



**A STUDY ON THE RELATIONSHIP BETWEEN  
ANXIETY TYPES AND THE ZEIGARNIK EFFECT**

**BUSE ERDİN**

Master's Thesis

Graduate School  
Izmir University of Economics

İzmir

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## ABSTRACT

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Master's Program in Experimental Psychology

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January, 2022

The Zeigarnik Effect argues that unfinished tasks are remembered more than finished ones. However, in this research it is thought that the perception of task completion or incompleteness might have a major effect on the recall rate of the tasks. Moreover, it is argued that how interruption is presented to the subjects might be a critical factor. If interruption presented as completion to the subjects, it will be perceived as completion even if that task is not completed. On the other hand, if the interruption presented as incompleteness than it is expected that the Zeigarnik Effect will occur. At the same time, it is expected that the way the task is introduced to people and how the interruption of task is perceived by people will vary depending on their level and type of anxiety, and it is expected that this condition will lead to the recall rates of completed and uncompleted tasks. Following that, a total of 116 participants were assigned to four different experimental conditions at random. Subjects were first given a scale an anxiety scale (STAI), and then a problem-solving series. Subjects were randomly

interrupted while solving some questions. The remaining problems were allowed to be completed. The findings revealed that how a task was perceived and how it was divided had no significant effect on the recall rate of completed and incomplete tasks. Furthermore, it was found statistically significant that state anxiety, along with the orientation type and interruption type, had an effect on the recall rate of completed and uncompleted tasks.

Keywords: Zeigarnik Effect, memory, anxiety, state anxiety, trait anxiety



## ÖZET

# KAYGI TÜRLERİ İLE ZEİGARNİK ETKİSİ ARASINDAKİ İLİŞKİ ÜZERİNE BİR ÇALIŞMA

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Deneyisel Psikoloji Yüksek Lisans Programı

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Ocak, 2022

Zeigarnik Etkisi uzun yıllardır üzerine çalışılan bir konu olmuştur. Bu etki tamamlanmamış, bir şekilde yarım kalmış işlerin veya durumların tamamlananlara göre daha çok hatırlandığını savunmaktadır. Kişinin işlere ilişkin algısının, o işin hatırlanması üzerinde önemli bir etkisi olduğu düşünülmektedir. Bu çalışmada ise, kişilerin tamamladıkları ve tamamlamadıkları işleri hatırlama oranını etkileyen en önemli faktörlerin işin kişilere nasıl tanıtıldığı ve işin bölünme şekli olduğu ileri sürülmektedir. Aynı zamanda işin kişilere tanıtılması ve işin bölünmesinin kişiler tarafından nasıl algılandığının kişinin anksiyete seviyesine göre farklılık gösterebileceği bu durumun tamamlanan ve tamamlanmayan işlerin hatırlanmasına yön verebileceği ön görülmüştür. Bunun üzerine, toplam 116 katılımcının katıldığı bir deney yürütülmüştür. Önce işin algılanma tipine göre (ego yönelimli ve iş yönelimli) iki ana grup oluşturulmuştur. Daha sonra bölünmenin sunuluş şekline (olumlu ve olumsuz) göre bu 2 ana grup 2 alt gruba daha ayrılmıştır. Bunun sonucu

katılımcılar seçkisiz olarak dört ayrı deney koşuluna katılmışlardır. Deneklere önce durumluk ve sürekli anksiyetelerini ölçen bir ölçek (STAI), sonrasında ise 16 sorudan oluşan bir problem çözme serisi verilmiştir. Denekler bazı problemleri çözerken seçkisiz şekilde durdurulmuştur. Kalan problemlerin ise tamamlanmasına izin verilmiştir. Sonuçlar işin algılanma şeklinin ve işin bölünme şeklinin tamamlanan ve tamamlanmayan işlerin hatırlanma oranının üzerinde bir etkisi olmadığını göstermiştir. Ayrıca durumluk anksiyetenin, işin algılanma tipi ve bölünmenin sunulmuş şekli ile birlikte tamamlanan ve tamamlanmayan işlerin hatırlanma oranı üzerinde etkisi olduğu istatistiksel olarak anlamlı bulunmuştur.

Keywords: Zeigarnik Etkisi, hafıza, anksiyete, statey, durumluk anksiyete, sürekli anksiyete

## ACKNOWLEDGEMENTS

First and foremost, I would like to express my gratitude to my dear thesis advisor, Prof. Dr. Falih KÖKSAL. It was a great honor for me to be able to collaborate with someone who has such a strong academic background and understanding. In addition to the academic benefits he provided, his wise character brightened my life in every way. He treated us with a great deal of psychological support, making us feel as if he was always there for us, even when we were in desperate situations. He allowed us to ask him any questions we wanted to, without fear of being judged. I consider myself extremely lucky to have had the opportunity to work with someone as brilliant as him.

It was a privilege for me to have the chance to ask questions as well as the academic information I received from Prof. Dr. Canan BAŞAR EROĞLU and Assoc. Prof. Seda CAN. I would like to thank my dear teachers for making me feel that their doors are always open.

Many thanks to my dear friends, Res. Asst. Günce YAVUZ ERGİYEN and Kurtuluş Mert KÜÇÜK, who are always willing to offer their knowledge with sincerity and friendship, and who try to assist me as quickly as possible whenever I ask for help.

I cannot imagine this process without my lovely friends Merve EVYAPAN AKALIN and Tuba KASABOĞLU, who have always been with me from the beginning to the completion of the thesis process and have always been behind me to never lose my energy. A massive thank you to my lovely friend Nilsu ALANYALI, for always being by my side and providing me with the best encouragement.

My lovely partner, Ufuk KILIÇASLAN, you stood by my side unconditionally. You supported me with your patience, energy and love whenever I needed it. I will never forget that you guided me with your knowledge. I don't even want to imagine going through this process without you and your pleasant support. Thank you for always being the best.

A massive thanks to my lovely and precious mother Nezahat AKDEMİR. It is hard to put my thankfulness into words. The beautiful energy you gave was always with me in this difficult process, as in all areas of my life. When you say that everything will be fine this time, the worth of your motivation is priceless, as it usually is throughout difficult times. It means a lot to me to know that you'll always be there for me. Love you.





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# CHAPTER 1: INTRODUCTION

## 1.1 Memory

### 1.1.1. Description of Memory

Memory is the process by which we store and recall data from the past in order to utilise it in the present (Sternberg, Sternberg and Mio, 2012). In other words, memory refers to a variety of biological mechanisms that allow living beings to obtain skills and knowledge, as well as access that information when needed. It can be found in all higher-order species (Sumrall, Sumrall and Doss, 2016). Memory is made up of a collection of interconnected systems, each skilled of coding, keeping, and obtaining information. When it comes to the examination of memory, there are three distinct categories of memory that are universally recognized. First of all, sensory memory is the short – term memory that we provide with our sense organs. Environmental stimuli such as light and sound are first processed by the sense organs and then stored in this way for a while. Second, short-term memory, sometimes called working memory, is where information is briefly stored in order to accomplish complicated tasks including understanding, reasoning, and long-term learning. Finally, long – term memory is a type of memory with a stronger coding and archiving system (Baddeley, 2013).

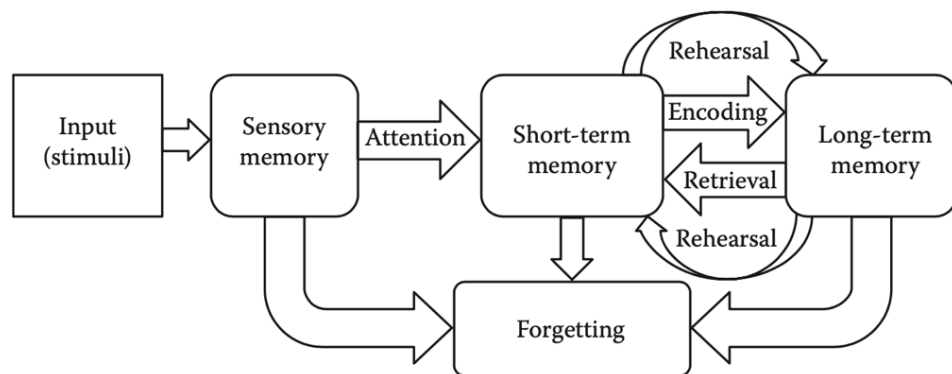


Figure 1. Atkinson and Shiffrin memory model (Source: Atkinson and Shiffrin, 1968)

This figure was prepared by (Atkinson and Shiffrin, 1968) and it is an indicator of the system described above.

Information is thought to transfer from the exterior into a limited capacity short-term store via a sequence of incredibly short sensory memories, which are likely best viewed as part of the perceptual system. Additionally, they claimed that the more an information is kept in this database, the more likely it is to be passed to long-term memory (Baddeley, Kopelman and Wilson, 2004).

### ***1.1.2. The Importance of Memory in Human Life***

We can understand the importance of memory in our life by visualizing what our life would be like in the absence of it. Our memory cannot be considered as a single organ. Our memory is not like our heart or livers. Memory permits us to learn from our past experiences and create future predictions based on what we've learnt.

Assume that an organism is provided with perceptual abilities such as sight, hearing, touch, and smell. All of these sensory channels must communicate with one another. To be able to observe this example and construct a mental image of an object, we obviously need memory. This may be a memory that allows the organism to acquire resources from the environment and organize the information effectively into its own reality, even if it is only for a limited time. It would also be beneficial to get some knowledge of the world over time. Although not every scenario in the world can be predicted, many can. Humans benefit greatly from this predicative scenario. Knowing which foods are good for humans and which induce illness, for example, is quite useful (Baddeley, 2013).

### ***1.1.3. Factors Affecting Memory***

We are exposed to a wide range of events throughout our lives, but we can only recall a small percentage of them. The way we remember an experience is determined by how that experience is preserved in our brain. We must investigate what contributes to the subjective sensation of remembering in order to comprehend the fragile capacity of memory (Schacter, 1996). Physiological or biochemical results can have a substantial impact on many areas of human memory (Baddeley, 2013). Attention level, sleep rate, testing, reminders, exercise - diet, rehearsal, and reward are all aspects that influence recall (Amin and Malik, 2014).

#### ***1.1.3.1. Attention***

Human memory is limited. In this case, choosing the data to be stored and preserved in memory is critical. The ability to selectively transfer perceived situations and items to memory is provided by attention (Amin and Malik, 2014). Memory emerges to be founded on a series of cognitive aspects: coding, stimulation, deactivation, preservation, reactivation, and information recall; however, all of these processes can be influenced by attention (Cowan, 1998).

#### ***1.1.3.2. Sleep***

The strengthening of memory is assisted by a night of sleep. This has been shown most clearly in adults for both implicit and declarative memory (Potkin and Bunney Jr, 2012).

Sleep improves human memory and assists with brain development, according to electrophysiological and behavioral findings (Amin and Malik, 2014). The influence of sleep on memory strengthening has been studied, and it has been discovered that sleep supports plastic alterations in the human brain (Frank and Benington, 2006).

#### ***1.1.3.3. Reward***

The procedure of reinforcement and punishment stimuli, as well as the neurological basis of reinforcement system of the brain, were explored by researchers (Amin and Malik, 2014).

Long-term memory is enhanced by a rewarding education, according to a study. Furthermore, In the same study, it was discovered that the neutral condition training group had a significant drop in memory acquisition (Abe et al., 2011).

#### ***1.1.3.4. Rehearsal***

Rehearsal is the process of repeating an action or topic in order to enhance it. Any complete theory of memory must include rehearsal as a fundamental component ( Craik and Watkins, 1973). According to Waugh and Norman (1965), rehearsing is in charge of retaining received information in short-term memory and converting it to long-term memory to make it more persistent.



### ***1.1.3.5. Mnemonics***

Mnemonic devices are memory enhancements that have been shown useful over time (Bellezza, 1987). Our brain can retrieve information more quickly when we associate memories with other terms, letters, numbers, or visuals. Mnemonics is the name for this mental method (Amin and Malik, 2014)

### ***1.1.3.6. Exercise and Nutrition***

It was found that, physical activity and proper diet can aid memory in elderly people who are at high risk of acquiring type 2 diabetes in a study (Watson et al., 2006). Moreover, exercise has been shown to be beneficial to people with low cognitive performance in studies. It has been suggested as a way for healthy people with low cognitive ability to improve their cognitive performance (Sibley and Beilock, 2007).

### ***1.1.3.7. Testing Effect***

Courses, reading, and study sessions are all ways to learn. The duration that the studied and focused material is retained in memory is measured through tests. As a result, tests are viewed as an assessment of what has been acquired. The testing effect refers to the discovery that retrieving knowledge from memory leads to better retention than restudying the same subject for a comparable length of time (Roediger III and Butler, 2011). In a study, it was seen that repeated study after learning had no effect on delayed recall, but repeated testing had a positive effect (Karpicke and Roediger, 2008). Long-term memory is formed through recurrent retrieval of information (Karpicke and Roediger III, 2007).

### ***1.1.3.8. Stress***

Stress is an inevitable aspect of our lives. It has powerful effects on our ideas, feelings, and actions (Schwabe, 2017). Stress is also said to have a significant impact on memory. Both chronic stress and acute stress affect memory (Luksys and Sandi, 2011). The hippocampus and amygdala, both of which includes stress hormone receptors, are key brain structures for learning and memory (Lindau, Almkvist and Mohammed, 2016). Many hormones, peptides, and neurotransmitters produced during stressful situations are primarily responsible for effects on memory (Schwabe, 2017). The

glucocorticoids (GCs), the most well-known of which is cortisol, are one kind of stress hormone that has a deleterious impact on long-term, delayed recall memory (Oei et al., 2007). Even though there is a strong psychoneuroendocrine relationship between memory, stress and glucocorticoids, the connection is not always clear (Sauro, Jorgensen and Teal Pedlow, 2003). Stress can be beneficial as well as harming memory. Stress appears to have varying effects on various processes and systems depending on when it arises. Moderate stress can help with information encoding and preservation. However, excessive stress has been shown to damage memory (Lindau, Almkvist and Mohammed, 2016).

## ***1.2. The Zeigarnik Effect***

Another factor affecting human memory is the Zeigarnik Effect, which is still valid today. From past to present, researchers have concentrated on this subject quite a lot. We don't need long readings or reviews to understand this effect. Because it is actually something that each of us has experienced. As humans, we are obliged to complete many tasks during the routine of our lives. During these task-completion processes, people often get interrupted before they finish their work. You may have experienced these interruptions without even realizing it. For example, while you were cooking your dinner at home, you saw your phone ringing. When you answered the phone, you heard your mother calling you urgently and you left the house in a hurry. I would like to draw attention to an important point in this case. You may remember the meal you made the moment your mother called you more than the other meals you made. Those who have encountered such a situation so far may not know the reason behind this cognition but the situation here is actually the reflection of the Zeigarnik Effect on our daily lives. Zeigarnik (1927) had found that an interrupted activity is remembered more than an uninterrupted activity. In order to get a more depth knowledge about how this effect came about, it is necessary to go over about its history.

### ***1.2.1. Origin of the Zeigarnik Effect***

In the 1900's, an academic group including Kurt Lewin, one of the most important figures of Social Psychology and Bluma Zeigarnik, a doctoral student went to a restaurant near the University of Berlin for a dinner. The academic group gave all their orders to the same waiter and received service from the same waiter throughout the

night. Bluma Zeigarnik and Kurt Lewin had noticed that the waiter serving them did not take notes on the orders and always got the items right. They were very impressed with the memory of the waiter who served them. Later on, the group left the restaurant after finishing their meal. When they left, Bluma realized that she had left her bag at the table. She returned to the restaurant and asked the waiter who was serving them to find her bag. The waiter did not recognize Bluma, and he had no idea what table she was sitting. Bluma was quite surprised by this situation. It had been only 10 minutes since she left the restaurant and the waiter who served them perfectly with only his memory, could not even remember Bluma's face. She wondered, How could this be possible? To satisfy her curiosity, she asked the waiter how he had forgotten them so quickly? The waiter addressed that he could remember every order he received from the customers until he delivered it, but he did not recognize anything about the order after he delivered it. Bluma Zeigarnik was amazed by what she had witnessed. Afterwards, Bluma and her supervisor Kurt Lewin could not ignore their fascinating experience and they decided to focus on waiter's story/explanation (Kodden, 2020). This was the corner stone for the discovery of the Zeigarnik Effect. Then they took action to test this situation in a laboratory environment and planned a progression of trials to uncover the case.

### ***1.2.2. The Experiment***

Zeigarnik presented her subjects a test that required 18 – 20 tasks. These tasks contained both craftworks (making clay and building boxes etc.) and problems which require mental processing like arithmetic problems and puzzles. Approximately 3 to 5 minutes were required for each of these tasks. Participants were allowed half of their tasks to be completed but the other half was paused before their work was finished. The experimenter tried to interrupt the participants when they mostly focused on their tasks. Interruption of the tasks was done randomly so that the participants did not suspect the reason behind it. After participants completed their last task, they were told to state all of the tasks they were done. However, they were not allowed to look what they had done. They were asked to remember using only their memories. There were no time limitations at this stage.

After many experiments Bluma Zeigarnik reported that, incomplete tasks were recalled much more than completed ones (Zeigarnik, 1938).

This academic publication was first presented in the series "*Untersuchungen zur Handlungs- und Affektpsychologie*" (1926-1937) which was created under the leadership of Kurt Lewin. One of the main issues they concentrate on in this study was the relationship between tension and memory (Van Bergen, 1968). They were primarily interested in the problem of internal tensions in the organism and the mechanisms by which these tensions are released, as evidenced by persistence of activity, satiation on a task, spontaneous return to unfinished tasks, modes of frustration response, and behavior in playful or serious situations (Abel, 1938). It was assumed that a tension is built when a person aims to finish a task which he or she started. This tension has a tendency to release upon the completion of the task. If the finalization of the task does not occur, the tension in the person will not be discharged (Van Bergen, 1968).

Tension can be caused by either physiological and mental needs. One example of the psychological type is the desire to complete an unfinished task. As a result, desire to accomplish a task will remain in place until the activity is completed and the tension is relieved. According to the Zeigarnik Effect, individuals generates motivation in order to minimize the tension. The findings of Zeigarnik supported Lewin's thesis about tension (Mandowsky, 2007).

It was claimed that unreleased tension determines the nature of the individual' s behavior until the action is completed. If the action is interrupted, this tension does not dissappear and thus the interrupted action remains in the memory (Köksal, 1993).

#### ***1.2.2.1. A Further Study from Maria Ovsiankina***

Parallel to Bluma Zeigarnik' s research, Maria Ovsiankina was also published her study about tension and interrupted activities on the same academic series "*Untersuchungen zur Handlungs- und Affektpsychologie*" (1926-1937) under the leadership of Kurt Lewin. The aim of the research was to determine whether subjects continued interrupted activities under certain conditions, and if so, under which conditions. The idea was that if a task was interrupted and a need/tension arose for completion, that task would be more likely to resume spontaneously after the interruption. The findings of the study were supportive of Bluma Zeigarnik' s findings. As a result of this study, the Ovsiankina Effect was found and according to this effect,

people have an inclination to restart an interrupted action while it has not yet been performed (Rickers-Ovsiankina, 1928).

### ***1.2.3. A Psychoanalytic Perspective***

It is thought that there is a relationship between people remembering interrupted activities more and the psychoanalytic approach. For elaborating this relationship better, it would be beneficial to go back and look at Freud's theory of repression. The tendency to suppress the sensation and expression of bad feelings or painful cognitions in order to protect one's good self-image from being damaged is referred to as repression (Garssen, 2007).

The term of "repressed" was first emerged in *Preliminary Communication from Studies on Hysteria*. In Breuer and Freud's writings on repression, they explained the term as the unpleasant memories which the patient desires to forget are repressed and impeded from conscious mind. This occurs due to the prevention of unpleasant feelings from the conscious thoughts (Breuer and Freud, 1955). Related to this, for once Kurt Lewin emphasized that Zeigarnik's main findings about interrupted activities are more recalled were close to Freud's basic assumptions which was about repression (Lewin, 1929). Freud has a statement supporting this issue. Problems that are not yet resolved, depressing thoughts, annoying worries pursue our thinking activity during sleep, keeping up with the psychic processes named as preconscious (Freud and Strachey, 1996).

### ***1.2.4. Research After the Manifestation of Zeigarnik Effect***

Zeigarnik's work on interruption and memory had attracted a lot of attention in early to mid 1900's and also it was met with interest and curiosity by other researchers.

#### ***1.2.4.1. Perception Variability of Instructions***

American Psychologist Alfred J. Marrow wanted to retest Zeigarnik's findings with further developed strategies. According to Marrow, participants in Zeigarnik's study often failed to understand the main purpose of the experiment with the manipulation being done to them. They usually perceived the test as an intelligence test (Marrow, 1938a). He conducted two related experiments. The first experiment contained

Zeigarnik's conditions and comparative directions. The second experiment was basically similar to the first experiment, but with some changes to the instructions. It was aimed to give direction to the perceptions of the participants about being interrupted. Marrow argued that the amount of motivation generated by what was said or explained to subjects in an encouraging or discouraging way affected the rate of recall of completed and uncompleted tasks. As a result of his studies, he concluded that uncompleted tasks with encouraging explanations were significantly higher in recall (Marrow, 1938b).

#### ***1.2.4.2. Memorability of the Pleasant***

In another study Helen Lois Koch analyzed the relationship between reviving memories from experiences and emotional colorings. The emotional colorings which were studied in this study are the pleasant and the unpleasant ones. For exploring this relationship, a group of students were given 10- minute exams at the end of certain periods. The exam papers given by the students were evaluated out of 100 points and then the exam papers with their grades were returned to the students at the class meetings. At the end of the study, it was examined how well the students remembered their satisfactory and unsatisfactory scores. It was found that in general participants remembered grades that satisfied them more frequently and accurately than those that did not (Koch, 1930). Although the author of this study did not interpret the results so much, it has been said that this study supports the Freudian repression theory (Rosenzweig and Mason, 1934).

#### ***1.2.4.3. Ego and Task Orientation in Relation to the Zeigarnik Effect***

Saul Rosenzweig is an American Psychologist who also studied repression. He is known for his Dodo Bird Hypothesis and Picture Frustration Test. Saul Rosenzweig and Gwendolyn Mason wanted to confirm some of the estimations which were found by Koch and Zeigarnik. Therefore, an experiment was conducted with 40 children to find out how successful or unsuccessful situations were more memorable. Rosenzweig had some fundamental conclusions from this study. According to him, experiences which damage a person's self respect are less likely to be remembered than experiences which satisfy the ego. As a result of task interruption experiments of which are presented to subjects as a competitive test, the unfinished tasks may be

considered as failures and the completed tasks as achievements. In accordance with the Freud's theory of repression, if subjects are emotionally mature enough, failed tasks will be repressed (Rosenzweig and Mason, 1934).

In another further study, Rosenzweig argued that the instructions given to individuals before starting a task will differ in how they remember completed or unfinished tasks. It was expected that ego-oriented or task-oriented explanations would differently affect the recall rate of completed and uncompleted tasks. In order to investigate the issue, the participants in the experiment were divided into two groups. Before the study began, a group of subjects were told that they would take an intelligence test and with that way their ego would be manipulated. It was thought that unfinished or interrupted tasks would damage the self-esteem of the participants. On the other hand, it was assumed that the participants would want to be successful at their tasks, for example, to be able to complete the task in order to maintain their self-confidence. In this group, the outcome turned out as expected, and participants were found to remember more of the tasks they completed when compared to what they remembered. Furthermore, The second group was told that they would help the experimenter and they were oriented to their tasks. In this group, the subjects were interested in the tasks they were doing, since there was no situation related to their self-esteem. Unlike the other group, this group recalled uncompleted tasks more (Rosenzweig, 1943).

#### ***1.2.4.4. W. C. H. Prentice's Study***

In another further study, it had been argued that, there have been conflicts in the results of past and attention – grabbing researches since the publication of Zeigarnik's original contribution on the topic of interruption. Also, it had been said that, it is possible to show that theoretical treatments do not keep up with the evidence. Treatment alone has proven to be insufficient in terms of motivational variables and more attention should be paid to the cognitive changes involved in most of the experiments (Prentice, 1944).

#### ***1.2.4.5. A Reexamination of the Zeigarnik Effect***

It is a phenomenon observed both in our daily life and clinically, that people remember the pleasing parts of their past experiences more than the unpleasant parts. However

this difference was very rarely statistically manifested. In Alper' s study, specific reasons for failure to achieve significant differences are evaluated. In view of these assessments, 3 distinct test theories have been proposed inside the structure of completed and incompleted tasks in memory. First of all, when personality factors of subjects in a particular group are randomly selected and when the number of completed and unfinished tasks to be remembered during the experiment is equal, it has been argued that there is no statistically significant difference between the random recall of completed and incompleted tasks. Secondly, in conditions where there are equal numbers of completed and incomplete tasks to be remembered, individuals who recall predominantly completed tasks consistently show personality differences from subjects who remember more uncompleted tasks. Lastly, the selective recall orientation of a given subject could differ from each other in a laboratory condition in which self – confidence is not involved and in a laboratory condition in which the individual' s self esteem is objectively threatened in relation to self – confidence (Alper, 1946).

To summarize, according to Rosenzweig and Mason, if a person has an adequate intellectual matureness and has a sufficient level of pride, unpleasant memories that undermine self-esteem are recalled less than ego – satisfying memories (Rosenzweig and Mason, 1934). Rosenzweig found that participants mostly remembered activities they did not complete more than they did in a casual platform which their self – confidence is not disturbed. However, in a formal experimental setting, it was found that the majority of subjects remembered completed tasks more than the interrupted activities (Rosenzweig, 1943). These discoveries are presented by the creators as proof to the verification of repression (Glixman, 1949). It was found that there was no significant difference in the participant' s recall of completed or uncompleted tasks by (Alper, 1946).

#### ***1.2.4.6. Achievement Motivation and the Zeigarnik Effect***

The lack of a sufficient measure of individual differences in terms of motivation has been considered as an important handicap in motivation studies of which the interruption technique is used. In this study, it was aimed to investigate to what extent the recall of interrupted and completed tasks are affected by the strength of the achievement motivation. This experiment was conducted with different experimental



instructions compared to conflicting studies that had been made in the past. By means of this study, the rate of recall of interrupted or completed tasks were aimed to be examined considering the individual differences in the strength of the achievement motivation. Male college students were used in this task interruption study. In the explanations made, it was requested to ensure that completion is perceived as personal success and incompleteness is perceived as personal failure. In each experimental condition, participants were divided into low and high motivation. At the end of the experiment, it was found that when the instructions were given clearly, that is, when completion was presented as success and failure to complete, it was found that highly achievement motivated people remembered the incomplete tasks more and showed the Zeigarnik effect more than those with low achievement motivation. The situation was the opposite for those with low achievement motivation (Atkinson, 1953).

#### ***1.2.4.7. A New Approach to the Zeigarnik Effect***

To summarize in general all the work on interruption, completion and recall that we have seen so far, Zeigarnik concluded that interrupting a continuous task determines its recall rate. She explained her results within the concept of 'tendency to completion'. In other respects, Rosenzweig suggested that the type of orientation (ego orientation or task orientation) is the most essential factor determining recall rate. He also explained these findings using the concept of 'tendency to completion' in the task-oriented situations. In the case of ego orientation, on the other hand, he explained his findings by claiming that people desire to preserve their self-esteem. Unfinished tasks were less remembered in ego-oriented circumstances because incomplete tasks were presented to the individuals as a failure, putting their self-esteem in threat. Subjects remembered less of the tasks they perceived as threatening their self – confidence (Köksal, 1993).

In the study "Zeigarnik Etkisine Yeni Bir Yaklaşım"(Köksal, 1993), it had been suggested that the factor that mainly affects the self-confidence of the ego-oriented group is the way how they were interrupted by the experimenter rather than the inability to complete their tasks. When individuals were stopped while performing tasks, and the interruption was presented as a success rather than a failure, this was not a condition that threatened the subjects' self-esteem. More clearly, it was predicted that if unfinished tasks were given a positive value, they would be remembered more

frequently than the completed tasks by the participants. Furthermore, it was anticipated that a positive value attribution would boost one's self-esteem. The presentation of the interruption is suggested to be the most important factor affecting the memory rate of finished and incomplete activities in this article. It was expected that the Zeigarnik Effect would not occur if it was explained that when participants were interrupted while doing their tasks, this interruption meant that they had completed the task. The subjects would be viewed as having completed the task even if they did not complete it. In contrast to all of this, the Zeigarnik Effect was supposed to arise when the participant was informed that the work had not been finished (Köksal, 1993). The participants in this study were separated into two groups: ego-oriented and task-oriented. It was revealed to the ego-oriented group that they had taken an intelligence test. It was explained to the task-oriented group that they were assisting the experimenter. These two primary groupings were then separated into two subgroups. Four groups were formed as a result of the interruption's positive and negative presentation (Köksal, 1993).

Table 1. Instruction content given by group type (Source: Köksal, 1993)

<i>Ego-oriented Positive Group:</i>	These participants were told they would be taking an IQ exam and that the interrupted tasks would be considered a success.
<i>Ego-oriented Negative Group</i>	These participants were informed that they would be taking an IQ test, and that the interrupted tasks would result in failure.
<i>Task-oriented Positive Group</i>	These participants were told that they would be assisting the experimenter and that the interrupted activities would be finished.
<i>Task-oriented Negative Group</i>	These participants were told that they would be assisting the experimenter, and that the interrupted tasks they were given were incomplete.

In the study, it was observed that the recall rate of unfinished tasks in the ego-oriented positive group was significantly higher than the ego-oriented negative group. For completed works, the scenario was the total opposite. The recall rate in the ego-negative group was considered to be significantly greater than in the positive group. Furthermore, the recall of completed tasks was shown to be substantially higher in the ego negative group than the recall of incomplete tasks. On the other hand, the task-oriented negative group's rate of remembering unfinished work was found to be dramatically higher than the task-oriented positive group's. Also, completed activities were recognized more than incomplete tasks in the task-oriented positive group (Köksal, 1993).

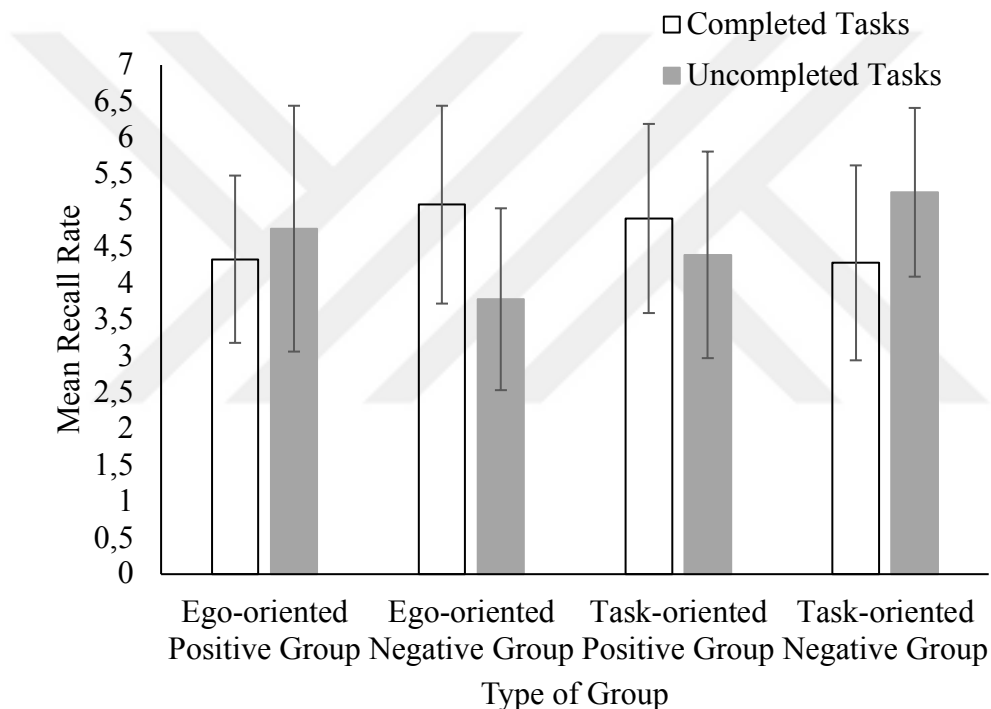


Figure 2. Recall rate of completed and uncompleted tasks in four different groups (Source: Köksal, 1993)

### 1.2.5. Contemporary Research of Zeigarnik Effect

Despite the fact that the Zeigarnik Effect, as well as sophisticated study and conversations on the subject, are centuries old, this is still a topic that is thoroughly investigated today. Since the effect touches many places in human life, the content range of the researches related to the subject is quite wide.

The Zeigarnik Effect, for example, was expected to be discovered again in one recent study. It was claimed that a similar result may be found. In this study, word problems were used. The subjects were stopped while their task was still being completed after an active problem-solving interval. Tasks that were completed were remembered better than tasks that were divided up. Less processing time was spent on split problems. A second experiment was performed on top of this experiment. The time was kept constant in this experiment, unlike the previous one. The Zeigarnik Effect was discovered in the second experiment. It was discovered that the participants had more access to unsolved problems during free recall (Seifert and Patalano, 1991)

A study was conducted on emotional disorders and Zeigarnik Effect. Intrusions and perseverations were mentioned in this study as having a role in the information processing system. It has been suggested that this position is responsible for notifying the cognitive system about upcoming tasks. Intrusions and perseverations may indicate the presence of unsolved concerns that require further processing in the case of psychiatric illness. The Zeigarnik effect is one possible cause among several that helps to maintain the occurrence of intrusions, according to this study. The Zeigarnik Effect is also discussed in terms of general anxiety disorder, obsessive compulsive disorder, and post-traumatic stress disorder in the article (James and Kendell, 1997).

It has been stated in a more recent study that not all factors affecting the Zeigarnik Effect have been studied in previous studies. Furthermore, the interaction between task difficulty and the Zeigarnik Effect among university students was investigated in this study. Interrupted tasks were remembered better by participants than finished tasks, and difficult tasks were remembered similarly. Difficult tasks were recalled higher than simple ones by students (Shi et al., 2019).

Again, in a recent study, the Zeigarnik Effect was investigated. In this study, the relationship between the Zeigarnik Effect and self-confidence was investigated in young adults and adolescents with intellectual disabilities. According to the study's findings, the group with low self-confidence had a very low zeigarnik effect score, which means they remembered completed tasks more. Those with a "high" level of self-esteem showed the specific recall tendency. Failure recall was interpreted as a threat in participants with low self-esteem, leading to the conclusion that it was selective forgetting (Alevriadou, 2010).

### ***1.2.6. Zeigarnik Effect in Various Groups***

In many studies, it has been discussed and examined that the Zeigarnik Effect may vary due to personality differences. Consequently, the effectiveness of the Zeigarnik Effect has also been studied among many different human groups. The discovery of Zeigarnik (1938) that incomplete tasks are remembered better than completed tasks was reported to be most prominent in "enthusiastic" (motive) participants, whereas "uninterested" (poorly motivated) subjects remembered more completed tasks than incomplete tasks (Moot III, Teevan and Greenfeld, 1988).

If we look at whether there is a cultural difference, we can give an example of the study conducted with Congolese students. Congolese students' recall behavior validates the Zeigarnik effect in informal settings and the "reversed Zeigarnik effect" in formal situations across cultures (Claeys, 1969). Moreover, with people who had organic brain impairment, a conceptual recreation of the well-known Zeigarnik Effect was performed. A substantial difference in recollection of uncompleted versus completed activities was found in a sample of 56 mentally challenged people, establishing the Zeigarnik effect in that demographic (House and McIntosh, 2000). In another study, the Zeigarnik effect was studied in regard to sex, and 200 subjects' resistance was measured. The Zeigarnik effect was strongly influenced by resistance, with inflexible respondents having a higher tendency to recall the interrupted work. The Zeigarnik scores were unaffected by gender (Chhaya, 1985).

### ***1.2.7. Zeigarnik Effect and It's Reflections in Modern Life***

We have gone over the origins of the Zeigarnik Effect and how it has evolved from the past to the present. Looking at where the Zeigarnik Effect is applied in practice today, what sort of reflection it has on us and where it is used will bring the significance of the Zeigarnik Effect to the surface. We can start by looking into how the Zeigarnik Effect is practiced in areas like therapy, learning and work efficiency strategies. Moreover, we will look at more instances subsequently to see how the Zeigarnik Effect affects fields like advertising, promotion, and art.

The Zeigarnik Effect was used in a study to see how a group of Japanese junior high school students who went on school trips may improve the aspects they learnt about these disciplines. The pupils were instructed to learn more about the history and natural

history of the sites they visited. The students first saw the information about the places visited in the school. Students created quizzes for each other based on this information. The pupils, on the other hand, did not provide each other the quiz questions they had prepared in advance. In this way, the students were given an incomplete experience and it was insured that they were more open to the knowledge when they went to the field. The studies of the students will be finished during the trip. The trials yielded the expected findings, confirming the Zeigarnik effect's impact on learning (Hiramatsu, Ito and Sato, 2013).

Another study looked into the relation between traumatic memories and the Zeigarnik Effect. Research suggests that the Zeigarnik Effect reflects the creation of traumatic memories as uncompleted activities. The Zeigarnik Effect's significance in the establishment and improvement of post-traumatic stress disorder is studied in this article. The therapy technique of eye movement desensitization and reprocessing (EMDR), according to the report, is a successful therapy technique for post-traumatic stress disorder. The Zeigarnik Effect is one of the therapeutic components that contributes to EMDR's specific efficacy. According to the article, the EMDR technique uses the apparent benefit of eye movements to complete Zeigarnik reminders. Furthermore, the Zeigarnik Effect may be used to improve EMDR therapy, according to this paper (Fox, 2020).

In another study, written plans were found to boost people's success and productivity. This listing event is said to have started with the discovery of the Zeigarnik Effect. According to the effect, when people make a to-do lists, their level of stress over unfinished activities lowers in reality. Recent research has discovered that if one of the activities is passed without being completed, the subsequent task perform poorly. To be more precise, the study claims that people are more efficient when they finish and cross off the first thing on their to-do list before moving on to the next (Schrager and Sadowski, 2016).

The Zeigarnik Effect was studied as a source of behavior in one study. It was suggested in this study that the Zeigarnik Effect and paraphilias might be related. It is thought that Paraphilias (voyeurism, sexual sadism), are unavoidable for people once they develop. The authors argue that the motivation for an interrupted activity to come to mind more than a completed activity may also apply to paraphilias. Especially early

sexual arousal is thought to be associated with disappointment and possible subsequent events. According to this study, paraphilias are the tendency of preferring the recall of incompleted activities rather than the finished ones (Munroe and Gauvain, 2001).

The Zeigarnik Effect and consumer interest in commercials were another subject to a study. The Zeigarnik Effect is a marketing approach that is also used in the advertising industry. Advertisers are continuously on the search for innovative ways to capture the attention of consumers and persuade them to buy. The relationship between Zeigarnik Effect and consumer attention on commercials are the subjects of this research. To see if there was a link, ads were displayed to a set of people. According to the results of the experiment, participants remembered incomplete ads more than completed ads (Hammadi and Qureishi, 2013).

The reflection of the Zeigarnik Effect on art was also examined. It has been stated that this impact can be found in the writings of Ahmet Hamdi Tanpınar, one of Turkey's literary pioneers and author of works like " Saatleri Ayarlama Enstitüsü, Edebiyat Üzerine Makaleler, Bursa' da Zaman." It is said that there are unfinished things in Ahmet Hamdi Tanpınar's works that keep the reader's curiosity alive. The spread of the Zeigarnik Effect in Ahmet Hamdi Tanpınar's works is due to the fact that the story protagonists in the works are chasing infinite occurrences, continuously seeking for results, but failing to achieve those results (Keskin, 2018).

A case study was conducted in another study concerning songs that stuck in our minds and the distressing aspect of them. It has been suggested that these are not obsessions, but may create distraction. This occurrence is known as "earworms". It has been claimed that it's more common among those who value music in their lives. Most of us have had the experience of an unpleasant melody or song becoming stuck in our heads as a result of an external stimulus. Some people are claimed to feel relieved when they are free of this condition. The Zeigarnik Effect has been proposed as the underlying cause of this condition. It has been argued that the repetitive spinning condition will stop once the entire song has been listened (Orjuela-Rojas and Rodriguez, 2018).

### ***1.2.8. Relationship of Anxiety and the Zeigarnik Effect***

Considering the effects of stress, it is thought that there may be a relationship between stress and the Zeigarnik Effect. A research has been conducted to investigate the effect of stress on the recall of completed and unfinished tasks. Two main assumptions aimed to be studied in this research. Firstly, it was assumed that, the number of the recalled of unfinished tasks are lower when stress level rises. Secondly, it was thought that the opposite would be the case for completed works. When the stress level increased, completed tasks were expected to be remembered more. The first argument was confirmed by the results of the study. As the stress level increased, there was a significant fall in recall of unfinished tasks. Second assumption was not confirmed by the data. The recall of the completed tasks did not show any increment when the level of stress had risen up (Glixman, 1949).

### ***1.3. Anxiety***

Almost every one of us has experienced the emotional state we describe as anxiety. Some of us experience it more often, some less frequently. Many of us have experienced or witnessed the intense emotional state experienced by a student just before the exam he/she is preparing for, the feelings of a patient preparing to undergo surgery or the thoughts of a parent wondering if their child has arrived home. Freud explained that anxiety is experienced by everyone with the following words. "I don't think it's necessary for me to explain you to anxiety. Every single one of us has felt that sensation, or to put it another way, that affective state, at some point in our lives."(Zeidner and Matthews, 2010). Moreover, in many societies, anxiety is one of the most common and universal human emotion (Sarason and Sarason, 1990).

#### ***1.3.1. Definition of Anxiety***

Anxiety was defined by Sigmund Freud as "something felt," a negative emotional state or mood of the living person. This state was defined by "everything that is included by the word 'nervousness,'" as he noticed it in patients suffering from anxiety neuroses. To say more clearly, anxiety was characterized as "(1) a distinct unpleasant characteristic, (2) efferent or discharge phenomena, and (3) the awareness of these" in more detail. With its distinctive combination of subjective and physiological qualities, anxiety, according to Freud, can be addressed separately from other negative moods



such as wrath, grief, and sadness. Feelings of concern, tension, or fear were among the experience elements connected with worry that made it a distinct "type of unpleasure." Tachycardia, breathing difficulties, perspiration, shaking, restiveness and other physical and behavioral releasing events related with worry were recognized crucial features of anxiety states by Freud, contributing to their unpleasantness (Spielberger, 1972).

A broad situation of unwanted tension can be identified as anxiety. It has a considerably larger reach than worry since it is triggered by a variety of factors, including high levels of arousal and disappointment. Anxiety is not the same as stimulation in overall, since it differentiates from general arousal, or neutral stimulation, and pleasurable excitement. Anxiety, on the other hand, is less comprehensive than arousal but more so than fear (Epstein, 1985).

In order to better comprehend anxiety, it has been advocated that the evolutionary purpose of anxiety and its underlying mechanisms be evaluated when looking at ordinary anxiety reactions. The role of the living beings anxiety reaction, it is argued, is to notice environmental risks and develop strategies for how to deal with them (Bateson, Brilot and Nettle, 2011).

### ***1.3.2. Fear and Anxiety***

Although fear and anxiety are separate emotional states, they often tend to be confused as concepts. To have a deeper understanding of the meanings of these phrases, it is useful to look at the traditional definitions of these words.

Fear refers to the anticipation of a negative or catastrophic event. The concept of fear includes the fact that the event that the person is worried about has not yet happened and the person's apprehensions about this event. The perception that there is actual or prospective risk in a certain scenario is considered to as fear. So fear is a cognitive process.

In other respects, anxiety is described as a "intense emotional condition" (Beck, Emery and Greenberg, 1985).

If we look at a more recent definition: anxiety is the feeling of something bad happening in the future. Anxiety is typically linked to physical stress and attention in anticipation of impending danger, as well as careful or avoidant responses (American Psychiatric Association, 2013).

### ***1.3.3. State – Trait Anxiety***

The casual use of the “anxiety” phrase for two quite different meanings causes some uncertainty in the concept of anxiety. Anxiety is generally described as a transient state of the organism that varies in intensity or changes over time. However, anxiety can relate to a personality characteristic as well. Giving an example of this confusion will provide a better explanation of the situation. For example, if we consider this sentence; “Mr. Smith is anxious.”, this statement can easily lead us to two different conclusions. At first, we can think that “Mr. Smith is anxious right now.” Secondly, we can think in the way that “Mr. Smith as a generally anxious person.” (Spielberger, 1966).

Cattell and Scheier’s factor analysis studies were the first to suggest this situation. They said that there is a lot of debate over how long an emotion should continue, how intense it should be, and whether it should have a specific object before it can be classified as anxiety.(Cattell and Scheier, 1958). Later on, this study formed the core of the Two Factor Theory of Anxiety (Öner and LeCompte, 1983).

#### ***1.3.3.1. State Anxiety***

It is the subjective fear that the individual experiences due to the stressful circumstance she/he is in. Physical alterations in the autonomous nervous system, such as sweating, yellowing, blushing, and trembling, are physiological indications of an individual's feelings of tension and anxiety. Furthermore, when the stress is intense, the state anxiety level rises, and when the stress disappears, there is a decrease (Öner and LeCompte, 1983).

#### ***1.3.3.2. Trait Anxiety***

The proneness of the individual to the anxiety experience is referred to as Trait Anxiety. This is also known as the inclination to see or interpret situations as stressful. It is a sensation of dissatisfaction and sadness that happens when an individual

perceives neutral events as unsafe and frightening based on objective criteria. Individuals with high levels of this form of anxiety are known to be easily hurt and pessimistic. State anxiety impacts these people more frequently and intensely than it does the rest of the population (Öner and LeCompte, 1983).

#### ***1.3.3.3. A Trait – State Anxiety Theory***

Concept of anxiety has usually been considered as an emotional condition of which intensity may change over time (Spielberger, 1966). Krause (1961), suggests that the state of anxiety should be identified by observing physiological signs and assessing them with information provided by introspective reports during this emotional state. On the other hand, anxiety as a relatively stable personality trait refers to the individuals who have a tendency to perceive a greater number of situations as a threat to the individual and the intensity of the emotional reactions to these situations is greater than individuals who are not identified as “anxious”. Thus, individuals experiencing anxiety as a trait (A-trait) are assumed to have a proneness to anxiety and react to certain types of situations with anxiety state (A-state) (Spielberger, 1966). However, in some conditions that involve painful threats such as electric shocks, individuals respond with similar A-state reactions regardless of their A-trait level (Katkin, 1965). In terms of task performance, individuals with high levels of A-trait seem to perform differently than individuals with low levels A-trait when failure or ego-involvement is involved in the situation, such as academic achievement (Spielberger, 1962).

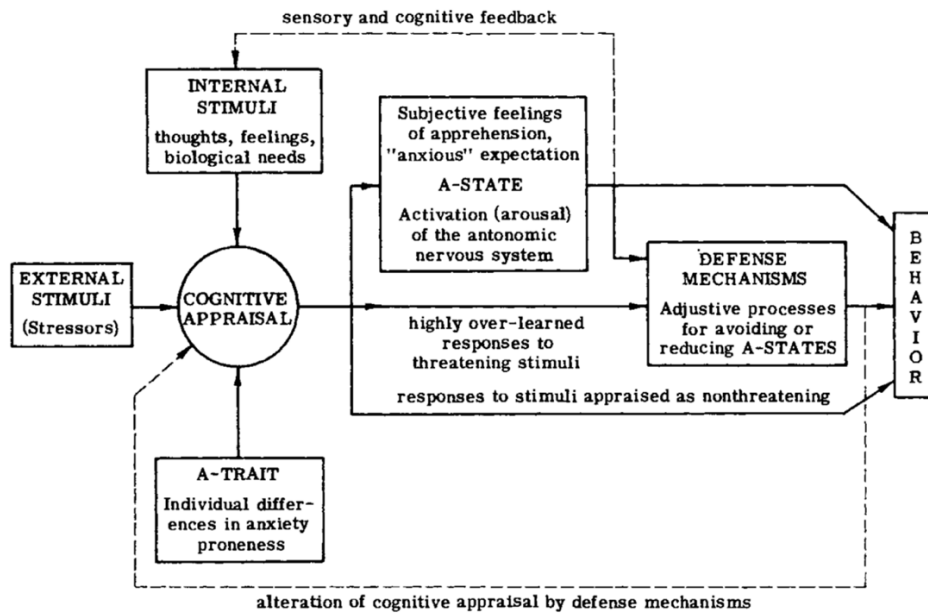


Figure 3. A trait-state conception of anxiety (Source: Spielberger, 1966)

#### 1.4. Present Study

The research for this paper was inspired by the article “Zeigarnik Etkisine Yeni Bir Yaklaşım”. According to the article “Zeigarnik Etkisine Yeni Bir Yaklaşım”, as mentioned in more detail above, the main factor affecting remembering is not whether or not the task is interrupted, but how the interrupting action is presented to the participants. The perception of task completion or incompleteness is thought to have a significant impact on the task recall rate in this study. Furthermore, it is suggested that the way in which the interruption is presented to the participants may be an important point. Though interruption is given to the participants as completion, they will view it as completion even if the task is not done. If, on the other hand, the interruption appears to be incomplete, the Zeigarnik Effect is likely to occur.

Similarly, there are two main groups in this study, ego-oriented and task-oriented, with a total of four groups dependent on how these groups are interrupted by the experimenter (positive and negative). These groups are: ego-oriented positive group, ego-oriented negative group, task-oriented-positive group and task-oriented negative group, as in the reference study. In the positive groups, participants were requested to interrupt some of the tasks they were doing during the experiment, and these works were represented as completed works to the participants. Negative group participants were also asked to leave some of their tasks undone during the trials. However, this

time, these interruptions were told to the participants as incompleteness. One of the main differences of this study from “Zeigarnik Etkisine Yeni Bir Yaklaşım” paper is the differentiation of the questions to be asked to the participants. Another fundamental difference is that the place where the participants and the experimenter meet to conduct the experiment is an online platform.

In a similar way, the purpose of this research is to investigate whether a task is interrupted and, if so, whether there will be a change in the recall rate of that task depending on how this interruption is perceived. To put it more specifically; It will be measured how much the participants remember the completed and uncompleted tasks among the ego-oriented positive, ego-oriented negative, task-oriented positive and task-oriented negative groups.

It will also be explored whether the action of interrupting tasks (positive or negative) will make a difference on the Zeigarnik Effect. It is expected that the results will be similar to those of the reference study.

The following findings were supported by the study “Zeigarnik Etkisine Yeni Bir Yaklaşım”:

- 1) The ego-oriented positive group has a higher recall rate of incomplete tasks than the ego-oriented negative group.
- 2) The ego-oriented negative group has a higher recall rate of completed tasks than the ego-oriented positive group.
- 3) If we only look at the ego-oriented negative group, the completed tasks were remembered more than the uncompleted ones in this group.
- 4) In the task-oriented negative group, incomplete tasks were remembered more than in the task-oriented positive group.
- 5) The task-oriented positive group remembered completed tasks better than the task-oriented negative group.
- 6) Unfinished tasks were remembered more than completed tasks in the negative task-oriented group, confirming the Zeigarnik Effect.

The effect of anxiety on the recall rate of completed and uncompleted tasks as a result of positive or negative interruption of ego-oriented and task-oriented groups will be

examined in this study. Furthermore, it will be analyzed which type of anxiety (state anxiety vs. trait anxiety) the Zeigarnik Effect is correlated with.

This research will show the effect of perception on the recall of an interrupted, unfinished event or situation. In this way, discovering the differences that perception creates will produce a significant awareness in everyday living. Furthermore, it is believed that this research could open the path for people with anxiety to organize their processes in completing a task based on their anxiety type.



## **CHAPTER 2: METHODS**

### ***2.1. Participants***

A total of 116 individuals participated in this study. In the experiment, which consisted of four groups, each group had 29 participants equally. Participants were randomly assigned to the groups. Age distribution of the participants is between 19 – 30 years old. Participants consist of 31 males and 85 females. Participants in the experiment were required to be a university student or graduate from a university.

### ***2.2. Procedure***

First of all, it was determined that the experiment would be conducted in two parts and would be conducted entirely online because of the pandemic.

In the first stage, it was decided that the participants would fill out an anxiety scale. In the second stage, it was decided to give participants 16 separate problem-solving task. In this way, the experimenter could interrupt the participant's problem-solving process at any time.

Ethics committee approval was obtained before starting the study. An online advertisement post was created to introduce the study to potential participant candidates and to increase the number of people willing to volunteer for the study. In the content of the advertisement, it was stated that the experiment to be attended was a memory research that consisted of two stages (filling out a survey and an online meeting with problem solving tasks), lasted around 30 minutes, and would be conducted online. The advertisement was announced to the participant candidates via social media and mail groups. At the same time, IEU Psychology students in the Introduction to Psychology class were told that if they volunteered in the experiment, they would receive extra credit in the class. Participants who decided to take part in the experiment scheduled an appointment with the experimenter by calling the number seen on the advertisement or sending an email to the address listed on the advertisement. On the day and time of the appointment, the participants received an informed consent form and an anxiety scale (State – Trait Anxiety Inventory) via Google Forms. Appendix A will contain the informed consent form and the anxiety

scale. At the same time, the participants were informed that when they completed the form and scale, they would be sent a connection link to a video conference platform (Zoom Video Communication or Google Meet) where they may have an online meeting with the experimenter in order to move on to the next phase of the study. According to the online platforms used, the experimenter and the participants had the opportunity to see the questions to be displayed on the screen simultaneously and to be in visual and auditory communication with each other at the same time. In this online interview, participants were asked 16 questions. The difficulty levels of the questions were adjusted according to the participants' ability to complete half of the questions in the allotted time while failing to complete the other half. The ego-oriented group was told that they would take an intelligence test. The reason for this was to pose a threat to the participant's self-confidence. The task-oriented group was told that they would help the experimenter. This was done to ensure that the members in this group did not feel under any pressure.

Before starting the experiment, the participants were asked to have paper and pencil with them. Subjects participated in the experiment individually and were randomly assigned to the four groups. Each participant was given the following instructions before starting the questions according to the group they were in.

*Ego – Oriented Positive Group:*

Now I will give you an intelligence test consisting of 16 questions. The questions will appear on your screen one by one and in order. If you want to solve the question by writing, I would like to point your camera towards your paper. The time given for each question varies according to the difficulty of that task. Time tracking is done by the experimenter. Time information will not be shared with the participants. If you reach the required point in the problem solution, that is, if you complete the question successfully, I will close the screen with the question before the timer runs out. Then we will move on to the next question. If you have any questions, please wait for the experiment to be completed and direct your question. Your score will be compared with the scores of other participants and will be announced later. Good luck.



*Ego – Oriented Negative Group:*

Now I will give you an intelligence test consisting of 16 questions. The questions will appear on your screen one by one and in order. If you want to solve the question by writing, I would like to point your camera towards your paper. The time given for each question varies according to the difficulty of that task. Time tracking is done by the experimenter. Time information will not be shared with the participants. If you cannot complete any question in the given time, when your time is up, I will turn off your screen and move on to the next question. If you have any questions, please wait for the experiment to be completed and direct your question. Your score will be compared with the scores of other participants and will be announced later. Good luck.

*Task – Oriented Positive Group:*

You will be asked 16 simple and short questions. These questions will not be used to measure your intelligence or abilities. Your score will not be compared to other people's scores. It makes no difference how well you answer questions or how quickly you do it. It is desirable to standardize these questions for later use in some experiments. The questions will display one by one and in an order on your screen. If you want to solve the question by writing, I would like to point your camera towards your paper. If I turn your screen off while you are answering a question, please do not be confused. Because this means that you have successfully completed this question. If you have any questions, please wait for the experiment to be completed and direct your question. We can get started if you are ready.

*Task – Oriented Negative Group:*

You will be asked 16 simple and short questions. These questions will not be used to measure your intelligence or abilities. Your score will not be compared to other people's scores. It makes no difference how well you answer questions or how quickly you do it. It is desirable to standardize these questions for later use in some experiments. The questions will display one by one and in an order on your screen. If you want to solve the question by writing, I would like to point your camera towards your paper. If you have any questions, please wait for the experiment to be completed and direct your question. We can get started if you are ready.

In the ego-oriented groups, the participants were told that time was being measured. But time was not actually measured. In order to make the participants experience the perception of time better, the sound of a stopwatch was given during the solution phase of the questions.

In each experimental trial, the participant was allowed to complete 8 of the 16 questions. The other 8 questions were interrupted while the participant was solving. The participants were observed throughout the length of the trial. Each subject received the questions in a different order. Also, in each study, the order in which questions were interrupted was also randomized. The experiment manager controlled the duration of the questions asked to the subjects according to the division and completion of the question. The time difference between the questions was kept to a minimum so that the participant would not be confused and noticed. The action of interrupting a question was done carefully at the times when the participant was most concentrated on solving the question.

The subjects was given about 30 seconds to rest after the last question was answered. Following that, only age information was obtained from the participants and noted. Finally, the participants was requested to hide the piece of paper from their view if they wrote anything while solving the questions. Than they were asked to say which questions they did during the experiment. Participants counted the questions they could remember, one by one. The experimenter categorized and recorded every questions that participants can remember.

After the whole process was over, the main purpose of the experiment was explained to the participants. If the participants had questions, they were tried to be answered. Participants who wanted to be informed about the results of the experiment were noted, and the e-mail address of the experimenter was shared in case the participants had anything to ask in the future.

### **2.3. Materials**

In the first part of the study, State – Trait Anxiety Inventory (STAI) have been used for measuring the anxiety level of the participants. In the second stage of the

experiment, participants were given a 16 separate problem solving task consisting of verbal and numerical questions.

### ***2.3.1. State – Trait Anxiety Inventory***

State and Trait Anxiety Inventory was developed by Spielberger, Gorsuch and Lushene, (1970). State and Trait Anxiety Inventory is a scale used to determine state and trait anxiety levels separately. Öner and LeCompte (1983) translated the State – Trait Anxiety Inventory to a Turkish version. The inventory is a self-assessment questionnaire consisting of short statements. The inventory consists of 40 items in total. The first 20 questions belong to the part of the state anxiety. The remaining 20 questions are from the trait anxiety part. The state anxiety part asks the individual to describe how he or she feels at a certain moment and under certain conditions. On the other hand, the trait anxiety section asks the individual to define how they usually feel. Some situations and behaviors are described in the items of the scale. Individuals are required to rate these feelings and behaviors according to their severity and frequency.

The intensity levels in the state anxiety section are as follow;

- (1) Not At All, (2) Somewhat, (3) Moderately So, (4) Very Much So

The frequency levels in the trait anxiety section are as follow;

- (1) Almost Never, (2) Sometimes, (3) Often, (4) Almost Always

In both parts of the scale, participants can achieve a minimum of 20 and a maximum of 80 points. Each high score represents a high amount of anxiety, while each low score shows a low level of anxiety.

The scale was originally developed for normal adults. However, over time, it has been seen that the scale is also suitable for adolescences and people with physical and psychiatric problems (Öner and LeCompte, 1983).

### ***2.3.2. 16 Separate Problem-Solving Task***

The problem series consisting of 16 questions was designed based on the article “Zeigarnik Etkisine Yeni Bir Yaklaşım (Köksal, 1993)”. The questions consist of

verbal and numerical questions. There are 11 verbal and 5 mathematical questions in the questionnaire. The questions are clear enough for anyone who has completed high school to answer. All questions can be accessed in Appendix B.

#### ***2.4. Data Analysis***

The data obtained as a result of the interviews were analyzed with SPSS version 24. In the data, there are two independent variables (type of orientation and type of interruption) which are between designs. Also, there are one independent variable (STAI scores of the participants) and one dependent variable (the recall rates of completed and uncompleted tasks) as within designs. Firstly, descriptive statistics (frequencies, means, standard deviations and outliers) were examined. Then the assumptions were checked. The effects of orientation types (ego-oriented and task oriented) and interruption types (positive and negative) on the recall of completed and uncompleted tasks were investigated in detail. Finally, anxiety types (state anxiety and trait anxiety) were examined to see if they had an impact on the groups based on their orientation and interruption type. The data were analyzed with mixed design ANOVA and independent samples T- Test.

## CHAPTER 3: RESULTS

### 3.1. Descriptive Statistics

As demographic data, the participants' age and gender were gathered. The participants were between the ages of 19 and 30 ( $M = 25.41$ ,  $SD = 3.82$ ). There are 31 males (26.7%) and 85 females (73.3%) among the participants. (See Table 1). Each experimental condition was assigned to 29 distinct individuals from a total sample of 116 people (See Table 2.)

Table 2. Gender Characteristics of the Participants

		<i>N</i>	%
Gender	male	31	26.7
	female	85	73.3
	Total	116	100.0

Table 3. Experimental Conditions and Participants

Type of Orientation	Interruption	Frequency	Percent
Ego-oriented	positive	29	50.0
	negative	29	50.0
	Total	58	100.0
Task-oriented	positive	29	50.0
	negative	29	50.0
	Total	58	100.0

### 3.2. The Effects of Orientation Type by Interruption Type on the Recall of Completed and Uncompleted Tasks

#### 3.2.1. The Main Effect of Orientation Type on the Recall of Completed and Uncompleted Tasks

Before starting an analysis, assumptions were checked. The analysis of normality by statistical method was checked according to skewness and kurtosis for the effect of orientation type (ego or task) on the recall rate of completed and uncompleted tasks. The skewness and kurtosis values of completed and uncompleted tasks were found to be between -1.5 and +1.5 when the recall rates of completed and unfinished tasks were

analyzed according to ego and task-oriented groups. Tabachnick, Fidell and Ullman (2007) accept this range of values as normal. In addition, Histograms, Q-Q and Detrended Plots were confirmed to be normal. As a result, the distribution was determined to be consistent to the normal distribution. Furthermore, according to the Levene' s Test, both the number of the recalled completed tasks  $F(114) = .065, p = .799$  and the number of the recalled uncompleted tasks  $F(114) = 1.663, p = .200$  are not significant. It is reasonable to presume that the variances are equal.

A mixed design ANOVA was conducted to investigate the effect of orientation type on recall rate of completed and uncompleted tasks. Sphericity assumption was met because there were two categories. Box' s Test of Covariance Matrices test was show that the equality of variance covariance matrix assumption was met  $F(9, 143751.820) = 1.030, p = .413$ . It was found that there was not a significant main effect of type of orientation on recall rate of completed ( $(M_{Ego} = 4.86, SE_{Ego} = .226) (M_{Task} = 4.78, SE_{Task} = .228)$ ) and uncompleted tasks ( $(M_{Ego} = 4.69, SE_{Ego} = .196) (M_{Task} = 4.36, SE_{Task} = .169)$ ).  $F(1, 112) = .341, p = .560, R^2 = .003$ .

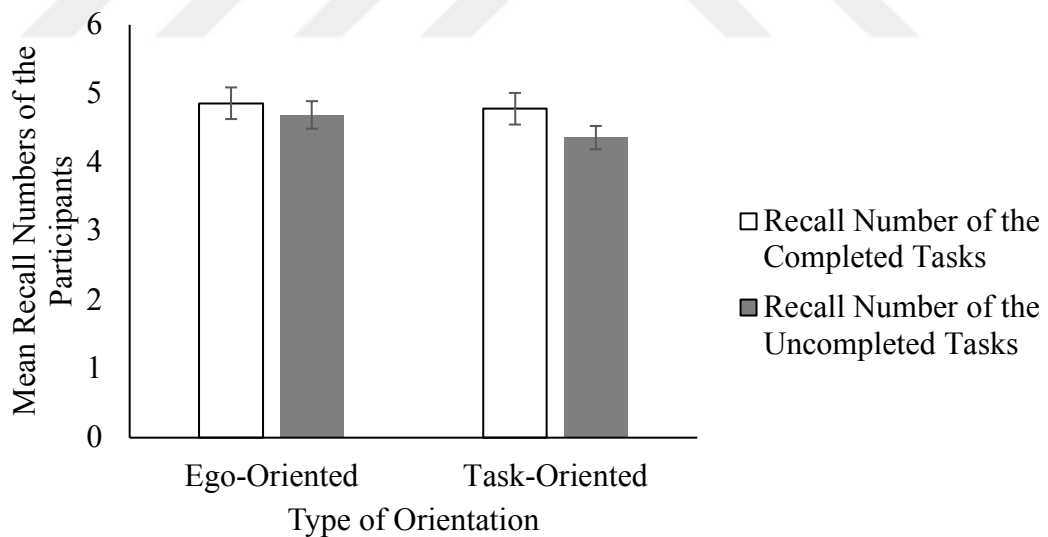


Figure 4. Mean (with 95% CI) Recall number of the completed and uncompleted tasks of the participants according to orientation type

### 3.2.2. The Main Effect of Interruption Type on the Recall of Completed and Uncompleted Tasks

The assumptions were tested to look at the effect of interruption types (positive or negative) on the recall rate of completed and unfinished tasks. The recall numbers of completed and uncompleted tasks are evaluated according to the interruption style, all skewness and kurtosis values are in the normal range, that is, between -1.5 and +1.5, as Tabachnick, Fidell and Ullman (2007) suggested. In Histograms, Detrended Plots, and Q-Q Plots, it was determined that no condition exceeded normality. For recall rates of completed  $F(1, 114) = 2.662, p = .106$  and uncompleted tasks  $F(1, 114) = .006, p = .938$  the homogeneity of variance assumption is also insignificant.

A mixed design ANOVA was performed to search whether there was an effect of interruption type on the recall number of the completed tasks and the recall number of the uncompleted tasks. As type of interruption variable has two levels, the sphericity assumption was not a concern. The equality of variance covariance matrix condition was met by Box's Test of Covariance Matrices,  $F(9, 143751.820) = 1.030, p = .413$ . The main effect of interruption type on the recall rate of completed ( $(M_{Positive} = 4.90, SE_{Positive} = .210)$  ( $M_{Negative} = 4.74, SE_{Negative} = .243$ )) and uncompleted ( $(M_{Positive} = 4.34, SE_{Positive} = .177)$  ( $M_{Negative} = 4.71, SE_{Negative} = .187$ )) tasks was discovered to be non-significant  $F(1, 112) = 1.567, p = .213, R^2 = .014$ .

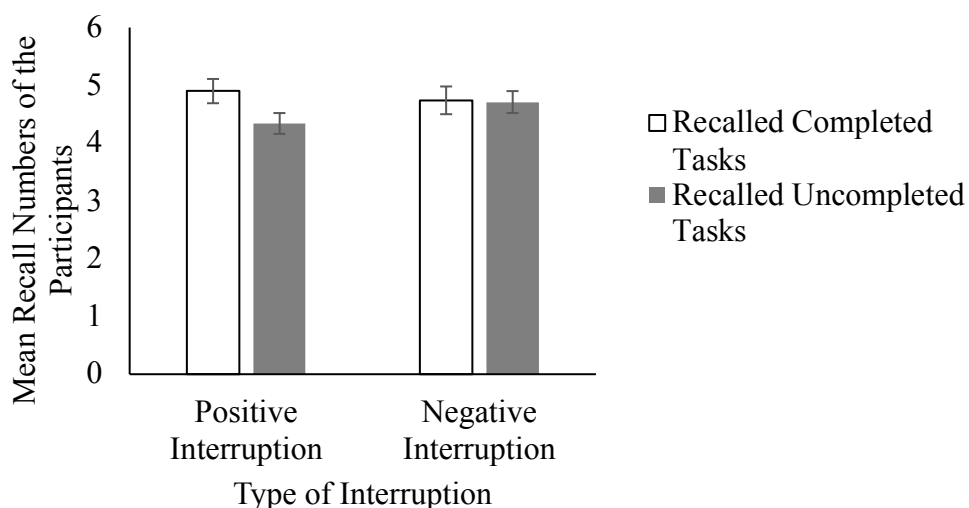


Figure 5. Mean (with 95% CI) Recall number of the completed and uncompleted tasks of the participants according to interruption type

### ***3.2.3. The Interaction Effect of Orientation Type and Interruption Type on the Recall of Completed and Uncompleted Tasks***

A mixed design ANOVA was performed to investigate with orientation type (ego – task) and interruption (positive – negative) as between-subject designs, the recall number of the completed and uncompleted tasks as within-subject factors. Before the analysis, the assumptions were tested. According to the Mauchly' s Test of Sphericity, sphericity can be assumed. Furthermore, Box's Test of Covariance Matrices proven that the assumption was confirmed,  $F(9, 143751.820) = 1.030, p = .413$ . Lastly, Levene' s Test showed that the variances are equal for both the number of the recalled completed tasks  $F(3, 112) = 2.198, p = .092$  and the number of the recalled uncompleted tasks  $F(3, 112) = .797, p = .498$

The results of the mixed design ANOVA revealed that, there was not a significant interaction effect of orientation type and interruption type on the recall number of the recalled completed and recalled uncompleted tasks  $F(1, 112) = .843, p = .361, R^2 = .007$ .

However, as shown in *Figure 6*, in the ego-oriented group, positive or negative interruption has a sensitive effect on recall of completed and uncompleted tasks. In contrast to this fact, task-oriented group does not show this level of sensitivity. If we look at the data more carefully, we can observe that the completed tasks are recalled more than the uncompleted ones in the ego-oriented positive group. When we evaluate the ego-oriented negative group, we find the exact opposite situation. In this case, it can be noticed that the unfinished tasks are remembered more than the completed tasks. The ego-oriented negative group appears to be the most similar to the Zeigarnik effect in this study.



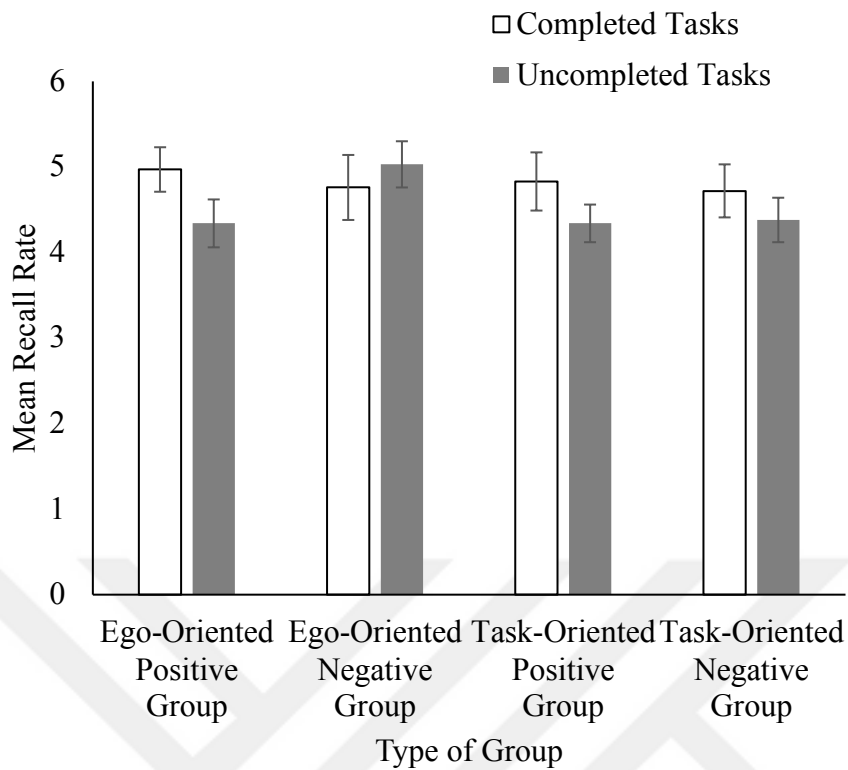


Figure 6. Mean (with 95% CI) Recall number of the completed and uncompleted tasks of the participants according to their group type

Table 4. Means and standard deviations of recall rates of groups

Type of Group	Recall Rate of Completed Tasks	Recall Rate of Uncompleted Tasks
Ego-Oriented Positive Group	$M = 4.97$ $SD = 1.375$	$M = 4.34$ $SD = 1.495$
Ego-Oriented Negative Group	$M = 4.76$ $SD = 2.029$	$M = 5.03$ $SD = 1.426$
Task-Oriented Positive Group	$M = 4.83$ $SD = 1.814$	$M = 4.34$ $SD = 1.203$
Task Oriented Negative Group	$M = 4.72$ $SD = 1.688$	$M = 4.38$ $SD = 1.374$

$N = 29$  (For Every Group)

### ***3.3. The Effects of State Anxiety and Trait Anxiety on the Recall of Completed and Uncompleted Tasks According to their Orientation and Interruption Type***

Before conducting the analysis, assumptions were controlled for the state and trait anxiety scores of the participants. According to the Kolmogorov – Smirnov Test of Normality, state anxiety scores do not show any significant deviation from normal distribution  $D(116) = .067, p = .200$ . On the other hand, trait anxiety scores found to be significantly different from the normal distribution  $D(116) = .088, p = .028$ . However, skewness and kurtosis values are in the normal range for both anxiety scores. Furthermore, in the Histograms, Q-Q Plots and Detrended Plots no abnormality were found for both types of anxiety scores.

Anxiety scores (state and trait) were divided into two groups: low and high anxiety scores, in order to explore the recall rates of completed and uncompleted tasks for people with low and high anxiety. Our two continuous variables (state and trait anxiety scores of the participants) were converted to categorical variables. State and trait anxiety variables were visually binned by the percentile of the scanned data. In terms of state anxiety scores, 34 points and lower were defined as low anxiety, and 35 points and above were labeled as high anxiety. The low category for trait anxiety scores was 42 points or less, and the high category was 43 points or more.

A mixed design ANOVA was conducted to investigate the effects of state and trait anxiety on the recall of completed and uncompleted tasks according to their orientation and interruption type. Sphericity was not an issue on this part of our analysis because all our variables consist two categories. The dependent variables' covariance matrices are equal across groups  $F(39, 2845.423) = .836, p = .754$ .

The analysis revealed that state anxiety has a significant impact on recall numbers of completed and uncompleted tasks according to their orientation and interruption types  $F(1, 100) = 5.292, p < .05, R^2 = .050$ . However, it was found that trait anxiety does not significantly effect the recall numbers of completed and uncompleted tasks according to their orientation and interruption types  $F(1, 100) = 3.904, p = .051, R^2 = .038$ .

### 3.2. The Effects of State Anxiety on the Recall Number of the Completed and Uncompleted Tasks According to Its' Levels (Low State Anxiety – High State Anxiety)

An Independent Samples T-Test was conducted to investigate whether there was a difference between the effect of low and high state anxiety on the recall rate of completed and uncompleted tasks. Before conducting the analysis, assumptions were checked. The data were found to be normally distributed as a consequence of the investigations. The result of the analysis indicated that, there was no significant difference between the group with low state anxiety ( $M = 4.78, SE = .231$ ) and the group with high state anxiety ( $M = 4.86, SE = .223$ ) regarding the recall number of the completed tasks  $t(114) = -.230, p = .819$ . Furthermore, there was no significant difference between the group with low state anxiety ( $M = 4.67, SE = .180$ ) and the group with high state anxiety ( $M = 4.38, SE = .185$ ) considering the recall rates of uncompleted tasks  $t(114) = 1.129, p = .261$ .

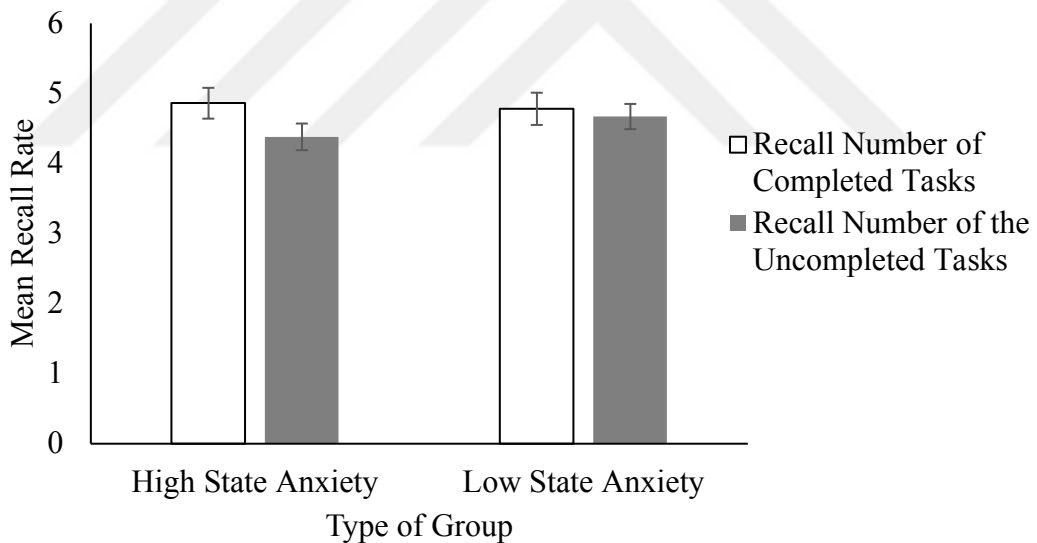


Figure 7. Mean (with 95% CI) Recall number of the completed and uncompleted tasks of the participants according to their state anxiety level

## CHAPTER 4: DISCUSSION

In this study, the Zeigarnik Effect was tried to be discussed from other perspectives. According to the Zeigarnik Effect (1927), uncompleted tasks are remembered more than completed ones. In this study, it has been argued and tested that the most important effects affecting the recall rate are how the person perceives the type of work and how the work is divided. Simultaneously, it was hypothesized and tested that anxiety types could influence such recalls. Results showed that orientation type and division type had no effect on recall of completed and incomplete tasks. Furthermore, the combined effect of orientation type and division type on recall of completed and unfinished tasks was not found. However, examining the relationships between anxiety types, however, the situation was kind of different for the recall rates for completed and uncompleted tasks. State anxiety has been found to have an effect on the memory rate of completed and uncompleted tasks when combined with the orientation type and interruption type. Although the results were not significant, we can observe from the data that the group closest to the Zeigarnik Effect is the ego-oriented negative group.

There were some limitations in the study. We were unable to meet with the participants face to face since we were in the middle of a pandemic. As a result, we conducted the study entirely online. Despite the fact that conducting our works online has become an increasingly important part of our lives, it is believed that manipulating participants in a face-to-face encounter will considerably more successful. In this study, it was expected to obtain results close to the results found in the “Zeigarnik Etkisine Yeni Bir Yaklaşım” study (Köksal, 1993), but no close effect was observed. The fact that the study is conducted online is regarded to be the main explanation behind this. Throughout the study, we experienced some challenges in doing this experiment online. During the Zoom/Google meetings, there were occasional interruptions caused by the internet. It was observed by the experimenter that this situation had a demotivating and discouraging effect on the participants. This experiment is believed to be significantly more efficient in terms of experimental outcomes and participant motivation if it were conducted in a laboratory setting. Despite the fact that the participants were offered a series of questions that were equally difficult and easy to

answer, some found all the questions difficult to answer. It is thought that it may be useful to review the difficulty levels of the questions in another future study. Moreover, although the verbal and mathematical questions were equally distributed, some participants had difficulties in mathematical questions and asked to pass some questions or leave the experiment unfinished. At the same time, some participants expressed dissatisfaction with the experimental process in general and expressed a desire to leave. All these reasons suggest that it may be useful to review the number of questions and the duration of the experiment. It was thought that stating at the beginning of the experiment that there would be a small reward given to the participants at the end of the experiment process, because the experimental process was a little time-consuming and the participants demonstrated mental performance, would help to boost the participants' motivation. Another very important issue that needs to be reviewed is the instructions given to the participants. The instructions given to the participants in this experiment form the basis of the experiment. It was thought that the fact that the instructions given were a little shorter in order to attract more attention of the participants and better assimilate them, may be a factor that will help to find more precise results in future studies. Furthermore, the manner in which the experimenter offers instructions to the participant, as well as his/her general attitude and behavior toward the participant, play a significant role in this experiment. It has been noticed that in order for the participants to keep up with the seriousness of the experiment, the experimenter must maintain a solid and calm attitude without disrupting it, and this might cause significant changes in the experiment's outcomes. It is strongly recommended that the experimenter should be very sensitive about this issue in potential future studies. Another limiting factor of the study is the sample size. Despite the fact that we have the ability to contact participants via online platforms, it has been noticed that participant candidates abstain the study's material. It is thought that the main reason for this is that the participants were informed that the experiment is a study on memory and that it includes verbal numerical questions. It is suggested that the first information presented to participant candidates for future research be chosen with care to ensure that the material does not irritate the participant. In this study, the age range was chosen as 18-30 years old. However, it is thought that including the age range of 30 and 50 may be beneficial in terms of results. In addition, it is thought that the fact that female participants were in the majority in this study may have some effects. It is highly recommended to pay attention to gender equality in the

number of participants in future studies. Because the findings are based on a small sample size, they may not be representative of the broader population.

In the beginning of the study, we mentioned that the Zeigarnik Effect is a subject that has been studied for many years. Researchers that desire to replicate the findings of this study, on the other hand, have conducted comparable experiments and have obtained similar results at times and different results at other times (Van Bergen, 1968). Many investigations did not appear to support Zeigarnik because they did not produce statistically significant recall differences in the predicted direction under experimentally controlled settings of task completion and incompleteness (Alper, 1957).



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## *Appendix A – Informed Consent and STAI*

### Deneyisel Psikoloji Yüksek Lisans Tez Çalışması

#### Bilgilendirilmiş Onam Formu

Bu araştırma İzmir Ekonomi Üniversitesi Lisansüstü Eğitim Enstitüsü Deneysel Psikoloji Bölümü Yüksek Lisans Tezi kapsamında Prof. Dr. Falih KÖKSAL danışmanlığında, Buse ERDİN tarafından yürütülmektedir. Bu çalışmada hafıza üzerine bir araştırma yürütülecektir. Bu deney iki ana bölümden oluşmaktadır. Önce sizden bir envanter doldurmanız istenecektir. Sonrasında Zoom uygulaması üzerinden online bir görüşme gerçekleştirilecektir. Görüşmede size bazı sözel ve sayısal sorular yöneltilenmektedir. İki aşamada da vereceğiniz cevaplar araştırmanın niteliği açısından oldukça önemlidir. Cevaplarınızı bunu göz önünde bulundurarak vermeniz rica olunur. Bu araştırma bilimsel amaçla yapılmaktadır. Sizden alınacak cevaplar gizli tutulacaktır. Çalışma kapsamında sizden yaşınız ve cinsiyetiniz dışında herhangi bir kimlik bilgisi talep edilmeyecektir. Bu çalışmaya katılmak tamamen gönüllülük esasına dayanmaktadır. Araştırmaya katılmama veya başladıktan sonra herhangi bir anda çalışmadan çıkma hakkına sahipsiniz. Katılımınız ve ayırdığınız zaman için şimdiden teşekkür ederiz. Araştırmaya veya katılımınıza dair verilen bu bilgiler dışında daha fazla bilgiye ihtiyaç duyarsanız araştırmaya aşağıda bulunan e-posta adresinden ulaşabilirsiniz.

İletişim e-mail: buse-erdin@hotmail.com

Bu formu onaylamanız, araştırmaya katılım için onam verdiğiniz anlamına gelecektir.

Katılmam beklenen çalışmanın amacı, nedeni, katılım süresi ve süreciyle ilgili bilgileri okudum. Gönüllü olarak çalışma süresince üzerime düşen sorumlulukları anladım. Bu araştırmaya kendi isteğimle, hiçbir baskı ve zorlama olmaksızın katılmayı kabul ediyorum.

Kabul ediyorum ve onaylıyorum.

Aşağıda kişilerin kendilerine ait duygularını anlatmada kullandıkları birtakım ifadeler verilmiştir. Her ifadeyi okuyun, sonra da o anda nasıl hissettiğinizi ifadelerin sağ tarafındaki kutucuklardan uygun olanını işaretlemek suretiyle belirtin. Doğru ya da yanlış cevap yoktur. Herhangi bir ifadenin üzerinde fazla zaman sarfetmeksizin anında nasıl hissettiğinizi gösteren cevabı işaretleyin.

		HIÇ	BIRAZ	ÇOK	TAMAMIYLA
1.	Şu anda sakinim	(1)	(2)	(3)	(4)
2.	Kendimi emniyette hissediyorum	(1)	(2)	(3)	(4)
3.	Su anda sınırlarım gergin	(1)	(2)	(3)	(4)
4.	Pişmanlık duygusu içindeyim	(1)	(2)	(3)	(4)
5.	Şu anda huzur içindeyim	(1)	(2)	(3)	(4)
6.	Şu anda hiç keyfim yok	(1)	(2)	(3)	(4)
7.	Başıma geleceklerden endişe ediyorum	(1)	(2)	(3)	(4)
8.	Kendimi dinlenmiş hissediyorum	(1)	(2)	(3)	(4)
9.	Şu anda kaygılıyım	(1)	(2)	(3)	(4)
10.	Kendimi rahat hissediyorum	(1)	(2)	(3)	(4)
11.	Kendime güvenim var	(1)	(2)	(3)	(4)
12.	Şu anda asabım bozuk	(1)	(2)	(3)	(4)
13.	Çok sinirliyim	(1)	(2)	(3)	(4)
14.	Sınırlarımın çok gergin olduğunu hissediyorum	(1)	(2)	(3)	(4)
15.	Kendimi rahatlamış hissediyorum	(1)	(2)	(3)	(4)
16.	Şu anda halimden memnunum	(1)	(2)	(3)	(4)
17.	Şu anda endişeliyim	(1)	(2)	(3)	(4)
18.	Heyecandan kendimi şaşkına dönmüş hissediyorum	(1)	(2)	(3)	(4)
19.	Şu anda sevinçliyim	(1)	(2)	(3)	(4)
20.	Şu anda keyfim yerinde.	(1)	(2)	(3)	(4)

Aşağıda kişilerin kendilerine ait duygularını anlatmada kullandıkları birtakım ifadeler verilmiştir. Her ifadeyi okuyun, sonra da genel olarak nasıl hissettiğinizi ifadelerin sağ tarafındaki kutucuklardan uygun olanını işaretlemek suretiyle belirtin. Doğru ya da yanlış cevap yoktur. Herhangi bir ifadenin üzerinde fazla zaman sarfetmeksizin genel olarak nasıl hissettiğinizi gösteren cevabı işaretleyin.

		Hemen hemen hiçbir zaman	Bazen	Çok zaman	Hemen her zaman
21.	Genellikle keyfim yerindedir	(1)	(2)	(3)	(4)
22.	Genellikle çabuk yorulurum	(1)	(2)	(3)	(4)
23.	Genellikle kolay ağlarım	(1)	(2)	(3)	(4)
24.	Başkaları kadar mutlu olmak isterim	(1)	(2)	(3)	(4)
25.	Çabuk karar veremediğim için fırsatları kaçıırım	(1)	(2)	(3)	(4)
26.	Kendimi dinlenmiş hissedirim	(1)	(2)	(3)	(4)
27.	Genellikle sakin, kendine hakim ve soğukkanlıyım	(1)	(2)	(3)	(4)
28.	Güçlüklerin yenemeyeceğim kadar biriktiğini hissedirim	(1)	(2)	(3)	(4)
29.	Önemsiz şeyler hakkında endişelenirim	(1)	(2)	(3)	(4)
30.	Genellikle mutluyum	(1)	(2)	(3)	(4)
31.	Her şeyi ciddiye alır ve endişelenirim	(1)	(2)	(3)	(4)
32.	Genellikle kendime güvenim yoktur	(1)	(2)	(3)	(4)
33.	Genellikle kendimi emniyette hissedirim	(1)	(2)	(3)	(4)
34.	Sıkıntılı ve güç durumlarla karşılaşmaktan kaçınırım	(1)	(2)	(3)	(4)
35.	Genellikle kendimi hüzünlü hissedirim	(1)	(2)	(3)	(4)
36.	Genellikle hayatımdan memnunum	(1)	(2)	(3)	(4)
37.	Olur olmaz düşünceler beni rahatsız eder	(1)	(2)	(3)	(4)
38.	Hayal kırıklıklarımı öylesine ciddiye alırım ki hiç unutamam	(1)	(2)	(3)	(4)
39.	Aklı başında ve kararlı bir insanım	(1)	(2)	(3)	(4)
40.	Son zamanlarda kafama takılan konular beni tedirgin eder	(1)	(2)	(3)	(4)

**Appendix B – 16 Separate Problem Solving Task**

**1. Soru:**

$$319 \times 169 = ???$$

**2. Soru:** Zıt anlamlı kelimeleri eşleştirelim.

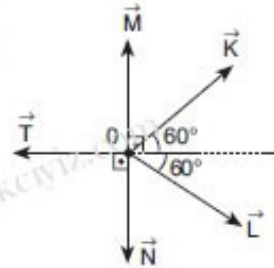
Tekil – Aşağı – Açık – Gider – Kapalı – Azami – Artı – Alıcı – Kısaltmak  
– Duru – Gerçek – Unutmak – Düş – Islak – Ağır – Yukarı – Pasif –  
Bulanık – Gelir – Hafif – Satıcı – Kuru – Asgari – Eksik – Aktif – Çürük –  
Üvey – Özel – Uzatmak – Dağıtmak – Perakende – Kurnaz – Tutsak –  
Sağlam – Hatırlamak – Sol – Çoğul – Resmi – Toptan – Saf – Öz – Sağ –  
Toplamak

**3. Soru:**

69 dan geriye 2 şer 2 şer ve 3 er 3 er sayalım.

**4. Soru**

Şekildeki K , L, M vektörlerinin büyüklüğü eşit ve 4 birim, N ve T vektörlerinin büyüklüğü eşit ve 3 birim olduğuna göre, vektörlerin bileşkesinin büyüklüğü kaç birimdir?



- A)  $\sqrt{2}$       B)  $\sqrt{3}$       C) 2      D)  $\sqrt{5}$       E)  $\sqrt{7}$

**5. Soru:** Anlam bütünlüğünü bozan

Herkes mesleğinde ve karanlık birçok hayatında yoldan geçmeye mecburdur. Ancak bu yolları elinde bir meşalelerinden olmadan geçmeye çalışmaktansa, başkalarının tecrübe ışık faydalanarak yürümek daha kolay ve karlı değil midir?



**6. Soru:** Verilen harfler ile anlamlı bir kelime oluřturalım.

• A - N - A - M - R - T - K - A - A

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**7. Soru :** ‘e’ ve ‘a’ harflerini sayalım

Uykusuzluk hastalığı; uykuya dalmada sorun yaşama, uyuduktan kısa bir süre sonra uyanıp yeniden uykuya dalamama, ışığa aşırı duyarlı olma ve uykuda dinlenememedir. Teşhisi için henüz tıbbi bir test kullanılmazsa da sıklıkla rastlanan hastalıklardandır. İlerleyen yaşlarda ortaya çıkma ihtimali artan bu hastalık, gençlerde de görülebilmekte ayrıca kadınlarda erkeklere oranla iki kat fazla ortaya çıkmaktadır. Uykusuzluk hastalığı; hafıza problemleri, sinirlilik ve dikkat dağınıklığı gibi sorunlara yol açmaktadır. Uzun yıllar hastalığın başlıca nedeninin tansiyon ve stres olduğu düşünölmüşse de son arařtırmalar, hastalığın ortaya çıkmasında fizyolojik ve psikolojik pek çok etkenin olabileceğini göstermektedir.

**8. Soru:**

Z harfinden geriye L harfine kadar alfabetik bir şekilde sayalım.

**9. Soru:** Sayıları ardışık şekilde takip ederek anlamlı kelimeyi bulalım.

16-n/12-u/2-ü/14-s/8-y/10-r /5-e /1-h / 18-z /3-p/  
15-a/11-m /7-i/4-l/ 6-t/  
9-o/13-ş/17-ı/

**10.Soru:** Sağ kutuda bulunan kelimeleri bulmaca içinde bulalım.

k k s x a g x k i k i r d a k  
o f o b l f x m b k u h z c g  
n f s a v v b i i g a j o r z  
t p d g e b u r s o b n h a y  
c a c o o n m r h k c k b j q  
a k w j l c r p u p e c x h j  
t c y d s a u i t h d l s z o  
a i c t k s s o z p k i e f c  
r g b l a z d i t h t a w t g  
d e m h s q h k m r k e l e s  
a r k k v c m a m h t c m p e  
m v l e m q t x h u c r e v r  
a o e v m s o l u n u m g e u  
r s n l x i v b a k t e r i m  
j v f s m e k e w e w q f d b

kikirdak  
serum  
lenf  
alveol  
hucre  
kan  
kas  
dolasim  
kalp  
kemik  
solunum  
akciger  
iskelet  
bakteri  
atardamar

**11.Soru**

$$\left(\frac{8}{3} - \frac{9}{4}\right)\left(4 + \frac{4}{5}\right)$$

**işleminin sonucu kaçtır?**

**12.Soru:** Karışık halde duran kelimelerden anlamlı bir cümle oluşturalım.

Tanpınar – tanımamıştır – bir – onlardan – eserleri – yalnız – bağlantısı – yıllarından – hayatının – üzerinde – bağlantısı – duran – denilebilir ki – güzel – önemsememiş – değerini – edebiyat – sonuna kadar – varlığını – daha üstün – gençlik

**13.Soru:** Boş bırakılan yerleri anlamlı kelimelerle dolduralım.

Para, gerçek ----- değildir. O, sadece ihtiyaçların giderilmesine vasıta olduğu için değerlidir. Bir çölün ortasında, harareten yanan bir ----- için birkaç damla soğuk su, bir torba altından çok ----- değerlidir.

**14.Soru:** Kelimelerin sondan ikinci harflerini kullanarak bir kelime oluşturalım.

Hislerimizi etkileyen yüz ifadeleri üzerinde yapılan çalışmalar, iyi durumdayken bile pek fazla gülmediğimizi ortaya çıkarmıştır. Oysa gülümseme ve gülme, biyolojik süreci etkileyerek kendimizi daha iyi

**15.Soru:** Aşağıda 1' den 100' e kadar olan tüm sayıların yazılı olduğu bir kart verilmiştir. Sadece 2' nin katı olan sayılar, hem 2' nin hem 3' ün katı olan sayılardan kaç fazladır?

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

**16.Soru:** Verilen harfler ile anlamlı bir kelime oluřturalım.

• A - H - Ü - N - M - İ - T - A - E - N

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
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