798

Hartsuiker, R. J., Pickering, M. J. & Weltkamp, E. (2004). Is syntax separate or shared between languages? Cross-linguistic syntactic priming in Spanish/English bilinguals. *Psychological Science, 15*, 409. doi:10.1111/j.0956-7976.2004.00693.x

Hatiboglu, V. (1982). *Dilbilgisi Terimleri Sözlüğü.* Ankara Üniversitesi, Ankara.

Heim, I. & Kratzer, A. (1998). *Semantics in Generative Grammar*. Blackwell. UK.

Kan, S. (2010). *Number marking and Turkish noun phrases.* Master's thesis, University of Massachusetts Amherst, Amherst, MA.

Karakaplan Hanoğlu, H. (2016). *The effects of priming in the production of L2 morphology,* A Master's thesis, İstanbul.

Kaschak, M. P., Kutta, T. J. & Jones, J. L. (2011). Structural Priming as Implicit Learning: Cumulative Priming Effects and Individual Differences. *Psychon Bull Rev*. *18*(6), 1133–1139. doi:10.3758/s13423-011-0157-y.

Ketrez, N. (2003). -lAr-marked nominals and three types of plurality in Turkish. *In Proceedings of the Chicago Linguistics Society 39*, 176–192.

Ketrez, F. N. (2001). *Plurality and mass-count distinction in Turkish*, Master's Thesis, University of Southern California, Los Angeles.

Kim, Y. & McDonough, K. (2008). Learners' production of passives during syntactic priming activities. *Applied Linguistics*, *29*, 149-154. doi:10.1093/applin/amn004

Korkmaz, Z. (1992). *Gramer Terimleri Sözlüğü.* Ankara, Türk Dil Kurumu Yayınları.

Kornfilt, Jaklin. (2002). Lars Johanson & Éva Ágnes Csató (eds.), The Turkic languages (Routledge Language Family Descriptions). London: Routledge, 1998. Pp. xxiii+474.. Journal of Linguistics. 38. 397 - 439. doi:10.1017/S0022226702251622.

Krifka, M. (1992). Thematic relations as links between nominal reference and temporal constitution. In Ivan A. Sag & Anna Szabolcsi (eds.), *Lexical matters*, 29–53. Stanford, CA: CSLI Publications.

Kratzer, A. (2005). On the plurality of verbs. In J. Dölling and T. Heyde-Zybatow (eds.), *Event Structures in Linguistic Form and Interpretation*, 269–300. Mouton de Gruyter, Berlin.

Kurtzman, Howard S. & Maryellen C. M. (1993). Resolution of Quantifier Scope Ambiguities. *Cognition 48*, 243-279.

Kroch, Anthony S. (1974). *The semantics of scope in English*. A Master's Thesis: Massachusetts Institute of Technology dissertation, Cambridge.

Levelt, J. M. & Kelter, S. (1982). Surface form and memory in question answering. *Cognitive Psychology 14*, 78-106.

Lewis, G.L. (2000). *Turkish grammar*, 2nd ed. Oxford: Oxford University Press.

Link, G. (1983). The logical analysis of plurals and mass terms: a lattice-theoretic approach. In P. Portner and B. H. Partee (Eds.), *Formal Semantics - the Essential Readings*, 127 147. Blackwell.

Link, G. (1987). Generalized quantifiers and plurals. In Peter Gärdenfors (ed.), *Generalized quantiers*, 151–180. Berlin, Germany: Springer. doi:10.1007/978-94-009-3381-1_6 Reprinted in Link (1998).

Maldonado, M., Chemla, E. & Spector, B. (2017). Priming plural ambiguities. *Journal of Memory and Languag*e, *95*, 89-101

Martı´, L. (2020a). Inclusive plurals and the theory of number. *Linguistic Inquiry 51*(1), 37–74.

Martı´, L. (2020b). Numerals and the theory of number. *Semantics & Pragmatics.* 13(3). Early access, https://semprag.org/index.php/sp/article/view/sp.13.3/pdf https://doi.org/10.3765/sp.13.3

May, R. (1985). *Logical Form: Its Structure and Derivation.* Cambridge: MIT Press.

Mercan, G. (2016). Structural priming in L2 Turkish: A study on possessive noun phrases and noun clauses. In A. Gürel (Ed.), *Second Language Acquisition of Turkish,* 313-332. John Benjamins, Amsterdam. doi: 10.1075/lald.59.12mer

Meyer, D. E. & Schvaneveldt, R. W. (1971). Facilitation in recognizing pairs of words: evidence of a dependence between retrieval operations. *Journal of Experimental Psychology, 90*, 227.

Nurmio, S. (2017). Collective nouns in Welsh: a noun category or a plural allomorph?. *Transactions of the Philological Society 115*(1), 58–78.

Ojeda, Almerindo E. (1998). The semantics of collectives and distributives in Papago. *Natural Language Semantics 6*, 245-270.

Potter, M. C. & Lombardi, L. (1998). Syntactic Priming in Immediate Recall of Sentences. *Journal of Memory and Language, 38,* 265-282. http://dx.doi.org/10.1006/jmla.1997.2546

Reitter, D., Keller, F. & Moore, J. D. (2011). A computational cognitive model of syntactic priming. *Cognitive Science, 35*(4), 587–637. https://doi.org/10.1111/j.1551-6709.2010.01165.x

Sağ, Y. (2018). The semantics of numeral constructions in Turkish. In, Uli Sauerland and Stephanie Solt (ed.), *Proceedings of Sinn und Bedeutung (SuB) 22*, 307–324. Leibniz Centre General Linguistics, Berlin.

Sağ, Y. (2019). *The semantics of number marking: Reference to kinds, counting, and optional classifiers*, PhD dissertation, Rutgers University, New Jersey.

Scha, R. (1981). Distributive, collective and cumulative quantication. In Groenendijk, J., Janssen,T., and Stokhof, M., (eds), *Formal methods in the study of language*. Mathematical Center Tracts, Amsterdam, Netherlands. Reprinted in Groenendijk et al. (1984)

Scheepers, C. (2003). Syntactic Priming of Relative Clause Attachments: Persistence of Structural Configuration in Sentence Production. *Cognition, 89,* 179-205. http://dx.doi.org/10.1016/S0010-0277(03)00119-7

Shin, J. & Christianson, K. (2012). Structural Priming and Second Language Learning. *Language Learning, 62.* 931-964. doi:10.1111/j.1467-9922.2011.00657.x.

Stabile, Claire, et al. (2015). Cross linguistic priming of the passive in Mandarin-English bilinguals. *Generative Approaches to Second Language Acquisition Conference, Indiana University Bloomington, 4 March 2015*. https://www.researchgate.net/publication/275658265_Cross_linguistic_priming_of_the_passive_in_MandarinEnglish_bilinguals.

Pagliarini, E., Fiorin, G. & Dotlačil, J. (2012). The acquisition of distributivity in pluralities. In Alia K. Biller, Esther Y. Chung & Amelia E. Kimball (eds.), *Proceedings*
of the 36th Boston University Conference on Language Development (BUCLD), vol. 2, 387–399. Cascadilla Press.

Pickering, M. J. & Branigan, H. P. (1998). The representation of verbs: Evidence from syntactic priming in language production. *Journal of Memory & Language*. *39*(4), 633–651.

Pickering, M. J., & Branigan, H. P. (1999). Syntactic priming in language production. *Trends in Cognitive Sciences, 3*, 136-141.

Pickering, M. J. & Ferreira, V. S. (2008). Structural Priming: A Critical Review. *Psychological Bulletin, 134*(3), 427-459.

Sternefeld, W. (1998). Reciprocity and cumulative predication. *Natural Language Semantics 6*(3). 303–337. doi:10.1023/a:1008352502939

Syrett, K. & Musolino, J. (2013). Collectivity, distributivity, and the interpretation of plural numerical expressions in child and adult language. *Language acquisition 20*(4).
259–291. doi:10.1080/10489223.2013.828060

Tannen, D. (1987). Repetition in conversation: toward a poetics of talk. *Language 63*, 574–605.

Thothathiri, M. & Snedeker, J. (2008). Syntactic priming during language comprehension in three-and four-year-old children. *Journal of Memory and Language, 58*, 188–213.

Tunstall, S. L. (1998). *The interpretation of quantifiers: Semantics and processing*, Unpublished doctoral dissertation, University of Massachusetts, Amherst.

Underhill, R. (1976). *Turkish Grammar*, Cambridge, Mass: MIT Press

van der Does, J. & Verkuyl H. (1996). Quantification and predication. In Kees van Deemter and Stanley Peters (eds), *Semantic ambiguity and underspecification*, 27–54. Stanford, CA: CSLI Publications.

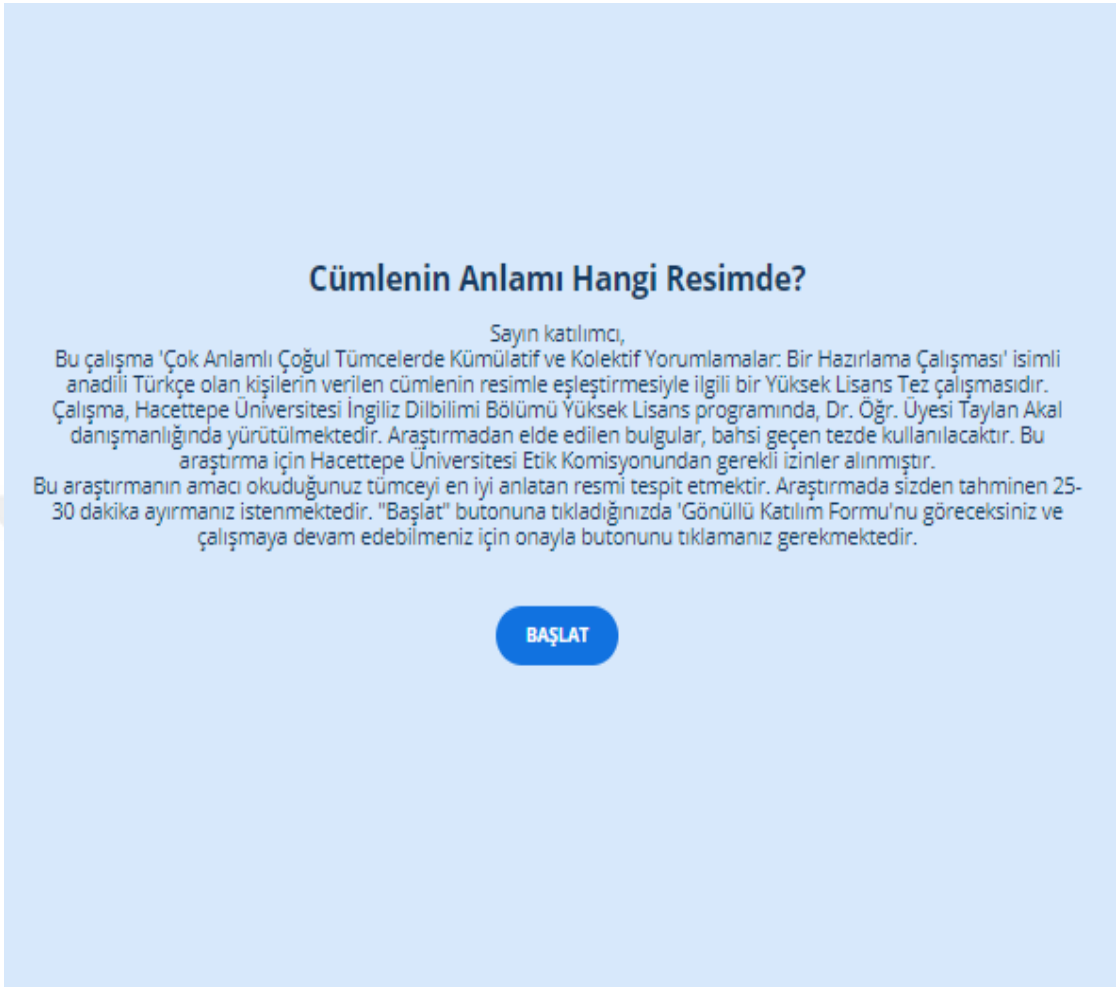
Vasilyeva, M., Waterfall, H., Gámez, P. B., Gómez, L. E., Bowers, E. & Shimpi, P. (2010). Cross-linguistic syntactic priming in bilingual children. *Journal of Child Language*, *37*(5), 1047-1064. doi: 10.1017/S0305000909990213

Verkuyl, H. J. & van der Does J. (1991). *The semantics of plural noun phrases*, vol. LP-91-07 ITLI prepublication series for logic, semantics and philosophy of language. Amsterdam, University of Amsterdam, Netherlands. https://www.illc.uva.nl/Research/Publications/Reports/LP-1991-07.text.pdf

Villalta, E. (2003). The role of context in the resolution of quantifier scope ambiguities. *Journal of Semantics, 20*, 115-162

Zweig. E. (2009). Number-neutral bare plurals and the multiplicity implicature. *Linguistics and Philosophy*, Springer Verlag, *32*(4), .353-407.

APPENDIX 1. THE FIRST PART OF ONLINE QUESTIONNAIRES



Cümlenin anlamı hangi resimde?

Sayın katılımcı,
Bu çalışma 'Çok Anlamlı Çoğul Tümcelerde Kümülatif ve Kolektif Yorumlamalar: Bir Hazırlama Çalışması' isimli anadili Türkçe olan kişilerin verilen cümlenin resimle eşleştirmesiyle ilgili bir Yüksek Lisans Tez çalışmasıdır. Çalışma, Hacettepe Üniversitesi İngiliz Dilbilimi Bölümü Yüksek Lisans programında, Dr. Öğr. Üyesi Taylan Akal danışmanlığında yürütülmektedir. Araştırmadan elde edilen bulgular, bahsi geçen tezde kullanılacaktır. Bu araştırma için Hacettepe Üniversitesi Etik Komisyonundan gerekli izinler alınmıştır.
Bu araştırmanın amacı okuduğunuz cümleyi en iyi anlatan resmi tespit etmektir. Araştırmada sizden tahminen 25-30 dakika ayırmanız istenmektedir. Araştırmaya sizin dışınızda yaklaşık 80 kişi katılacaktır. Resimler ve tümceler kesinlikle kişiye özel konuları içermemektedir. Bu çalışmaya katılmak tamamen gönüllülük esasına dayanmaktadır. Çalışmanın amacına ulaşması için sizden beklenen, bütün soruları eksiksiz, kimsenin baskısı veya telkini altında olmadan, size en uygun gelen cevapları içtenlikle verecek şekilde cevaplandırmanızdır. Araştırmadan istediğiniz zaman çekilebilirsiniz. Bu durum size hiçbir sorumluluk getirmeyecektir. Araştırmada vereceğiniz cevaplar, çalışmada yer alan araştırmacılar ve çalışmanın veri kısmında anonim şekilde kullanılmak dışında kimseyle paylaşılmayacaktır. Araştırma sonuçları tez ve bilimsel yayınlar için kullanılacaktır. Araştırmanın tüm süreçlerinde kişisel bilgileriniz ihtimamla korunacaktır. Bu formu okuyup onaylamanız, araştırmaya katılmayı kabul ettiğiniz anlamına gelecektir. Ancak, çalışmaya katılmama veya katıldıktan sonra herhangi bir anda çalışmayı bırakma hakkına da sahipsiniz. Bu gönüllü katılım formunu onaylamadan önce veya daha sonra çalışmayla ilgili aklınıza gelebilecek olan soruları araştırmacılara sorabilirsiniz. Araştırmacıların iletişim bilgileri formun alt kısmında verilmiştir. Araştırmaya katılmayı tercih ediyorsanız okudum anladım butonunu işaretleyiniz.

Sorumlu Araştırmacı:
Adı, Soyadı: Taylan Akal
Telefonu: [redacted]
E-posta: [redacted]
Adres: [redacted]

Yardımcı Araştırmacı:
Adı, soyadı: Zahide Kübra AYANOĞLU
Telefonu: [redacted]
E-posta: [redacted]
Adres: [redacted]

1.

Adınız ve soyadınız

Adı

Soyadı

2.

Onam formunu okudum, anladım. Çalışmaya katılmayı kabul ediyorum

Yukarıda yer alan ve araştırmadan önce katılımcıya verilmesi gereken bilgileri okudum ve katılmam istenen çalışmanın kapsamını ve amacını,gönüllü olarak üzerime düşen sorumlulukları anladım. Çalışma hakkında yazılı açıklama yapıldı. Kişisel bilgilerimin özenle korunacağı konusunda yeterli güven verildi.Bu koşullarda söz konusu araştırmaya kendi isteğimle, hiçbir baskı ve telkin olmaksızın katılmayı kabul ediyorum.

3.

Anketi yaptığınız tarihi yazınız.

4.

mail adresiniz

5.
Yaşınız

6.
Cinsiyetiniz

- Kadın
- Erkek

7.
Eğitim düzeyiniz

- Lise okuyor/mezun
- Üniversite okuyor/mezun
- Yüksek Lisans/Doktora
- Diğer

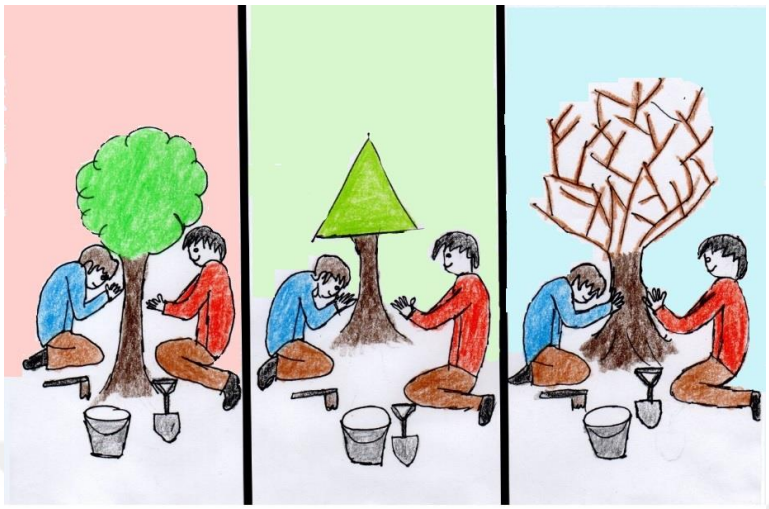
8.
Bölümünüz

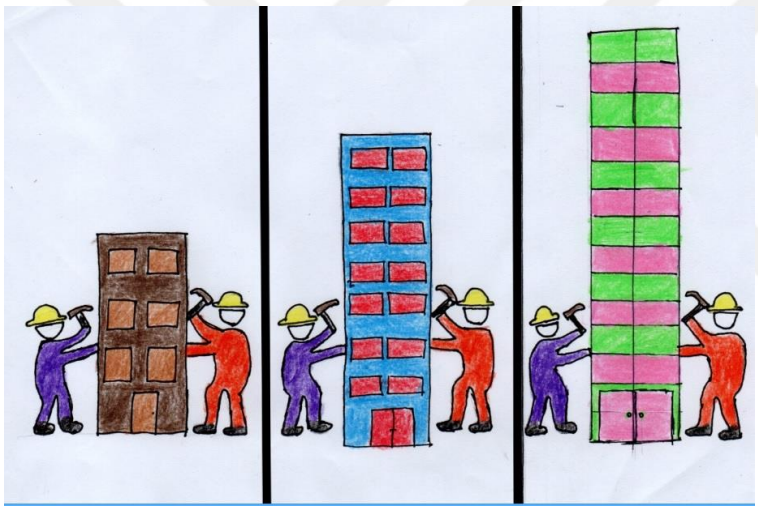
9.
Anadiliniz

- Türkçe
- Diğer

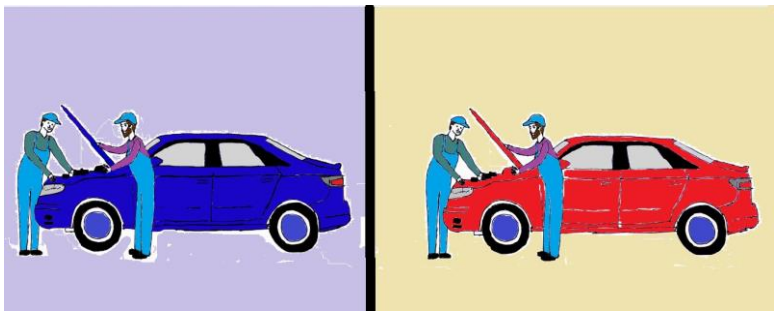
Aşağıdaki verilen cümleleri en iyi anlatan resmi seçiniz.
NOT: Her cümle için iki seçenek verilmiştir. Verilen resimler arasından yalnızca bir tanesini seçebilirsiniz.

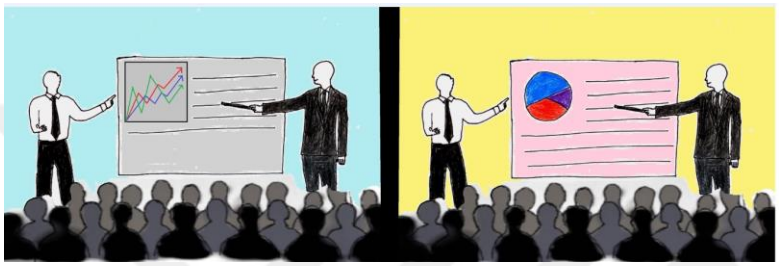
APPENDIX 2. PICTURES OF COLLECTIVE INTERPRETATION OF THE SENTENCES





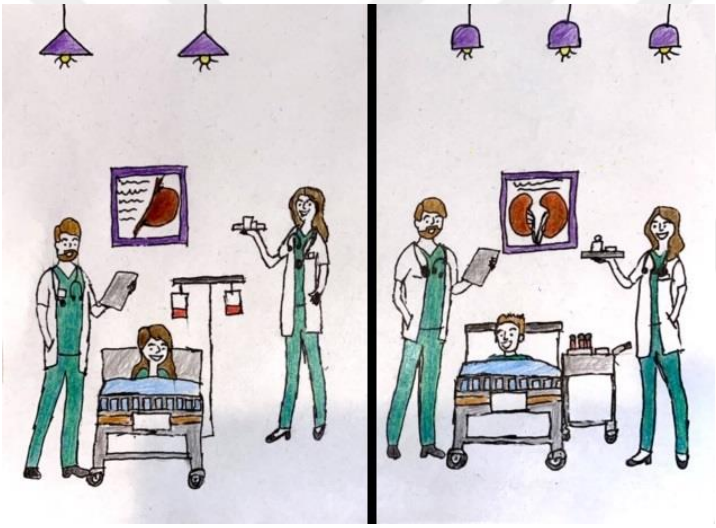




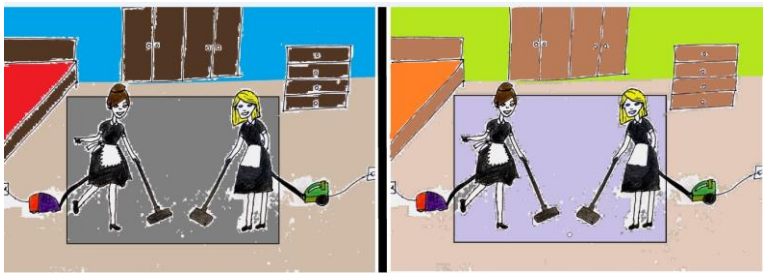


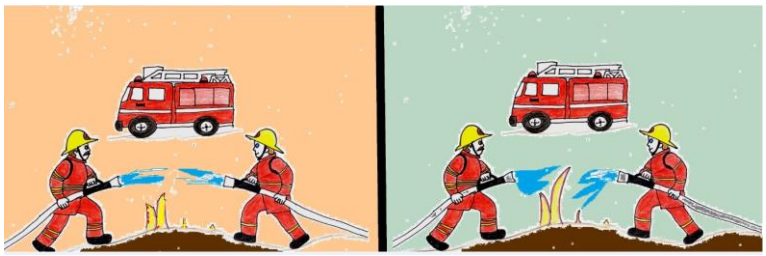


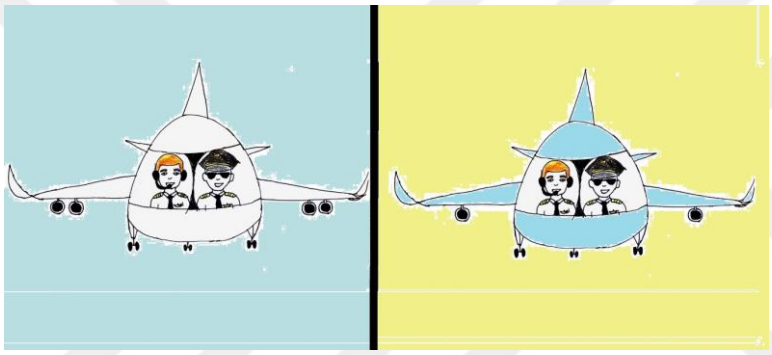










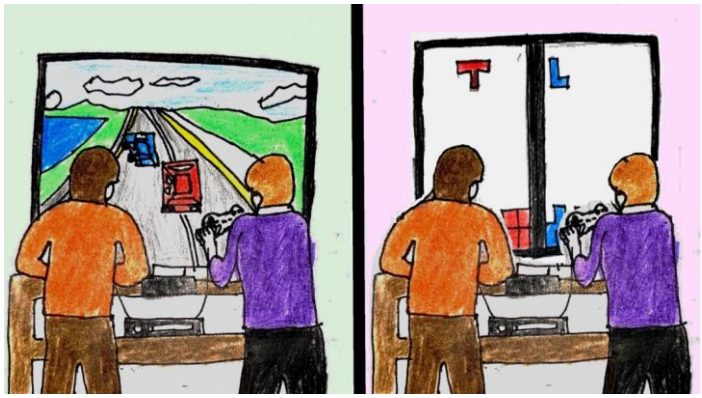










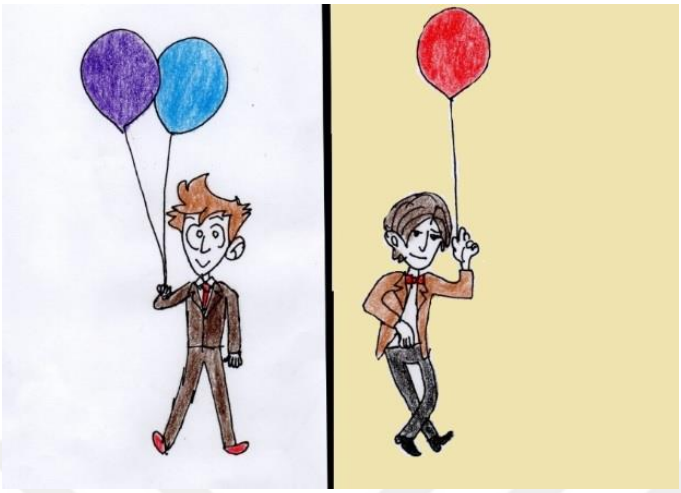

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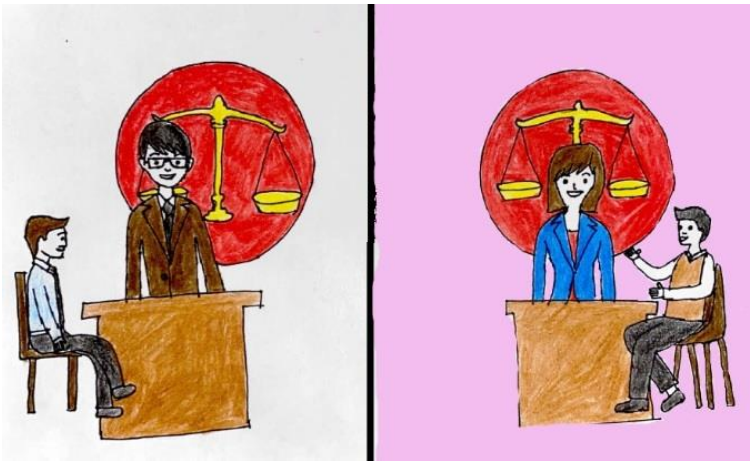


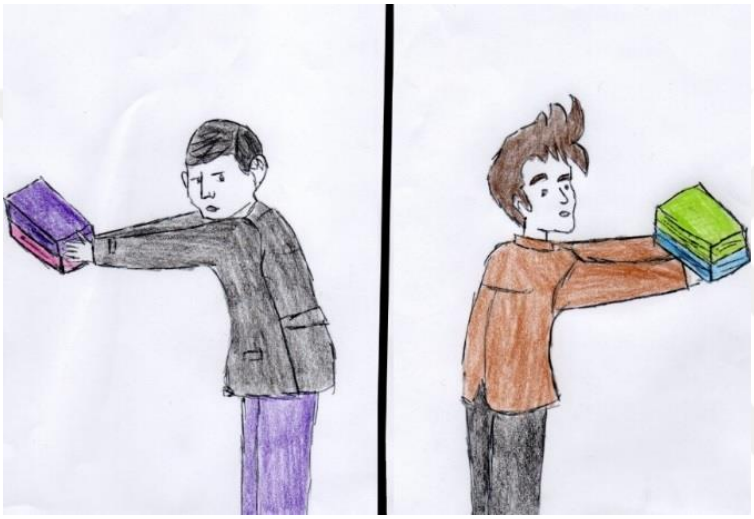
APPENDIX 3. PICTURES OF CUMULATIVE INTERPRETATION OF THE SENTENCES

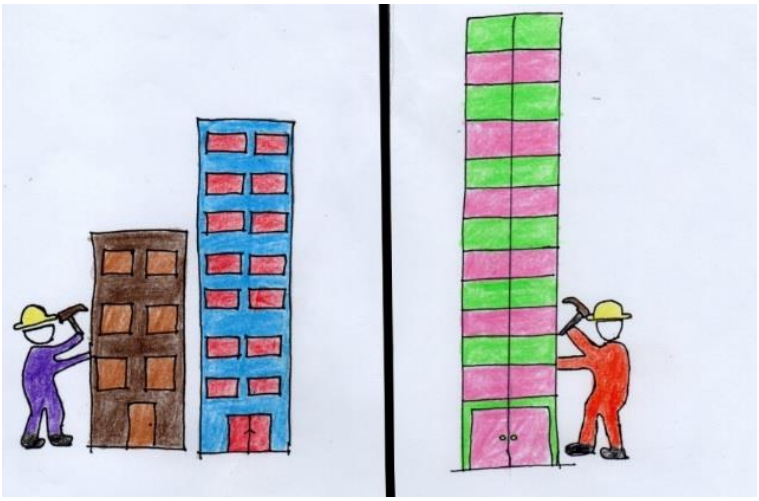


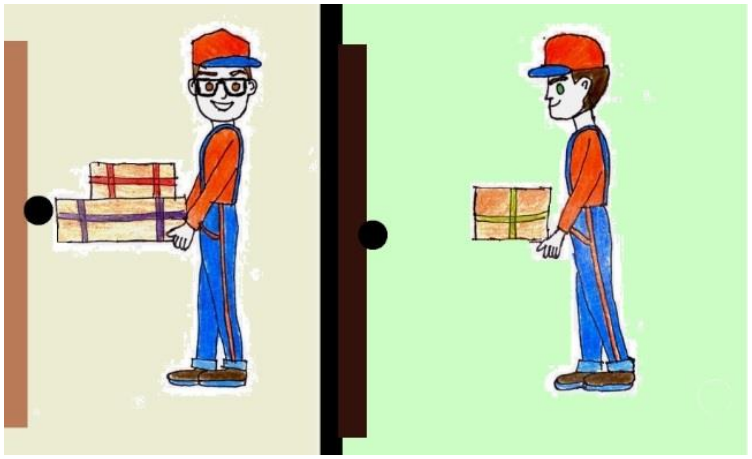


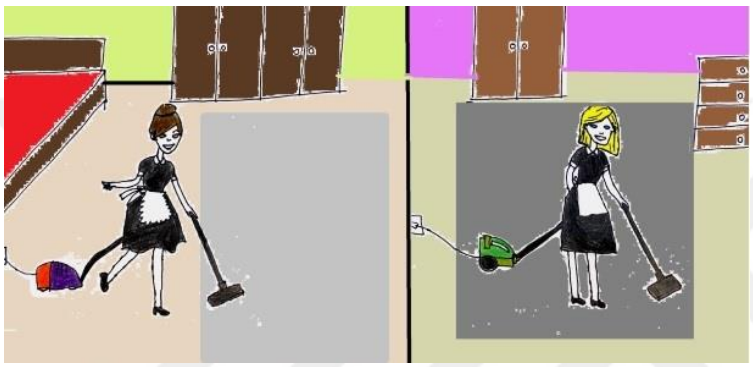


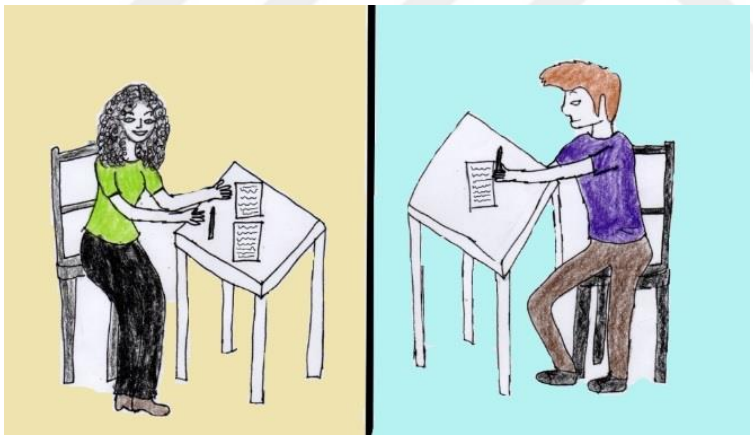


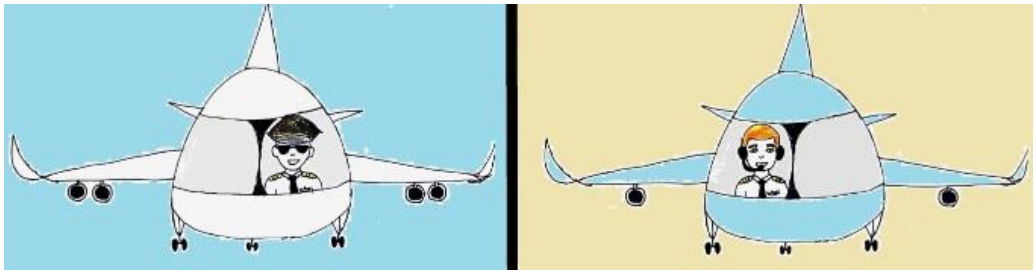




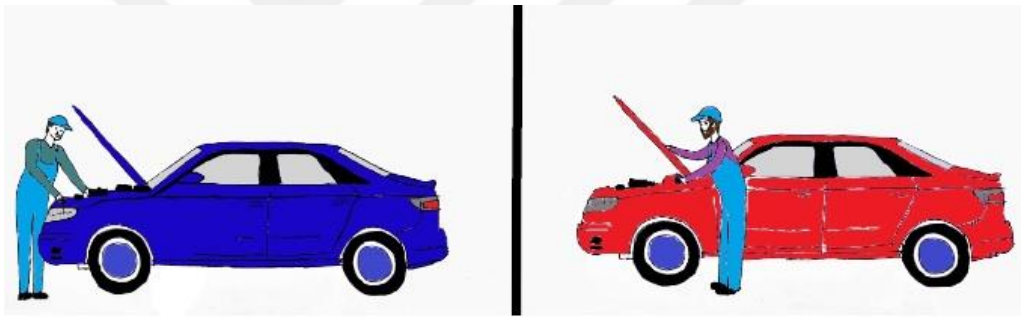


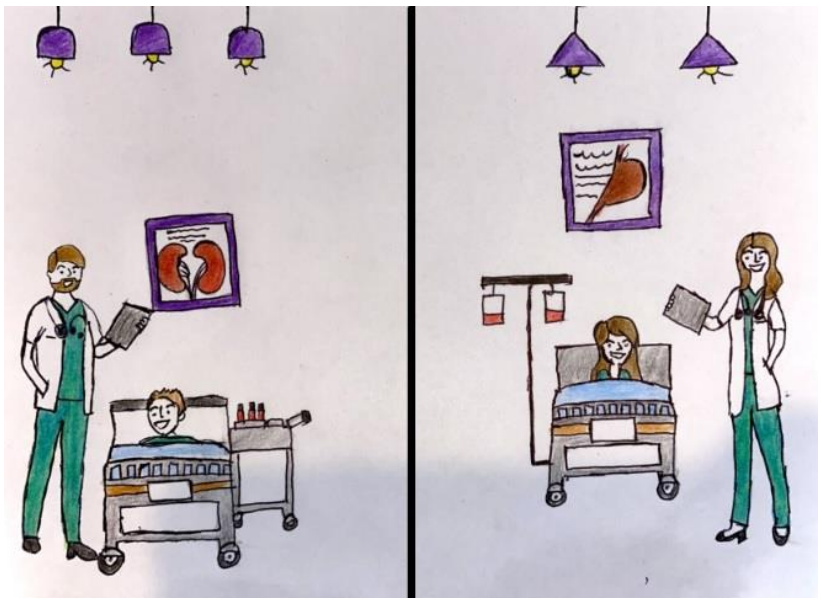


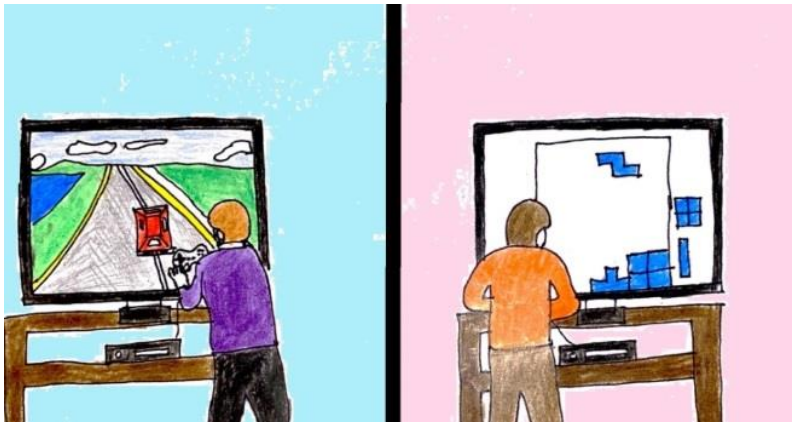




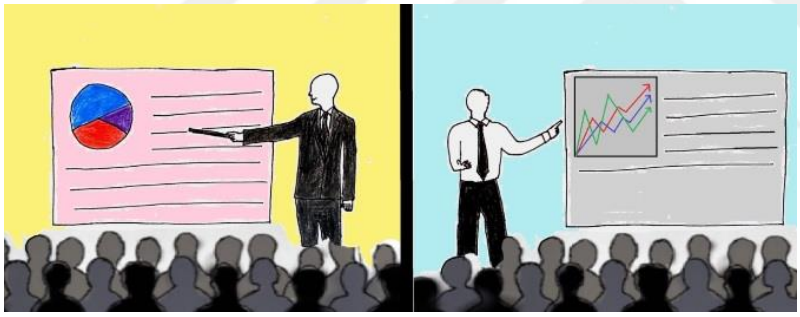




















APPENDIX 4. FILLERS







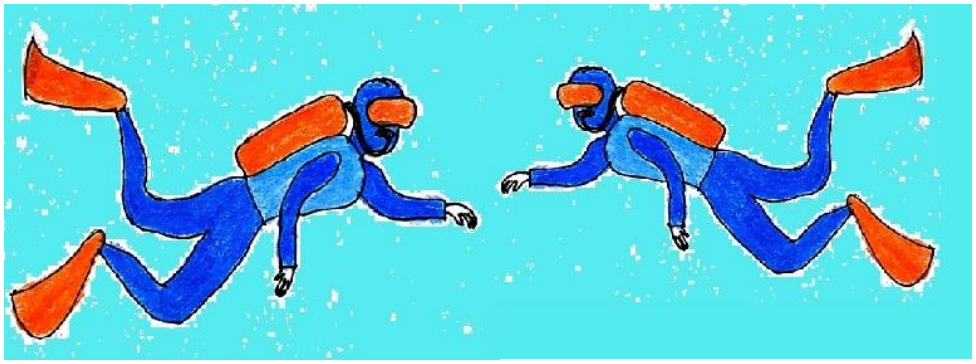





















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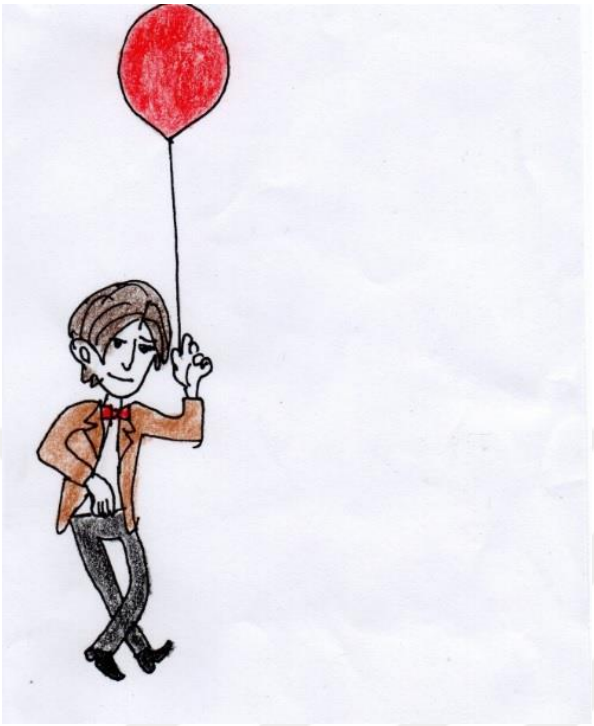








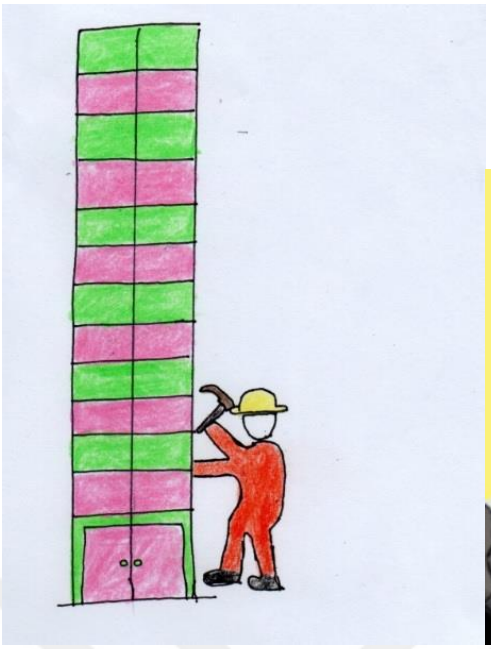
APPENDIX 5. PICTURES OF UNAMBIGUOUS SENTENCES

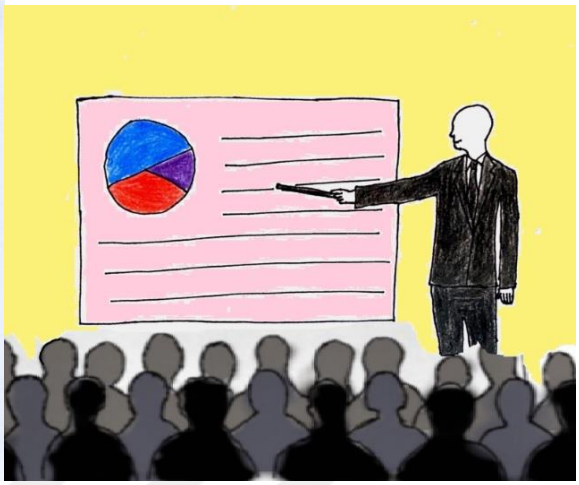




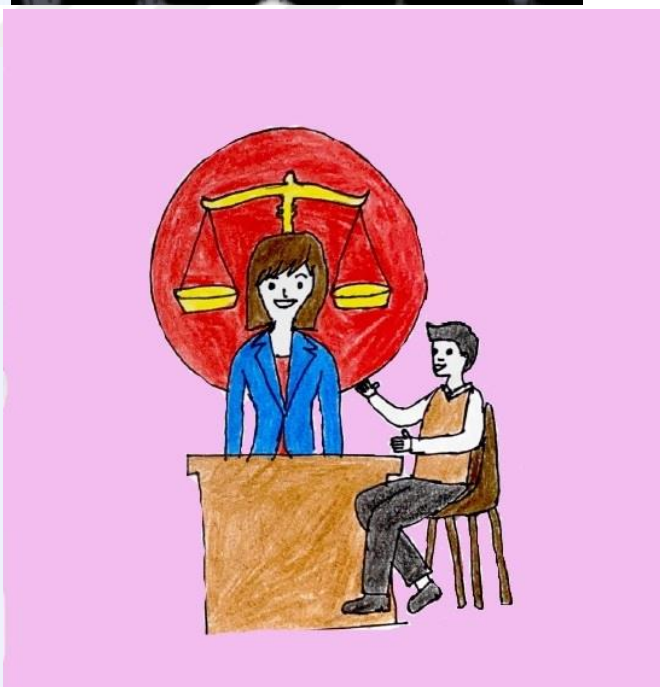


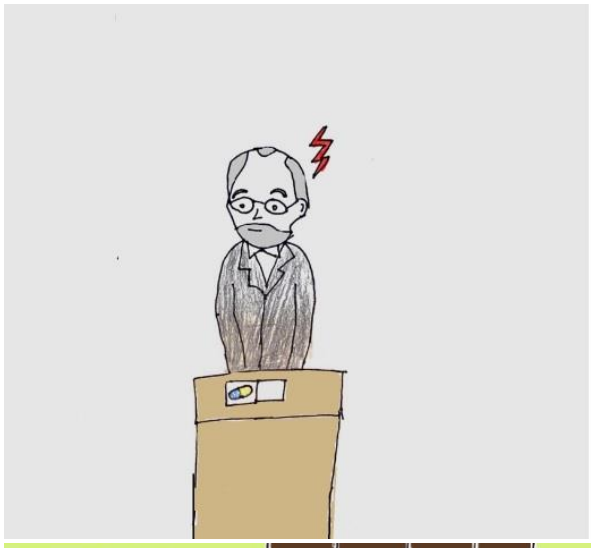




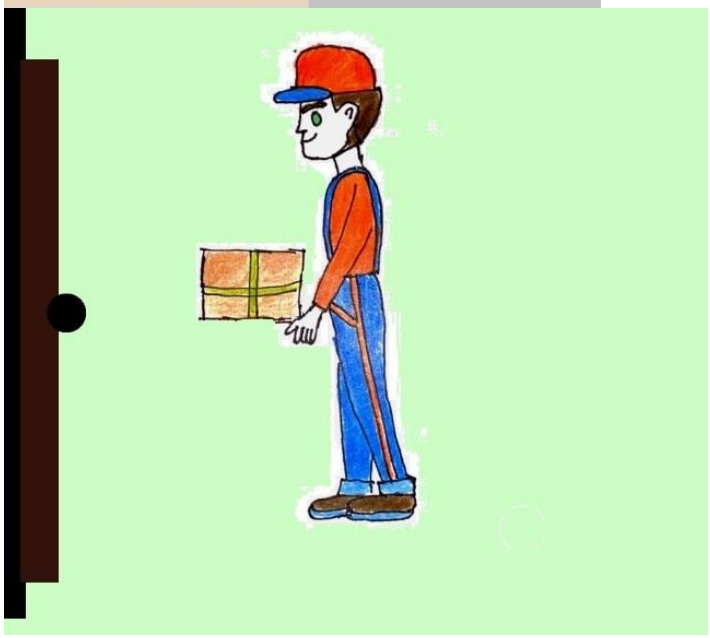


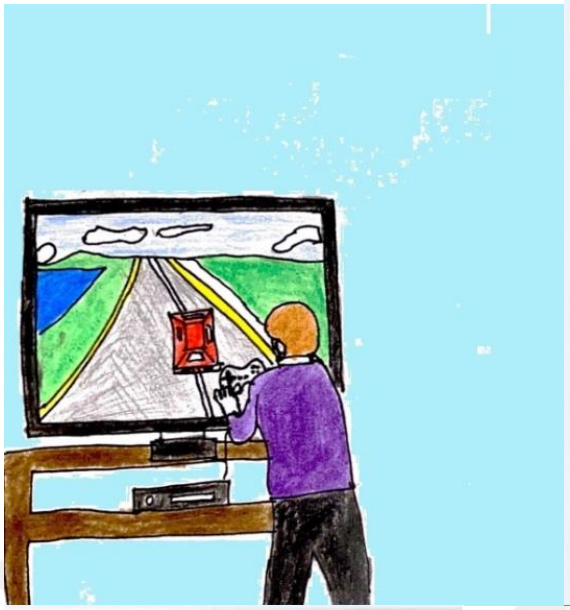






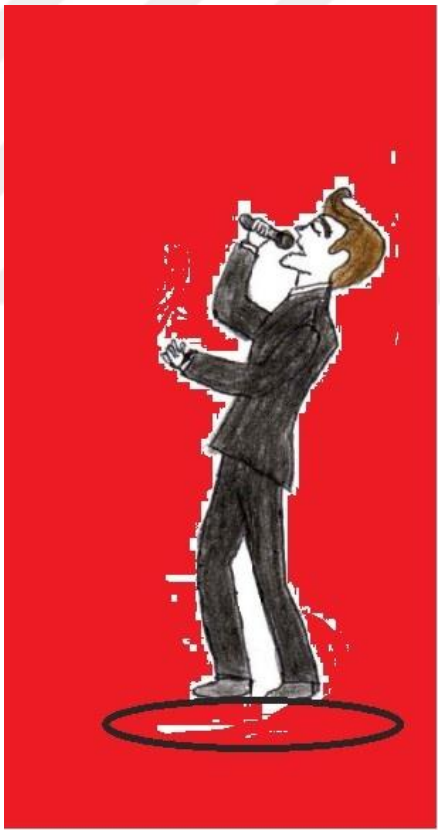






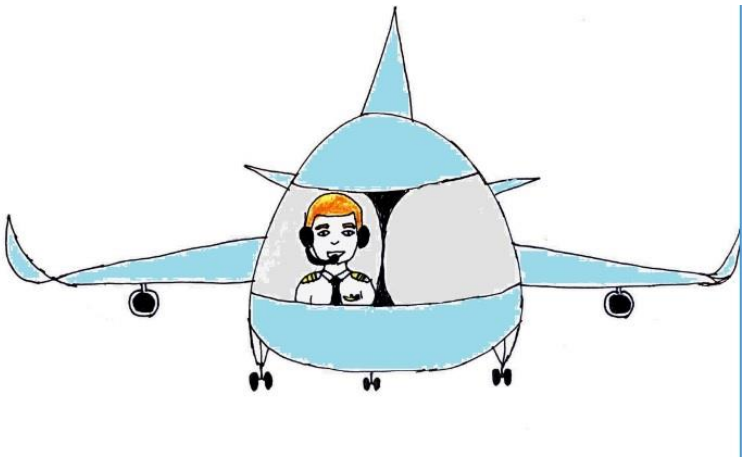
















APPENDIX 6. CONSENT FORM

Sayın katılımcı,

Bu çalışma 'Çok Anlamlı Çoğul Tümcelerde Kümülatif ve Kolektif Yorumlamalar: Bir Hazırlama Çalışması' isimli anadili Türkçe olan kişilerin verilen cümlenin resimle eşleştirmesiyle ilgili bir Yüksek Lisans Tez çalışmasıdır. Çalışma, Hacettepe Üniversitesi İngiliz Dilbilimi Bölümü Yüksek Lisans programında, Dr. Öğr. Üyesi Taylan Akal danışmanlığında yürütülmektedir. Araştırmadan elde edilen bulgular, bahsi geçen tezde kullanılacaktır. Bu araştırma için Hacettepe Üniversitesi Etik Komisyonundan gerekli izinler alınmıştır.

Bu araştırmanın amacı okuduğunuz cümleyi en iyi anlatan resmi tespit etmektir. Araştırmada sizden tahminen 25-30 dakika ayırmanız istenmektedir. Araştırmaya sizin dışınızda yaklaşık 80 kişi katılacaktır. Resimler ve tümceler kesinlikle kişiye özel konuları içermemektedir. Bu çalışmaya katılmak tamamen gönüllülük esasına dayanmaktadır. Çalışmanın amacına ulaşması için sizden beklenen, bütün soruları eksiksiz, kimsenin baskısı veya telkini altında olmadan, size en uygun gelen cevapları içtenlikle verecek şekilde cevaplandırmanızdır. Araştırmadan istediğiniz zaman çekilebilirsiniz. Bu durum size hiçbir sorumluluk getirmeyecektir. Araştırmada vereceğiniz cevaplar, çalışmada yer alan araştırmacılar ve çalışmanın veri kısmında anonim şekilde kullanılmak dışında kimseyle paylaşılmayacaktır. Araştırma sonuçları tez ve bilimsel yayınlar için kullanılacaktır. Araştırmanın tüm süreçlerinde kişisel bilgileriniz ihtimamla korunacaktır. Bu formu okuyup onaylamanız, araştırmaya katılmayı kabul ettiğiniz anlamına gelecektir. Ancak, çalışmaya katılmama veya katıldıktan sonra herhangi bir anda çalışmayı bırakma hakkına da sahipsiniz. Bu gönüllü katılım formunu onaylamadan önce veya daha sonra çalışmayla ilgili aklınıza gelebilecek olan soruları araştırmacılara sorabilirsiniz. Araştırmacıların iletişim bilgileri formun alt kısmında verilmiştir. Araştırmaya katılmayı tercih ediyorsanız okudum anladım butonunu işaretleyiniz.
Yukarıda yer alan ve araştırmadan önce katılımcıya verilmesi gereken bilgileri okudum ve katılmam istenen çalışmanın kapsamını ve amacını, gönüllü olarak üzerime düşen sorumlulukları anladım. Çalışma hakkında yazılı açıklama yapıldı. Kişisel bilgilerimin özenle korunacağı konusunda yeterli güven verildi.
Bu koşullarda söz konusu araştırmaya kendi isteğimle, hiçbir baskı ve telkin olmaksızın katılmayı kabul ediyorum.

Sorumlu Araştırmacı:

Adı, Soyadı: Taylan Akal
Telefonu: [redacted]
E-posta: [redacted]
Adres: [redacted]

Yardımcı Araştırmacı:

Adı, Soyadı: Zahide Kübra AYANOĞLU
Telefonu: [redacted]
E-posta: [redacted]
Adres: [redacted]

APPENDIX 7. THE LIST OF SENTENCES

Ambiguous Sentences

İki pilot iki uçak sürdü.

İki işçi üç bina inşa etti.

İki polis iki suçlu yakaladı.

İki itfaiyeci iki yangın söndürdü.

İki çocuk üç balon tuttu.

İki öğrenci üç makale yazdı.

İki tamirci iki araba tamir etti.

İki öğretmen altı sınav okudu.

İki çocuk dört kitap taşıdı.

İki kurye üç koli taşıdı.

Unambiguous Sentences

Bir pilot bir uçak sürdü.

Bir işçi bir bina inşaa etti.

Bir polis birsuçlu yakaladı.

Bir itfaiyeci bir yangın söndürdü.

Bir çocuk bir balon tutu.

Bir öğrenci bir makale yazdı.

Bir tamirci bir araba tamir etti.

Bir öğretmen bir sınav okudu.

Bir çocuk bir kitap taşıdı.

Bir kurye bir koli taşıdı.

Filler Sentences

Bir adam balık tuttu.

Bir kadın motorsiklet sürdü.

Bir kız çocuk uçurtma uçurdu.

Bir erkek ressam resim yaptı.

Bir erkek çocuk kitap okudu.

Bir kadın sporcu koştu.

Bir dalgıç denizde yüzdü.

Bir kadın boyacı duvarı boyadı.

Bir kadın futbol oynadı.

Bir erkek aktör oyun sergiledi.

APPENDIX 8. ORİJİNALLİK RAPORU

HACETTEPE ÜNİVERSİTESİ
SOSYAL BİLİMLER ENSTİTÜSÜ
YÜKSEK LİSANS TEZ ÇALIŞMASI ORİJİNALLİK RAPORU

HACETTEPE ÜNİVERSİTESİ
SOSYAL BİLİMLER ENSTİTÜSÜ
İNGİLİZ DİLBİLİMİ ANABİLİM DALI BAŞKANLIĞI'NA

Tarih: 16/06/2022

Tez Başlığı : Çok Anlamlı Çoğul Tümcelerde Kümülatif ve Kolektif Yorumlamalar: Bir Hazırlama Çalışması

Yukarıda başlığı gösterilen tez çalışmamın a) Kapak sayfası, b) Giriş, c) Ana bölümler ve d) Sonuç kısımlarından oluşan toplam 133 sayfalık kısmına ilişkin, 15/06/2022 tarihinde şahsım/tez danışmanım tarafından Turnitin adlı intihal tespit programından aşağıda işaretlenmiş filtrelemeler uygulanarak alınmış olan orijinallik raporuna göre, tezimin benzerlik oranı % 9'tür.

Uygulanan filtrelemeler:

1- ☐ Kabul/Onay ve Bildirim sayfaları hariç
2- ☒ Kaynakça hariç
3- ☒ Alıntılar hariç
4- ☐ Alıntılar dâhil
5- ☐ 5 kelimeden daha az örtüşme içeren metin kısımları hariç

Hacettepe Üniversitesi Sosyal Bilimler Enstitüsü Tez Çalışması Orijinallik Raporu Alınması ve Kullanılması Uygulama Esasları'nı inceledim ve bu Uygulama Esasları'nda belirtilen azami benzerlik oranlarına göre tez çalışmamın herhangi bir intihal içermediğini; aksinin tespit edileceği muhtemel durumda doğabilecek her türlü hukuki sorumluluğu kabul ettiğimi ve yukarıda vermiş olduğum bilgilerin doğru olduğunu beyan ederim.

Gereğini saygılarımla arz ederim.

[redacted]
16/06/2022

Adı Soyadı: Zahide Kübra AYANOĞLU
Öğrenci No: [redacted]
Anabilim Dalı: İNGİLİZ DİLBİLİMİ
Programı: YÜKSEK LİSANS

DANIŞMAN ONAYI

UYGUNDUR.

[redacted]
Dr. Öğr. Üyesi Taylan AKAL
(Unvan, Ad Soyad, İmza)

APPENDIX 9. ORIGINALITY REPORT

HACETTEPE UNIVERSITY
GRADUATE SCHOOL OF SOCIAL SCIENCES
MASTER'S THESIS ORIGINALITY REPORT

HACETTEPE UNIVERSITY
GRADUATE SCHOOL OF SOCIAL SCIENCES
TO THE DEPARTMENT OF ENGLISH LINGUISTICS

Date: 16/06/2022

Thesis Title : Cumulative and Collective Readings in the Sentences Containing Plural Ambiguity in Turkish: A Priming Study

According to the originality report obtained by myself/my thesis advisor by using the Turnitin plagiarism detection software and by applying the filtering options checked below on 15/06/2022 for the total of 133 pages including the a) Title Page, b) Introduction, c) Main Chapters, and d) Conclusion sections of my thesis entitled as above, the similarity index of my thesis is 9 %.

Filtering options applied:

1. ☐ Approval and Decleration sections excluded
2. ☒ Bibliography/Works Cited excluded
3. ☒ Quotes excluded
4. ☐ Quotes included
5. ☐ Match size up to 5 words excluded

I declare that I have carefully read Hacettepe University Graduate School of Social Sciences Guidelines for Obtaining and Using Thesis Originality Reports; that according to the maximum similarity index values specified in the Guidelines, my thesis does not include any form of plagiarism; that in any future detection of possible infringement of the regulations I accept all legal responsibility; and that all the information I have provided is correct to the best of my knowledge.

I respectfully submit this for approval.

[redacted]
16/06/2022

Name Surname: Zahide Kübra AYANOĞLU
Student No: N18139194
Department: ENGLISH LINGUISTICS
Program: MA (Master of Arts)

ADVISOR APPROVAL

APPROVED
[redacted]
Asst. Prof. Taylan AKAL
(Title, Name Surname, Signature)

APPENDIX 10. ETİK KOMİSYON ONAYI

T.C.
HACETTEPE ÜNİVERSİTESİ
Rektörlük

Sayı : 35853172-300
Konu : Zahide Kübra AYANOĞLU Hk. (Etik Komisyon İzni)

SOSYAL BİLİMLER ENSTİTÜSÜ MÜDÜRLÜĞÜNE

İlgi : 04.12.2020 tarihli ve E-12908312-300-00001351280 sayılı yazınız.

Enstitünüz İngiliz Dilbilimi Anabilim Dalı yüksek lisans programı öğrencisi **Zahide Kübra AYANOĞLU**'nun **Dr. Öğr. Üyesi Taylan AKAL** danışmanlığında hazırladığı; **"Çok Anlamlı Çoğul Tümcelerde Kümülatif ve Kolektif Yorumlamalar: Bir Hazırlama Çalışması"** başlıklı tez çalışması Üniversitemiz Senatosu Etik Komisyonunun **08 Aralık 2020** tarihinde yapmış olduğu toplantıda incelenmiş olup, etik açıdan uygun bulunmuştur.

Bilgilerinizi ve gereğini saygılarımla rica ederim.

e-imzalıdır
Prof. Dr. Vural GÖKMEN
Rektör Yardımcısı

Hacettepe Üniversitesi Rektörlük 06100 Sıhhiye-Ankara
Telefon:0 (312) 305 3001-3002 Faks:0 (312) 311 9992 E-posta:yazimd@hacettepe.edu.tr İnternet Adresi: www.hacettepe.edu.tr
Duygu Didem İLERİ