Effect of Interference in Autobiographical Memory

by

Büşra Tanrıverdi Özkan

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Büşra Tanrıverdi Özkan

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Committee Members:

_____

Prof. Sami Gülgöz

_____

Asst. Prof. Tilbe Göksun

_____

Asst. Prof. Çağla Aydın

Date: _____

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ABSTRACT

Interference plays an important role in reorganization of memories. Yet, the direction of this reorganization was left unexplained as well as the factors that lead to interference in autobiographical memory. This study aimed at investigating the types of memories that are more or less susceptible to interference. One hundred and forty-seven participants reported two holiday memories (one recent and one remote), and one accident memory in the first session, and retrieved the same event memories in the second session. In the beginning of the second session, participants were randomly assigned to four different interference conditions. One group had interference that was induced by telling a third holiday memory of theirs. One group was asked to imagine a future holiday. In third group, interference was manipulated by making participants read another person's holiday memory. In the last experimental group, interference was induced by asking participants to read the school memory of another person. The control group did not have any interference condition. Results revealed that the groups did not differ in terms of how they remembered the details, thus our interference manipulations were not successful. Recent memories compared to remote memories were found to be less prone to errors in remembering month, year, and other people in the event details. Also, repeated events (holidays) compared to unique events (accidents) were more prone to errors in remembering year and other people details, but less prone to errors in retrieving month details. Place detail was protected against interference in all types of memories.

Key words: interference, recent memory, remote memory, repeated memory, unique memory

ÖZET

Ket vurma belleğin yeniden düzenlenmesinde önemli bir rol üstlenir. Yakın zamanda ket vurmanın bu düzenleyici rolünün otobiyografik belleği nasıl etkilediği ve ket vurmaya yol açan faktörler tespit edilememiştir. Bu araştırma, farklı otobiyografik anıların ket vurmaya açık olup olmadığını araştırmaktadır. Bu araştırmada, yüz kırk yedi katılımcı bir yakın zaman tatili, bir geçmiş zaman tatili ve bir kaza anısı anlatmıştır. Katılımcılar aynı olayları bir hafta arayla iki kez anlatmış ve ikinci hatırlamanın başında rastsal gruplara ayrılarak farklı ket vurma süreçlerine maruz bırakılmışlardır. Buna göre, bir grup yaşadıkları ama daha önce anlatmadıkları bir tatil anısını anlatmış, ikinci bir grup da gelecekte yaşayacakları bir tatili hayal ederek bu hayali anlatmıştır. Üçüncü grup kendilerine ait olmayan bir tatil anısını, dördüncü grup ise kendilerine ait olmayan bir okul anısını okuyarak bu anılar hakkında konuşmuştur. Ket vurma süreçlerinin sonunda her gruptaki katılımcılar birinci hafta anlattıkları olayları yeniden anlatmıştır. Kontrol grubu olan beşinci grup ise hiçbir ket vurma sürecine maruz bırakılmadan bir önceki hafta anlattıkları anılarını yeniden anlatmıştır. Araştırma sonuçlarına göre, farklı ket vurma süreçlerine maruz kalan gruplar arasında hatırlanan anıların bozulmasına ilişkin bir farklılık bulunmamıştır. Fakat gruplar birleştirilerek yapılan analizler göstermiştir ki, yakın zamandaki tatil anılarına ait ay, zaman ve olaydaki diğer insanlara ilişkin detaylar, geçmiş zamanlı tatil anılarına göre daha az hata ile hatırlanmıştır. Ayrıca, katılımcıların tekrarlanan olaylara (tatil) ait yıl ve olaydaki diğer insanlara ilişkin detayları tekrarlanmayan olaylara (kaza) göre daha fazla değiştirdiği, olaya ait ay detayını ise daha az değiştirdiği gözlenmiştir. Olaya ilişkin mekan bilgisi hiçbir anı türünde değişiklik göstermemiştir.

Anahtar sözcükler: ket vurma, tekrarlanan olaylar, benzersiz olaylar, yakın tarihli olaylar, uzak tarihli olaylar

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CHAPTER 1

INTRODUCTION

1.1. Effect of Interference in Autobiographical Memory

Autobiographical memories are the memories of personal experiences, recollected with vivid details and belief in their accuracy (Rubin, 1998; Rubin, Schrauf, & Greenberg, 2003). Autobiographical memory research mostly focused on the factors that make a memory retrievable, however there is also the phenomenon of forgetting. Memory literature in general suggests that there are two sources of forgetting: delay and interference. Although both can result in forgetting a memory completely, there is a high likelihood of reconstruction of memories due to interfering information (Craig, Della Sala & Dewar, 2014). The way reconstruction works, however, remains uninvestigated in the current literature. What details change in time and what remains same? What are the factors that make an autobiographical memory open to reconstruction? This research is an attempt to investigate these questions.

1.2. Reconstructing Autobiographical Memories

It is well known that one's autobiographical memory is changeable by suggestion and implantation (Loftus and Pickrell, 1995). However, the question of whether autobiographical memories can change without any explicit effort remains unanswered. Retroactive interference is one promising paradigm to investigate this question, and it recently attracted the attention of autobiographical memory researchers. Several studies investigated the changes in memory reports due to interference. In one study, St. Jacques and Schacter (2013) found that selectively reactivating personal memories interferes with the subsequent retrieval processes, and it can both enhance or distort the relevant memory. In this study, they investigated whether reactivation affects the subsequent retrieval of a personal memory in three sessions each of which was conducted 48 hours after the previous one. In the first session, they took participants to a museum tour while wearing a camera, which was set to

automatically take photographs every 15 seconds. The tour involved 32 events, each having six stops, e.g. at a point where there is a video display. There were two versions of the tour; both versions involved the same events yet they differed in the last two stops in each event. Participants in one version of the tour were unaware of the alternate stops in the other version. These alternate stops had similar contents, e.g. one video or another, and were used as lures in the recognition test. In the second session, reactivation phase, they showed participants the movie of the 32 events from the tour such that the movie of an event involved six photos of the stops in that event. For each event, after the presentation of relevant movie, participants were shown a photo of an alternate stop and asked to report whether that photo was related to that event by a yes/no judgment. The researchers also manipulated the order of reactivation in this session. That is, in some of the trials, the six photos within a movie were in the correct temporal order that the participants experienced during the tour; in the remaining trials the photos of the events were presented in the incorrect order. In the third session, participants were given pairs of target photos of the stops and asked to make a yes/no judgment as to whether the stops in a pair were experienced together during the tour. Pairs involved either the photos of an event in their correct temporal order (reactivation match), the photos of an event in the incorrect temporal order (reactivation mismatch), or the photos in the pair that were not shown during reactivation in the second session (baseline). The researchers found that reactivation increased the proportion of false alarms more than the proportion of hits compared to baseline. Reactivation-match condition led to higher false alarm and hit rates than the reactivation-mismatch condition. The authors explained the difference in false alarm rates in two conditions by the increased difficulty of source monitoring in the reactivation-match condition. Since the post-event information, the photos shown after the movies, were more similar to target information in the reactivation-match condition than in the reactivation-mismatch conditions, source monitoring became harder for participants. On the other hand,

the increase in the proportion of hits in the reactivation-match condition is explained by the fact that the matching reactivation cues better reminds the original episode more than the mismatching cues do.

Craig and colleagues also investigated changes in memory due to interference caused by autobiographical memory retrieval or future event imagination (Craig et. al., 2014). In one condition, the researchers had their participants study a list of words, and then administered an immediate recall of the list. Following the recall, participants were given a 9-minute delay, awake rest with no task. Then participants attended the second condition, which was similar to the first one with only a difference in the delay period during which they were given ten familiar audible cues (e.g. a cat's meow) and asked to either recall an autobiographical memory about the cue, or imagine an autobiographical event related to the cue. They then had to describe their memories or imagined scenarios aloud, as vivid and detailed as possible. Yet in a third condition, participants again learned a list of words, then their memory for the list was immediately tested. After the test, they had a 9-minutes delay during which they completed a picture search task. In this task, participants were first given short, familiar audible cues (e.g. the sound of a clock), two second later they were shown a detailed real-world photo and asked to find the cued object. During this task, they had to describe what they were searching for and where they were searching for it. At the end of the third condition, the researchers administered a surprise recall for the three wordlists, which was followed by a recall of cued pictures and memories. In this experiment, the second and the third delay conditions represented two different interference conditions. Interference was induced by retrieval of personal memories in the second condition; whereas it was induced by an online cognitive task in the third condition. The researchers found that memory retention for the lists were higher in the awake rest condition compared to interference conditions. The results of this experiment suggested that the two interference conditions equally decreased the

retention of the word lists. However, researchers noted that this could be related to the required verbal reports in both conditions, and suggested that if participants complete the picture search and autobiographical memory retrieval/imagination tasks in silence, the verbalization effect might have been controlled for. For that purpose, they conducted a second experiment with the same procedure with only a difference in the two interference conditions; participants did not provide verbal reports during the delays. They confirmed their hypothesis that verbalization during the picture search task increased the interference effect of the task, and when participants did not verbalize what they did, their memory for the word list increased, although not at the level of retention in the awake rest condition. This second experiment showed that interference induced by the retrieval of autobiographical memories or imagination of future autobiographical events resulted in the worst episodic memory.

These studies exemplify that there is a reconstruction in the episodic and autobiographical memories, which is a result of the post-reactivation information. Both autobiographical and episodic information are shown to interfere with each other. Schacter argued that reconstruction and resulted distortions in memory reflects adaptive processes (Schacter 2012; Schacter, Guerin & St Jacques 2011). Schacter and his colleagues reviewed the research investigating memory errors due to imagination inflation and post-event misinformation (2011). On the basis of constructive episodic simulation hypothesis, they claimed that a primary function of episodic memory is to prepare the person to a similar future event, by reconstructing previously stored information. Imagination is an important part of this future event prediction, and is strongly related to the memory of previous events. Distortions due to imagination inflation, then, are the cost of this adaptive constructive process. Similarly, they argued, misinformation errors reflect the dynamic and adaptive memory system, which is able to incorporate relevant information to the previous memory traces. They inferred that we have a dynamic memory system because it is adaptive for

predicting the future and for well-being. Updating the memory and incorporating new information allow people to predict a future behavior, thus help them cope with the stresses for self-evaluation. Memory distortions that occur during the updating processes are the costs of this adaptive system. Although adaptation argument offers an explanation to why we observe a reorganization of memories, the question of what factors make autobiographical memories susceptible or resistant to interference remains unanswered.

1.3. Factors That Makes Autobiographical Memories Susceptible to Interference

1.3.1. Age of the Memory

Age of the memory is an important factor that may impact the susceptibility of the memory to interference. Are recent and remote memories more or less prone to interference? Understanding the mechanism underlying the recent versus remote memories may offer help before answering this question. Standard consolidation theories suggest that memories are first hippocampus-dependent and through consolidation, they are transmitted to cortical regions, thus their retrieval becomes hippocampus independent (Frankland & Bontempi, 2005). By this, it is inferred that memories are stabilized as they age, and they stay in that stable state. On the other hand, recent memories are in a more labile state, as they are hippocampus-dependent and still undergoing consolidation processes. However, multiple trace theory (MTT) suggests that memories are organized in the hippocampal-cortical network and retrieval of the older memories still requires hippocampal activity (Nadel & Moscovitch, 1997). Both models agree that there is a reorganization of memories through reactivation of memory traces, yet they argue for different mechanisms for this reorganization. Although the standard model claims that this reactivation does not require the activation of hippocampus, MTT argues that it involves hippocampus and related network within the medial temporal lobe (Frankland & Bontempi, 2005).

This distinction between the two models is especially relevant in discussing how recent versus remote memories are reorganized and whether one or the other is more or less susceptible to interference. MTT explains that episodic memories are registered into multiple traces, and if well-consolidated they are associated with greater number of traces as a result of which, their retrieval becomes easier. Since they are multiply represented in different brain circuits, both hippocampal and cortical, they become resistant to loss due to a distortion in the hippocampal tissue. On the other hand, recent memories are more vulnerable and have higher likelihood to be forgotten in case of hippocampal damage since they are not registered into multiple traces yet (Nadel & Moscovitch, 1997). Although this difference has been suggested for the memory loss due to brain damage, namely retrograde amnesia, it is noteworthy that the same distinction could apply when there is no brain damage but the memories of recent and remote events are reorganized by interference. By following the assumptions of MTT, one would expect memories from earlier past to be less prone to interference compared to memories of recent events. Yet, most studies of autobiographical memory found that recent memories are well remembered. Yet, these studies investigated only the rate of remembrance from earliest and recent periods, and did not consider the rate of reconstruction of earliest versus recent memories.

One study that considered the effect of interference on episodic memory found that interference was similarly disruptive for both recent versus remote memories (Wichert, Wolf & Schwabe, 2011). The researchers invited the participants to the lab for three experimental days. In Day 1, participants learnt neutral and emotional pictures. In Day 2, they were divided into four groups. In the reactivation and relearning group, participants first retrieved pictures from Day1 (reactivation phase) and then learned a new set of pictures. In the new learning group, participants learned the new set of pictures without retrieving the prior memory. Participants in the reactivation group only retrieved the pictures from Day 1 in their minds.

Lastly, the control group neither retrieved their memory for previous pictures, nor learned new material. Day 2 was manipulated across participants; it took place 1 day, 7 days, or 28 days after Day 1 to see the effect of time on memory's susceptibility to interference and reconsolidation. In Day 3, which was 24 hours later than Day 2, participants completed a free recall test for the pictures they learned on Day 1. They found that interference impaired memories both in 1-day (recent) and 28-days (remote) intervals, yet did not have an impact in 7-days ("middle-aged") interval. On the other hand, increased vulnerability to interference after retrieval, which suggests the reorganization through reconsolidation, was present only for the middle-aged memories. The authors explained the difference between the remote and middle aged memories by the assumption that remote memories are already registered into cortical traces and their retrieval did not necessitate the engagement of the hippocampus. Therefore, they did not become susceptible to interference the way the middle-aged memories became, which were still under progress for reconsolidation. This is in line with the prediction of both standard model and the MTT. However, their finding regarding the difference between recent and middle-aged memories remains unexplained as we would expect recent memories to be similarly susceptible to interference. Thus, the reorganization of recent versus remote memories and their susceptibility to interference are still not resolved and need further investigation.

1.3.2. Uniqueness or Repetitiveness of Autobiographical Memory

An equally important distinction is between repeated and unique event memories. Script theory suggests that an abstract representation of event script is developed as a result of repeated experience of the same event (Connolly & Price, 2005). This abstract representation allows the person to incorporate new information to the existing memory of the repeated events as long as the new information is consistent with the characteristics of the past

experiences (Connolly & Price, 2005). Source monitoring theory also accounts for the differences between the unique versus repeated event memories. Repeated events, as they share many of the details and have commonalities in the event structure, have higher associations among themselves (Roberts, 2000; Connolly & Price, 2005). This brings controversy to the source of remembered details of an event; whether it is from one specific event or the other becomes uncertain at one point and thus the person starts attributing highly associated details to the events based on familiarity. The more familiar an event detail is, the more likely that there will be error in the detail-event association in memory. At this point, it is suggested that the person is likely to self-generate other highly associable but personally non-experienced event details as well, which makes the event memory open to suggestibility. In fact, Connolly and Price (2005) tested the two theories on an investigation of how suggestible children's memories are when they experienced single versus repeated events. They found that children who experienced an event repeatedly became more vulnerable to suggestions regarding what happened during the event. The authors concluded that this was due to the high associations between the details of repeatedly experienced and suggested events. This study provides basis for investigating unique versus repeated events in personal autobiographical memory in terms of their proneness to interference. Following the assumptions of both source monitoring and script theories, and the results of the reported study, one would assume that repeated events would be more prone to errors due to interference.

In addition, the question of repeated versus unique memories may also be examined on the basis of the assumptions of the two consolidation theories discussed above. Yet this examination would lead to contradictory predictions regarding the susceptibility to interference of unique events and repeated events. For one thing, repeated events share many highly associated details and one common abstract representation. These high associations

may mean multiple traces in the memory organization, whereby the memory for the repeated event would be well consolidated and very strong. If so, we would expect that memory for repeated events would be highly resistant to interference. On the other hand, repeated events, as suggested by script theory may have an abstract representation of the common event category. As a result, each time an event from that category is experienced, the shared abstract representation is retrieved and the experienced event is bound into it. In other words, each time a similar event is experienced, the encoding for it would necessitate the retrieval of previously experienced similar events, which brings the script and the represented events into a labile state, open to reorganization. Similar to recent events, we would expect repeated events to be more susceptible to interference. Following this line of thought, unique events then would be less prone to error due to interference, because they are experienced only once and not retrieved from the memory repeatedly, thus protected against the destructive effects of reorganization.

1.3.3. The Role of Rehearsal

How often a memory trace is rehearsed and whether rehearsal predicts susceptibility to interference is another question that needs investigation. Rehearsal is the frequency of recall of a particular event. It is usually considered to be in two ways: by thinking of the event and by talking about it to another person (Boyacioglu & Akfirat, 2014). Previous studies mostly focused on the sharing aspect of rehearsal, that is how much one talks about his memory in a social context, and found that it has the functions of increasing the sociability of the person, helping the individual to find meaning in his past (Sutin & Robins, 2007), and it is related to the perceived loneliness of the person (Luchetti & Sutin, 2016). In those studies, besides being restricted to the sharing aspect, rehearsal was only explored as a characteristic of the memories. The proposed study suggests that rehearsal must be considered as a means of both

thinking of and sharing an event, and the frequency of rehearsal could be a predictor of interference. Similar to the repeated events, it is hard to form a one-directional hypothesis regarding how rehearsal will affect a memory's proneness to change. Yet, assuming that high rehearsal will bring a memory trace into a labile state more often, it is likely that these memories will be more prone to change due to interference. That is, with each rehearsal the memory will become open to reorganization and to incorporating further details into the memory trace. By this logic, it is assumed that memories that are less rehearsed will not be as likely to get affected by interference. However, the reverse effects are still possible. High rehearsal might result in a better consolidated memory trace, therefore may be more strengthened. This is in fact in line with the multiple trace theory. Whether it be one way or the other, these hypotheses regarding how rehearsal will affect a memory's proneness to interference needs investigation and is intended in this proposed study.

1.4. Present Study

In the current study, interference is manipulated across individuals in four conditions. In one condition, interference is induced by individual's own memory from similar past experiences. In another condition, it is induced by imagination of a future experience. In the third and fourth conditions interference is induced by giving event memories of other people to the participants; the only difference between these two groups being that one group read a memory of similar content whereas the other read an irrelevant memory. A control group was added to the study to see the effect of time alone on the organization of reactivated memories (see Figure 1 for an illustration of the procedure for groups). The effect of interference is measured as the amount of change that occurred in the phenomenological characteristics of the event memories: time, place and other people involved in the events.

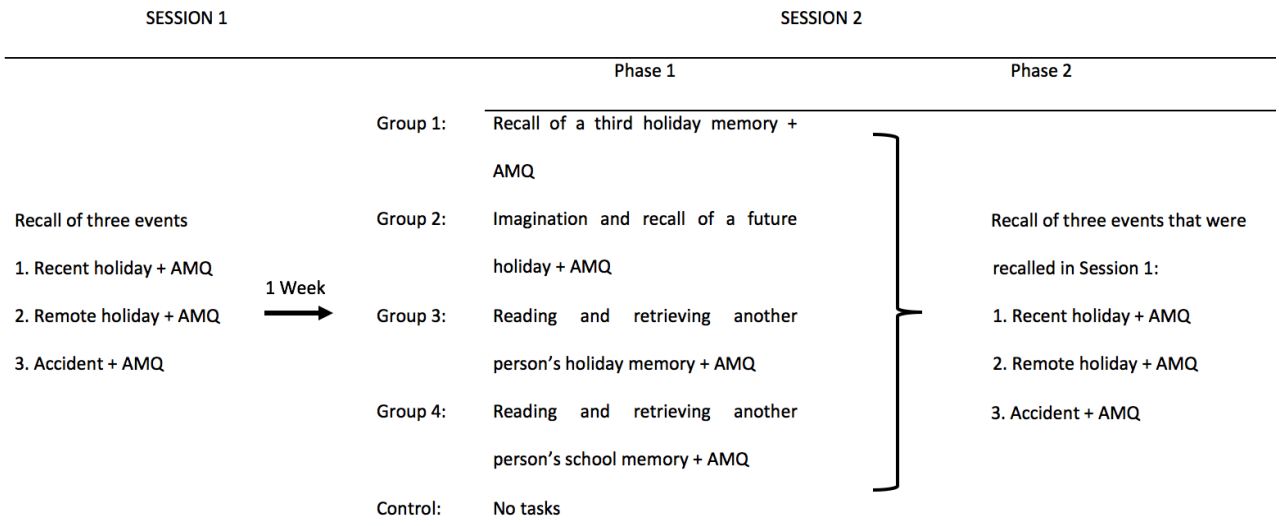

Figure 1. Illustration of experimental design. AMQ: Autobiographical Memory Questionnaire.

1.4.1. Hypotheses

Before going into how different factors affect the susceptibility of a memory to interference, there are two hypothesis regarding how well and vivid the episodic details of an event memory is remembered when recent versus remote events, and repeated versus unique events are compared. Episodic details refer to the time (day, month, and year), place and other people information in an event. The two hypotheses are as the following:

1. Recent holidays are hypothesized to be remembered with more vivid episodic details compared to remote holidays.

2. Accident memories are hypothesized to be remembered with more vivid episodic details compared to repeated events.

There are two alternative hypotheses that predict the way age of the memory will impact the memory's susceptibility to interference:

3. The time, place and other people details in the remote holidays will remain same across the two recall sessions, but these details in the recent holidays will change across the two recalls.
4. Remote holidays, compared to recent holidays, are expected to show more changes in the episodic details from the first session to the second.

The first hypothesis of the two alternatives is based on the multiple trace theory (MTT), which predicts that memories from earlier past (remote memories) will be less prone to interference compared to memories of the recent events. However, the standard consolidation theory predicts that recent event memories will be less prone to interference than the remote memories. The details of time, place and other people in the recent holiday are therefore expected to be remembered better, and these details will remain protected across the two sessions. Thus, the second hypothesis is an alternative to the first hypothesis, based on the standard consolidation theory.

Similar to the ones regarding the age of the memory, there are alternative approaches to how the uniqueness-repetitiveness of a memory will affect its proneness to interference. Three of them, script theory, source monitoring theory, and the standard consolidation theory, predicts the same outcome, but explains the results by different mechanisms. The prediction of these three theories are as the following:
5. The episodic details (time, place and other people information) of holiday memories will change more compared to the episodic details of accident memories.

Multiple trace theory, on the other hand, suggests that repeated events will be better protected against interference as they are registered into multiple traces, which will help protection of the details from reorganization due to interference. The prediction of the multiple trace theory then is the opposite of the other three theories:
6. The episodic details of holiday events will remain same across the two retrieval sessions whereas episodic details of accident memories will change.

7. Rehearsal will predict the changes in the time, place and other people details in all types of memories. The more rehearsed a memory is, the better the details will be protected against interference.

8. Emotional intensity will predict the changes in the time, place and other people details of all memories. The higher the emotional intensity is, the lower the proneness to interference.

All previous hypotheses are to test the effect of time in between the two recall sessions, that is, how the details of different types of memories change when there is a time interval between the two recalls. However, the current study also aimed at investigating how different interference conditions affect the change in the episodic details of a memory. There are five predictions regarding the impact of different interference manipulations based on the groups:

9. The first group, the group who recalled their own holiday memories as a source of interference is expected to show the highest interference effects. That is, the episodic details of their holiday memories will change more compared to the other groups.

10. The second group is expected to have the second highest effect of interference, and change the details of the holiday memories more than other three groups. This group is where participants imagine and talk about a future holiday. This is predicted on the basis of the findings that future imagination and past remembrance shares the similar cognitive processes and requires similar underlying brain activity (Addis & Schacter, 2009).

11. The third group, who read the holiday memory of another person is expected to have the lessened interference effect compared to the first two groups. Since what they read is still a holiday memory, it is hypothesized that there could be impact of the category of the event.

12. The fourth group, as they read a school memory of another person, is expected to have the lowest interference effect, besides the control group. This is expected since school memory is

a different category from holiday memory, which would result in increased likelihood of interference.

13. The control groups is only expected to show the effect of time, as they were not undergone through an interference manipulation.

CHAPTER 2

METHOD

2.1. Participants and Design

A hundred and forty-seven undergraduate students from Koc University subject pool, 94 females, and 53 males, participated in the study in exchange for course credit. The only exclusion criterion was not being a native speaker of Turkish, since the study was conducted in Turkish. The study was conducted in the Koç University Research in Autobiographical Memory (KURAM) laboratory by the first author and three undergraduate assistants. All participants provided their consent for their participation.

The study used a mixed design. Participants came to lab two times with one-week interval. They were randomly assigned to one of the five groups. The group was the between subject factor. The first session and the second part of the second session was same for all the groups. The comparison between participants' reports between the two sessions was the within subject factor.

2.2. Measures

An autobiographical memory questionnaire (AMQ; see Appendix 1) was created to measure the details of the memories. This questionnaire involved questions about time, place, and other people involved, which were the details expected to change across different recalls. Confidence questions were added for time and place details, as it is well known from flashbulb studies that confidence is negatively related to the accuracy of memory when the person's memory is open to suggestions (Kurdi, Diaz, Wilmuth, Friedman & Banaji, 2017; Roediger & DeSoto, 2014). The participants were asked to rate their confidence for these details on a 5-point Likert scale. The questionnaire also involved questions regarding the frequency of similar events, frequency of rehearsal and emotional intensity (then and now) of the event. These questions were in the form of a 5-point Likert scale in order to control

variability among participants. Different versions of the questionnaire were created for different groups, to be used in the first phase of the second session (see Appendices 1, 2, 3, and 4). A last version was created, with the addition of rehearsal questions for the one-week interval between the sessions, to be used in the second phase of the study (see Appendix 5). All of the items used in the questionnaire were derived from the memory experiences questionnaire (MEQ; Sutin & Robins, 2007) and a modified version of memory characteristics questionnaire (MCQ; Öner & Gülgöz, 2016; Johnson, Foley, Suengas & Raye, 1998).

2.3. Procedure

Students were invited to lab twice with a one-week interval. The procedure was the same for all participants, regardless of the groups, in the first session. They were asked to tell three event memories in the following order: a holiday event memory from the last five years, a holiday event memory from at least ten years ago, and a car accident memory. Participants who did not experience any accident were asked to tell an emergency room experience. Following their recall of the event memory, they were asked questions about the phenomenological characteristics of the event (see *Measures*).

Holiday memories were chosen to represent repeated events as many of them expected to share similar components. The two holiday memories were asked from different time periods to make sure that participants tell both a recent and a remote memory. The accident memory, on the other hand, was included to represent the unique events, as we did not expect participants to experience many car accidents. As some of the participants in the beginning of data collection reported that they did not have any experience of car accident, we added a fourth memory category, emergency room experience, to make sure that all participants talk about a unique event, and also that they all recall equal number of events. In order to control

for the repetitiveness versus uniqueness of the experienced events, we still asked our participants how often they experienced a similar event.

The second session involved two phases. In the first phase, participants in different groups went through different interference manipulations. The first group was asked to tell a holiday event memory which they did not tell in the first session. The second group was asked to imagine a future holiday for one to two minutes, and then told about their imagined holiday. The third group was given an event holiday memory of a third person, which was found online, and asked to read and then tell the story (see Appendix 6). The fourth group was asked to read a school memory for a third person, which was also found online, and tell the story to the experimenter (see Appendix 7). All four groups, after taking about their memories or the events they read about, were asked about the phenomenological characteristics for the specific memory. Each group were asked questions specific to their interference conditions (see Appendix 1, 2, 3 and 4). The control group did not have any task to do at this phase, and immediately started the second phase.

In the second phase of the second session, all participants were asked to re-tell the event memories they told in the first session, in the order of their first recall. The experimenters specifically asked them to tell the stories as if they were telling it for the first time, to make sure that they talk about the event as detailed as they would in the first session. Those who did not remember the event they told in the first session were reminded by keywords. Keywords were no more than three words and included no hint about any of the phenomenological characteristic. At the end of each event report, participants were again asked about the phenomenological details of the event, as in the first session. This time, they were also asked about the frequency of thinking and talking about the event within the last week. These questions were added to control if participants had talked to anyone about the events, and thus changed any of the details. If a participant told that s/he talked about the

event within the last week, s/he was further asked whether s/he talked about it with the persons involved in the event (see Appendix 5). The experiment ended when participants finished retelling all the events.

CHAPTER 3

RESULTS

3.1. Descriptive Analyses

Table 1 shows the distribution of the percentages and the frequencies of answers in all three dependent variables, time, place and other people, which were reported in each memory type. It is note-worthy that not all participants were able to tell an accident event, so they were asked to tell an emergency room experience instead. However, 18 participants recalled neither an accident nor an emergency room memory. In the end, all accident and emergency room events were recoded as accident events, as they were both considered in the unique events category and were included to make sure every participant reported three event memories. Time variable was divided into three parts as day, month, and year, as the number of participants recalling any one detail differed across the memories and across the sessions.

Table 1. Distribution of the percentages and the frequency of reported time, place, and other people information in all three types of events.

	Session1						Session2					
	Recent Holiday		Remote Holiday		Accident		Recent Holiday		Remote Holiday		Accident	
	Perc.	Fre.	Perc.	Fre.	Perc.	Fre.	Perc.	Fre.	Perc.	Fre.	Perc.	Fre.
Event Day	30.6	45	17	25	19	28	42.2	62	19.7	29	25.9	38
Event Month	89.1	131	64.6	95	56.5	83	93.2	137	63.2	93	63.3	93
Event Year	97.9	144	85	125	75.5	111	94.6	139	82.9	122	77.6	114
Event Place	100	147	100	147	87.1	128	100	147	100	147	87.1	128
Others in Event	100	147	100	147	87.1	128	100	147	100	147	87.1	128

3.1.1. Phenomenological Characteristics

The measures of the phenomenological characteristics for recent holiday, remote holiday, and accident memories were calculated by averaging the ratings and the answers given to the questions in the first session. Time since the event variable was calculated by subtracting the year of the event from the year of the recall (2017). Rehearsal was calculated by averaging the frequency of sharing of and thinking about the event. Table 2 shows the means and standard deviations of each item for all three event memories. In 40 participants, similar event frequency was recoded by two undergraduate research assistants based on the frequencies of similar events questions in the autobiographical memory questionnaire (see Appendix 1). If participants reported that they experienced a similar event less frequently than 3 times in their lives, their memory's frequency for similar events were recoded as *minimum*. If they reported that they had experienced similar events in between three and ten times, their frequency was recoded as *average*. If, however, the participants reported that they experienced a similar event more often than ten times, their frequency was recoded as *maximum*. In only accident events, 18 participants with a recoding of average or maximum were excluded in the analyses, since the accident events were expected to represent unique experiences. The correlation between the two coders were 0.98 for recent holidays, 0.97 for remote holidays, and 0.93 for accident. Since the inter-rater reliability was high for all event types, one of the coders recoded the rest of the data and her recoding was included in further analysis. Table 3 shows the frequency of similar events experienced by the participants in all three types of memories. Note that the frequencies of average and maximum similar event experiences are left blanked in the accident memory, where 18 participants were removed from the data.

Table 2. Means and standard deviations of the items in Autobiographical Memory Questionnaire.

	Recent Holiday		Remote Holiday		Accident	
	M	SD	M	SD	M	SD
Time Since the Event	1.79	1.25	12.66	2.27	7.37	5.37
Confidence in Time	4.18	1.0	2.59	1.28	2.98	1.43
Confidence in Place	4.78	.65	4.54	.91	4.74	.75
Rehearsal	2.50	.82	2.18	.83	2.35	.97
Emotional Intensity Then	3.59	1.17	3.86	1.17	4.07	1.14
Emotional Intensity Now	2.70	1.26	2.52	1.31	2.41	1.21

Table 3. Cross-tabulations for the frequency of similar event experiences.

	Minimum		Average		Maximum	
	Perc.	Fre.	Perc.	Fre.	Perc.	Fre.
Recent Holiday	63.9	94	17.7	26	16.3	24
Remote Holiday	70.1	103	12.2	18	8.8	13
Accident	75.5	111	-	-	-	-

3.1.2. Time

Time has been divided into three components as day, month, and year. For each participant, all components were coded for the first and the second sessions. Then, each component was recoded so as to find the difference in the information participants provided for the two sessions. The data were recoded in two different ways. In the first version, for all

day, month, and year components, if the information was the same across the two sessions, it was recoded as *same*; if it was completely different, it was recoded as *different*; and if the information from session 1 to session 2 has differed in terms of details, being more or less specific, it was recoded as *similar*. This recoding has been completed for all day, month, and year information separately by the first author and one undergraduate research assistant, who also assisted in the data collection. The correlation between the two coders were 0.99, 0.79, and 0.99 respectively for day, month and year variables in the recent holiday for the first session, thus the recoding of the first author was used in further testing. Table 4 shows the frequency of the same, similar and different answers for all these items in all three types of events, distinguishing the way the answers changed across the two recall sessions. In the second version of recoding, the data coded as similar and different in the first version were merged into "different" category because the frequencies in each category were too low for the analyses and reasoning that even though the responses in the similar category contained some common information in their initial and later responses, the answer had been changed. Note that in the second recoding, the accident memories of 18 participants were excluded from the data as frequency of similar event experience was high in their accident memories, which was supposed to be a unique experience. Two participants were also removed from the recent holiday data since they did not follow the instructions. Lastly, 13 participants were excluded in the remote holiday category, as they failed to follow the instructions. Table 5 shows the frequency and percentages of this second version of the recoded data. Based on the hypotheses being tested, either first or the second version of recoded data were used (see Analyses of Hypotheses).

Table 4. Cross-tabulations for the changes in the memory from the first recall to the second in the first version of data recoding.

	Repeated Events												Unique Events					
	Recent Holiday						Remote Holiday						Accident					
	Same		Similar		Different		Same		Similar		Different		Same		Similar		Different	
	Per.	Fre.	Per.	Fre.	Per.	Fre.	Per.	Fre.	Per.	Fre.	Per.	Fre.	Per.	Fre.	Per.	Fre.	Per.	Fre.
Day	29.7	33	22.5	25	47.7	53	29.5	13	6.8	3	63.6	28	21.2	11	9.6	5	69.2	36
Month	79.5	116	8.2	12	12.3	18	58.4	73	17.6	22	24	30	48.7	58	11.7	14	39.5	47
Year	77.9	113	4.1	6	17.9	26	47.8	65	12.5	17	39.7	54	53.9	69	7.0	9	39.1	50
Place	52.1	76	45.2	66	2.7	4	61.9	83	35.1	47	2.9	4	63.7	81	33.1	42	3.1	4
Others	61.6	90	34.9	51	3.4	5	54.5	73	44	59	1.5	2	75.9	98	19.4	25	4.6	6

Table 5. Cross-tabulations for the changes in the memory from the first recall to the second in the second version of data recoding.

	Repeated Events								Unique Events			
	Recent Holiday				Remote Holiday				Accident			
	Same		Different		Same		Different		Same		Different	
	Per.	Fre.	Per.	Fre.	Per.	Fre.	Per.	Fre.	Per.	Fre.	Per.	Fre.
Day	29.7	33	70.2	78	29.5	13	70.5	31	25	10	75	30
Month	79.5	116	20.5	30	58.5	72	41.5	51	49.5	50	50.5	51
Year	77.9	113	22.1	32	47	63	52.9	71	51.8	57	48.2	53
Place	52.1	76	47.9	70	61.9	83	38.1	51	63.3	69	38.1	40
Others	61.6	90	38.4	56	54.5	73	45.5	61	77.5	86	22.5	25

3.1.3. Place

The participants were asked to tell where the event had happened. This information was coded as place in the two sessions. Similar to the time variable, place variable was also recoded in to ways. First, participants' answers to the place questions were recoded categorically as either same, similar, or different. If the participants gave exactly the same information in the two sessions, their answers were recoded as *same*. If they gave the same place information, but with little changes in details, such as if they did omissions from or additions to the place description at the first session, or if they gave more specific or more general information, their answers were recoded as *similar*. If they gave information of place that is completely different from the information given at the first session, their answers were recoded as *different*. Recoding was completed by the author and one undergraduate research assistant, who also assisted in the data collection, separately. The correlation between the two coders were 0.85 for the place variable in the recent holiday for the first session, thus the recoding of the author was used in further testing. Table 4 shows the percentages and the frequency of changes in place variable across the two recall sessions, for all three types of memories. In the second recoding, the data coded as similar and different in the first version were merged into "different" category as they both represent a *change* in the answer. Table 5 shows the frequency and percentages of this second version of the recoding. Based on the hypotheses being tested, either first or the second version of recoded data were used (see Analyses of Hypotheses).

3.1.4. People

The participants were asked to tell who else was involved in the event. This information was coded as others in the two sessions. People variable was also recoded in two ways. In the first recoding, participants' answers to the "others" questions were recoded into

one of the three categories: same, similar, or different. If the participants gave exactly the same information in the two sessions, their answers were recoded as *same*. If they gave the same information, but with little changes in details, such as if they did omissions from or additions to their answers at the first session, or if they gave more specific or more general information, their answers were recoded as *similar*. If they gave information of others that is completely different from the information given at the first session, their answers were recoded as *different*. Recoding was completed by the author and one undergraduate research assistant, who also assisted in the data collection, separately. The correlation between the two coders were 0.82 for the "others" variable in the recent holiday for the first session, thus the recoding of the first author was used in further testing. Table 4 shows the percentage and frequency of changes in the others variable across the two sessions, for all three types of memories. In the second recoding, the data coded as similar and different in the first version were merged into the "different" category as they still represent a *change* in the answer. Table 5 shows the frequency and percentages of this second version of the recoding. Based on the hypotheses being tested, either first or the second version of recoded data were used (see Analyses of Hypotheses).

3.2. Analyses of Hypotheses

The first hypotheses predicted that recent events would be remembered with more vivid episodic details, which are time, place and other people in the event. The hypothesis was partially supported by the data. Participants remembered the day 13.6% more, month 24.5% more, and year 12.9% more in recent compared to remote holidays in the first session. However, place and other people in the event were remembered by all participants for both recent and remote holiday memories (see Table 1). A Chi-square analysis was performed to test whether the difference in frequency of time reports between recent versus remote

holidays is significant. The test revealed that this difference in frequency was not significant, $X^2(2, N=147) = 3.72, p>.05$.

The second hypothesis predicted that episodic details would be better remembered in accident memories (unique) versus holiday memories (repeated events). Table 1 shows that repeated events are retrieved with a higher percentage in both time, place and other people in the event information. Specifically, participants remembered the day 4.8% more, the month 20.4%, and the year 16% more in holiday memories than in accident memories. Chi square analysis revealed that the frequency of recall of any of the time components was not significantly different between holiday versus accident memories $X^2 = 0.47, p>.05$. Place and other people information were both remembered 12.9% more in repeated events, but whether this difference was significant was not possible to test as the frequencies were same Chi-square analysis revealed no results.

The third and the fourth hypotheses predicted that age of the memory would affect the remembrance of episodic details in recent versus remote holidays. Similarly, the fifth and the sixth hypotheses predicted that episodic details will change differently in holidays (repeated) versus accident (unique) memories. Chi-square analysis was performed to test these hypotheses for time, place, and others variables separately. These analyses used the second version of the recoded data (see Table 5). A Chi-square performed to test the differences in time revealed that day information did not change from the first recall to the second in any of the event types ($X^2(2, N=147) = 0.4, p> .05$); month information changed significantly from the first recall to the second ($X^2(2, N=147) = 26.021, p< .001, n^2=.288$) in all types of the events; and year information significantly differed from the first recall to the second in all event types ($X^2(2, N=147) = 33.534, p<.001, n^2=.275$). A Chi-square test was also performed to test whether the place information changed in any of the event types across the two recall sessions. The test revealed that place information did not significantly change for any of the

event types, $X^2(2, N=147) = 4.573$, $p > .05$. Finally, a Chi-square analysis revealed that other people information in all event types changed significantly from the first recall to the second, $X^2(2, N=147) = 16.466$, $p < .0001$, $n^2 = .201$. Table 5 shows the frequency of changes in all time, place and others variables.

The seventh hypothesis predicted that rehearsal would predict the changes in episodic details in all event types. Specifically, it was predicted that the change in details would decrease as the rehearsal increased. Similarly, the eight hypothesis predicted that emotional intensity of the event at the time it was experienced (from now on will be referred as "emotional intensity") would affect the change in the episodic details. These two hypotheses were tested by Univariate ANOVAs performed separately for recent holiday, remote holiday and accident memories, and for different time, place and others variables, using the first version of the recoded data (Table 4). Since the rehearsal within the last week would better predict the changes that occurred in the one-week interval, the "rehearsal in the last week" was calculated by averaging the sharing of and thinking about the event questions from the autobiographical memory questionnaire (see Appendix 1), and was also used in the analyses. Rehearsal (the general rehearsal score, see Table 1), rehearsal in the last week, and emotional intensity were added as covariates in these analyses.

First, a set of Univariate ANOVAs were performed to test whether the effect of rehearsal, rehearsal in the last week, and emotional intensity on the change in time variables (day, month and year). The test revealed that the effect of rehearsal on day information was not significant in recent holiday ($F(1, 104) = .817$, $p = .368$, $\eta_p^2 = .008$), in remote holiday ($F(1, 38) = .275$, $p = .603$, $\eta_p^2 = .007$), and in accident memories ($F(1, 35) = 1.104$, $p = .301$, $\eta_p^2 = .031$). The effect of rehearsal in the last week on day information was not also significant in recent holiday ($F(1, 104) = .187$, $p = .667$, $\eta_p^2 = .002$), in remote holiday ($F(1, 38) = 1.06$, $p = .310$, $\eta_p^2 = .027$), but was significant in accident memories ($F(1, 35) = 5.51$, $p = .025$, $\eta_p^2 = .136$).

Although non-significant, rehearsal in the last week and the change in day detail were positively correlated in accidents, Pearson's $r(40)=.278$, $p=.082$. In a similar vein, the effect of emotional intensity was not significant in recent holiday ($F(1, 104) = 3.65$, $p=.059$, $\eta_p^2=.034$), in remote holiday ($F(1, 38) =.289$, $p=.594$, $\eta_p^2=.008$), and in accident memories ($F(1, 35) =.25$, $p=.62$, $\eta_p^2=.007$).

Another Univariate ANOVA was performed to test the effect of rehearsal, rehearsal in the last week, and emotional intensity on the change in month information. The test revealed that the effect of rehearsal on month information was not significant in recent holiday ($F(1, 138) =.321$, $p=.572$, $\eta_p^2=.002$), in remote holiday ($F(1, 116) =.123$, $p=.727$, $\eta_p^2=.001$), but was significant in accident memories ($F(1, 96) =4.368$, $p=.039$, $\eta_p^2=.044$). Rehearsal and the change in month detail were positively correlated in accidents, Pearson's $r(101)=.222$, $p=.026$. The effect of rehearsal in the last week was not significant in recent holiday ($F(1, 138) =.000$, $p=1.0$, $\eta_p^2=.000$), in remote holiday ($F(1, 116) =1.545$, $p=.113$, $\eta_p^2=.021$), or in accident memories ($F(1, 96) =.293$, $p=.589$, $\eta_p^2=.003$). The effect of emotional intensity was also not significant in recent holiday ($F(1, 138) =.355$, $p=.552$, $\eta_p^2=.003$), in remote holiday ($F(1, 116) =.385$, $p=.536$, $\eta_p^2=.003$), and in accident memories ($F(1, 96) =1.825$, $p=.18$, $\eta_p^2=.019$).

Univariate ANOVA was also performed to test the effect of rehearsal, rehearsal in the last week, and emotional intensity on change in the year of the memory, and revealed that the effect of rehearsal on year information was not significant in recent holiday ($F(1, 138) =1.121$, $p=.292$, $\eta_p^2=.008$), in remote holiday ($F(1, 124) =1.371$, $p=.244$, $\eta_p^2=.011$), and in accident memories ($F(1, 104) =.124$, $p=.726$, $\eta_p^2=.001$). The effect of rehearsal in the last week on the change in year detail was not significant in recent holiday ($F(1, 138) =.45$, $p=.503$, $\eta_p^2=.003$), in remote holiday ($F(1, 124) =.016$, $p=.899$, $\eta_p^2=.000$), or in the accident memories ($F(1, 104) =.17$, $p=.681$, $\eta_p^2=.002$). The effect of emotional intensity on year

information was also not significant in recent holiday ($F(1, 138) = .292$, $p = .59$, $\eta_p^2 = .002$), remote holiday ($F(1, 124) = .003$, $p = .956$, $\eta_p^2 = .000$), but it was significant in accident memories ($F(1, 104) = 6.409$, $p = .013$, $\eta_p^2 = .058$). Emotional intensity and the change in year detail were positively correlated in accidents, Pearson's $r(110) = .241$, $p = .011$.

Another set of Univariate ANOVAs were performed to test the effect of rehearsal, rehearsal in the last week, and emotional intensity on the changes in place and others variables. The tests revealed that the effect of rehearsal on change in place was not significant in recent holiday ($F(1, 138) = .00$, $p = .984$, $\eta_p^2 = .000$), in remote holiday ($F(1, 124) = 1.498$, $p = .223$, $\eta_p^2 = .012$), or in accident memories ($F(1, 103) = .001$, $p = .976$, $\eta_p^2 = .000$). The effect of rehearsal in the last week on the change in place detail was not significant in recent holiday ($F(1, 138) = .117$, $p = .733$, $\eta_p^2 = .001$), in remote holiday ($F(1, 124) = 1.43$, $p = .234$, $\eta_p^2 = .011$), or in the accident memories ($F(1, 103) = .529$, $p = .469$, $\eta_p^2 = .005$). The effect of emotional intensity on the change in place detail was not also significant in recent holiday ($F(1, 138) = .323$, $p = .571$, $\eta_p^2 = .002$), or in accident memories ($F(1, 103) = .122$, $p = .728$, $\eta_p^2 = .001$), but was significant in remote holiday memories ($F(1, 124) = 6.759$, $p = .01$, $\eta_p^2 = .052$). Emotional intensity and change in place information was positively correlated in remote holiday, Pearson's $r(134) = .194$, $p = .025$.

The tests revealed that the effect of rehearsal on change in others variable was not significant in recent holiday ($F(1, 138) = 2.181$, $p = .142$, $\eta_p^2 = .016$), in remote holiday ($F(1, 124) = .041$, $p = .839$, $\eta_p^2 = .000$), or in accident memories ($F(1, 104) = .472$, $p = .494$, $\eta_p^2 = .005$). The effect of rehearsal in the last week on the change in others variable was not significant in recent holiday ($F(1, 138) = .742$, $p = .39$, $\eta_p^2 = .005$), in remote holiday ($F(1, 124) = .852$, $p = .358$, $\eta_p^2 = .007$), or in the accident memories ($F(1, 104) = 1.691$, $p = .196$, $\eta_p^2 = .016$). The effect of emotional intensity on the change in others variable was also not significant in recent

holiday ($F(1, 138) = .184$, $p = .668$, $\eta_p^2 = .001$), or in remote holiday ($F(1, 124) = 1.152$, $p = .285$, $\eta_p^2 = .009$), or in accident memories ($F(1, 104) = .006$, $p = .938$, $\eta_p^2 = .000$).

The last five hypotheses were about the effects of different interference conditions on autobiographical memory, and were tested by Chi-square analyses, using the second version of data recoding (see Table 5). A series of Chi-square analyses were performed to test whether the day, month, and year information changed in different experimental groups. Analysis for the day differences revealed that groups were not significantly different in terms of how they remembered the day information in recent holiday ($X^2(4, N=111) = .305$, $p = .989$), in remote holiday ($X^2(4, N=44) = 2.366$, $p = .669$), but they differed significantly in accident memories ($X^2(4, N=40) = 12.07$, $p = .017$, $n^2 = .481$). 68.4% of the fourth group, where interference was induced by reading a school memory, remembered the day of their own accident memories differently in the second session than in the first session, but the other groups did not differ from one another. Table 6 shows the percentages and the frequencies of the same and different answers in day questions given by each group.

Table 6. Cross-tabulations for changes in Day details from first recall session to the second, in five experimental groups.

	Recent Holiday				Remote Holiday				Accident			
	Day				Day				Day			
	Same		Different		Same		Different		Same		Different	
	Per.	Fre.	Per.	Fre.	Per.	Fre.	Per.	Fre.	Per.	Fre.	Per.	Fre.
Group 1	31.5	6	68.4	13	16.7	1	83.3	5	40	2	60	3
Group 2	28	7	72	18	25	3	75	9	12.5	1	87.5	7
Group 3	26.1	6	73.9	17	33.3	2	66.7	4	0	0	100	5
Group 4	31.8	7	68.2	15	25	3	75	9	13.3	2	86.7	13
Group 5	31.8	7	68.2	15	50	4	50	4	71.4	5	28.6	2

A Chi-square analysis to test how groups remembered the month information revealed that they were significantly different in terms of how they remember the month information, in recent holiday (X^2(4, N=146) =11.994, p=.017, n^2=.276) and in remote holiday (X^2(4, N=123) =9.92, p=.042, n^2=.273), but not in accident events (X^2(4, N=101) =3.491, p=.479). These differences were due to the fact that 86.6% of the third group, where interference was induced by reading a holiday memory, remembered the month of their own recent holiday differently in the second session than in the first session and the other groups did not differ in how they remembered the month information in their recent holidays. The third group also showed a difference in remembering the month of the remote holiday such that 53.8% of the third group remembered it differently than they did in the first session. 52% of the first group, where interference was induced by asking participants recall another holiday memory of theirs in the second session, also remembered the month of the remote holiday differently than their first recall. Half of the second group (50%), where interference was induced by imagining a future holiday, remembered the month of their remote holidays differently than their first recall. Table 7 shows the percentages and the frequencies of the same and different answers in month questions given by each group.

Table 7. Cross-tabulations for changes in Month details from first recall session to the second, in five experimental groups.

	Recent Holiday				Remote Holiday				Accident			
	Month				Month				Month			
	Same		Different		Same		Different		Same		Different	
	Per.	Fre.	Per.	Fre.	Per.	Fre.	Per.	Fre.	Per.	Fre.	Per.	Fre.
Group 1	78.6	22	21.4	6	48	12	52	13	47.4	9	52.6	10
Group 2	80	24	20	6	50	12	50	12	61.1	11	38.9	7
Group 3	58.6	17	41.4	12	46.2	12	53.8	14	50	10	50	10
Group 4	93.1	27	6.9	2	68	17	32	8	34.8	8	65.2	15
Group 5	86.7	26	13.3	4	82.6	19	17.4	4	57.1	12	42.9	9

The analyses for year information revealed no significant difference among the groups for recent holiday (X^2(4, N=145) =5.099, p=.277), remote holiday (X^2(4, N=134) =2.198, p=.699), or accident memories (X^2(4, N=110) =4.217, p=.377). Table 8 shows the percentages and the frequencies of the same and different answers in year questions given by each group.

Table 8. Cross-tabulations for changes in Year details from first recall session to the second, in five experimental groups.

	Recent Holiday				Remote Holiday				Accident			
	Year				Year				Year			
	Same		Different		Same		Different		Same		Different	
	Per.	Fre.	Per.	Fre.	Per.	Fre.	Per.	Fre.	Per.	Fre.	Per.	Fre.
Group 1	85.7	24	14.3	4	35.7	10	64.3	18	50	11	50	11
Group 2	70	21	30	9	48.1	13	51.9	14	36.8	7	63.2	12
Group 3	79.3	23	20.7	6	51.9	14	48.1	13	65	13	35	7
Group 4	67.9	19	31.2	9	46.2	12	53.8	14	60.9	14	39.1	9
Group 5	86.7	26	13.3	4	53.8	14	46.2	12	46.2	12	53.8	14

A set of chi-square analyses were then performed to test whether the place information changed across the two recall sessions in different experimental groups. The tests revealed that groups did not differ significantly from one another; the place information did not change across different times in recent holidays (X^2(4, N=146) =1.633, p=.803), in remote holidays (X^2(4, N=134) =.711, p=.95), or in accident memories (X^2(4, N=109) =1.86, p=.761). Table 9 shows the percentages and the frequencies of the same and different answers in place questions given by each group.

Table 9. Cross-tabulations for changes in Place details from first recall session to the second, in five experimental groups.

	Recent Holiday				Remote Holiday				Accident			
	Place				Place				Place			
	Same		Different		Same		Different		Same		Different	
	Per.	Fre.	Per.	Fre.	Per.	Fre.	Per.	Fre.	Per.	Fre.	Per.	Fre.
Group 1	42.9	12	57.1	16	67.9	19	32.1	9	52.2	12	47.8	11
Group 2	50	15	50	15	63	17	37	10	68.4	13	31.6	6
Group 3	55.2	16	44.8	13	59.3	16	40.7	11	65	13	35	7
Group 4	58.6	17	41.4	12	57.7	15	42.3	11	69.6	16	30.4	7
Group 5	53.3	16	46.7	14	61.5	16	38.5	10	62.5	15	37.5	9

A final set of Chi-square analyses were performed to test whether the other people information changed across the two recall sessions in different experimental groups. The tests revealed that groups did not differ significantly from one another; the other people information did not change across different times in recent holidays (X^2(4, N=146) =6.871, p=.143), in remote holidays (X^2(4, N=134) =3.444, p=.486), or in accident memories (X^2(4, N=111) =4.021, p=.403). Table 10 shows the percentages and the frequencies of the same and different answers in other people in the events questions given by each group.

Table 10. Cross-tabulations for changes in Other People information from first recall session to the second, in five experimental groups.

	Recent Holiday				Remote Holiday				Accident			
	Others				Others				Others			
	Same		Different		Same		Different		Same		Different	
	Per.	Fre.	Per.	Fre.	Per.	Fre.	Per.	Fre.	Per.	Fre.	Per.	Fre.
Group 1	78.6	22	21.4	6	64.3	18	35.7	10	87	20	13	3
Group 2	56.7	17	43.3	13	55.6	15	44.4	12	84.2	16	15.8	3
Group 3	69	20	31	9	44.4	12	55.6	15	80	16	20	4
Group 4	48.3	14	51.7	15	46.2	12	53.8	14	65.2	15	34.8	8
Group 5	56.7	17	43.3	13	61.5	16	38.5	10	73.1	19	26.9	7

3.3. Other Analyses

The effect of age of the memory on remembering the episodic details of the memories was also investigated by Univariate ANOVAs, where the event age was entered as a covariate. The event age was calculated as the time that passed since the event had occurred (*time since the event*). Time since the event variable was entered as a covariate along with rehearsal, rehearsal in the last week, and emotional intensity variables, to predict its effect on the change in specific time, place and other people details of an event memory.

In the recent holiday memories, the effect of time since the event was not significant on day change ($F(1,104)=.609$, $p=.437$, $\eta_p^2=.006$), on month change ($F(1,138)=.357$, $p=.551$, $\eta_p^2=.003$), on place change ($F(1,138)=.577$, $p=.449$, $\eta_p^2=.004$), and on the change in other people detail ($F(1,138)=.445$, $p=.506$, $\eta_p^2=.003$), but was significant on year change ($F(1,138)=11.544$, $p=.001$, $\eta_p^2=.077$). Time since the event variable was negatively correlated with the change in year detail in recent holiday memories, Pearson's $r(146)=-.282$, $p=.001$.

In the remote holiday memories, the effect of time since the event was not significant on day change ($F(1,38)=.02$, $p=.889$, $\eta_p^2=.001$), on month change ($F(1,116)=.097$, $p=.756$, $\eta_p^2=.001$), on year change ($F(1,124)=.133$, $p=.716$, $\eta_p^2=.001$), on place change ($F(1,124)=.614$, $p=.435$, $\eta_p^2=.005$), and on the change in other people detail ($F(1,124)=.004$, $p=.949$, $\eta_p^2=.000$).

In the accident memories, the effect of time since the event was not significant on day change ($F(1,35)=1.527$, $p=.225$, $\eta_p^2=.042$), on place change ($F(1,103)=.092$, $p=.762$, $\eta_p^2=.001$), and on the change in other people detail ($F(1,104)=.742$, $p=.391$, $\eta_p^2=.007$), but was significant on month change ($F(1,96)=9.004$, $p=.003$, $\eta_p^2=.086$), and on year change ($F(1,104)=17.883$, $p<.001$, $\eta_p^2=.147$). Time since the event variable was negatively correlated with the change in month and year details in accident memories, Pearson's $r(101)=-.343$, $p=.000$, and Pearson's $r(110)=-.403$, $p<.001$ respectively.

CHAPTER 4

DISCUSSION

The present study explored how different types of autobiographical memories are affected by interference, that was induced in a one-week interval. Two particular memory types were compared based on the age of the memory and the repetitiveness of the memory: recent versus remote holiday memories, and holiday (repeated) versus accident (unique) memories. Episodic details of autobiographical memories, such as the time and place the events were experienced, and the people that were involved in the events, were investigated. The phenomenological characteristics of the events, such as rehearsal and emotional intensity of the event were also examined.

4.1. Phenomenological Characteristics of the Events

In the first session, recent holidays were remembered with more vivid time (all day, month, and year) details and with the highest confidence in time, compared to remote holidays and accidents. Participants recalled more day details in recent holidays than accident memories than remote holidays. The frequency of remembered month and year details were the highest in recent holidays, higher in remote holidays, and the lowest in accidents. Participants had a higher confidence in the time of the accidents than in the time of remote holidays. Event place and the people involved in the event were equally well-remembered in both recent and remote holidays, but both information were slightly lost in accident memories. Interestingly, however, the participants' confidence in place information was higher in accident memories compared to remote holidays, although it was lower than that of in the recent holidays. Recent holidays were more rehearsed compared to accident memories, which were more rehearsed than remote holidays. Emotional intensity that was felt when the event was experienced was the highest in accidents, and was higher in remote holidays than in recent holidays. However, the emotional intensity that was felt during the recall followed the

opposite trend, as it was the highest in recent holidays, and higher in remote holidays than in accidents.

Interestingly, the frequency of reported day, month and year information were changed in the second session, in all types of memories. Participants recalled the day of the events more in the second recall, with recent holidays having the highest increase in the frequency of day reports, which was followed by the accidents, and then by the remote holidays. When it came to remembering month information, however, the frequency of recalling month detail increased in recent holidays and accidents, but slightly decreased in remote memories. The frequency of the reported year information was, on the other hand, decreased in the recent and remote holidays, but increased in accidents.

The first hypothesis was only partially supported by the data as the time detail was better remembered in recent holiday compared to remote holiday. However, the second part of the hypothesis was not supported by the data. That is, the participants remembered the place and the other people involved in the event equally well in the recent and remote holidays.

The second hypothesis that assumed that the unique memories would be remembered with more vivid details compared to repeated event memories, was not supported by the data. The only time detail that was remembered more in accident memories was the day information, however, its frequency was only higher than that of the remote memories, as the day detail was remembered most in the recent holidays. Also, accident memories were remembered with the lowest frequency in month, year, place and other people information in comparison to both holiday memories. Thus, in fact, the opposite of what was hypothesized was observed.

While considering the differences in frequencies of event details recalled by the participants in two different recall sessions, the quantity of change, is important, the main

interest in this research was to investigate on the nature of the changes that take place between the two recall sessions, the quality of change.

4.2. The Impact of Age of the Memory: Recent versus Remote Holidays

4.2.1. Time

There were two alternative hypotheses regarding the way the age of memory will affect the remembered time details. One hypothesis predicted that the time details will change in the recent holidays when participants recalled the event in the second session for the second time, but they will remain unchanged in the remote holidays. This hypothesis was based on the assumptions of the multiple trace theory (MTT), which suggested that earlier memories are well organized in multiple memory traces, which would ease their retrieval, along with the episodic details. The other hypothesis was based on the standard consolidation theory, which suggests that the recall of episodic details in remote memories will be harder as they no longer depend on the hippocampus and they are semanticized when registered into cortical networks (Frankland & Bontempi, 2005). Thus, this second hypothesis predicted that the time details of the recent holidays will be better preserved while these details change more in the remote holidays. The second hypothesis was supported by the data for the month and year details, that is, these details were changed less between the two sessions in recent holiday compared to remote holidays. The day information did not change between the two sessions in any of the event types. However, the day of the events were not remembered by most of the participants in the first hand, therefore the failure to find a change in day detail might be related to the lack of retrieval of it.

4.2.2. Place

Similar to the hypotheses about how the age of memory will affect the way time details are being remembered, there are also two hypotheses that would have predictions in

different directions regarding the way the place information will be affected by the age of the memory. Multiple trace theory again suggested that the place detail will change more in the recent holidays compared to remote holidays. The standard consolidation theories, however, predicted the opposite. Interestingly, the data supported neither of these theories. In fact, place detail did not change from the first recall to the second in either recent or remote memories. This could be due to the fact that holidays are mostly planned in a certain place, therefore the place information becomes distinct for most of the holidays.

4.2.3. People

Who else was involved in the event was another question that was investigated as one of the episodic details that would change across different retrievals. Similar to the time and place details, multiple trace theory suggested that the information about the other people involved in the event memory would change more in the recent than remote holidays. The standard consolidation theory on the other hand would predict the opposite, and expect that the information regarding who was involved in the event would change more in the remote holidays. The analyses showed that other people information changed more in the remote holidays than in the recent holidays. This finding can be explained by the standard consolidation theory. Since remote memories are registered into cortical networks, and no longer rely on the hippocampus, the memories get to be decontextualized more in time, whereby the episodic details become open to reorganization when the remote memories are retrieved after a long period with no recall (Yassa & Reagh, 2007).

The impact of age of the memory was also measured by the effect of time that passed since the event first occurred. The analyses revealed that in the recent holiday memories, the effect of time since the event was significant only on the change in year detail between the two recalls. It was found that the farther the event in time, the better the year detail was being

retrieved. This is different than, but not the opposite of, the finding that the year detail changed less in the recent holiday memories compared to remote holiday memories (see *Time* in this section). This latter finding could be related to the findings of Wichert et al (2011), that is, more recent and more remote memories are vulnerable to interference but the middle-aged memories are more protected. Similarly, the effect of time since the event was significant on the change in month and year details in accident memories, with a negative correlation. It is not unexpected that the more recent event memories are more vulnerable, since they are not well-consolidated yet, and are open to changes. It could be that within the last few years the memories are consolidated well, but the episodic details still remain within the memory trace, making the memory less vulnerable to changes. But later, as the memory gets older, to the tenth year for instance, it gets more semanticized and the memory trace starts losing episodic details, which in turn makes that older memory more vulnerable to interference again. It is noteworthy that both the current study and the study by Wichert and colleagues (2011) have found similar results. Future studies should investigate the effect of time more systematically to understand for how long a memory trace is vulnerable and/or protected.

4.3. The Impact of Uniqueness or Repetitiveness: Holiday versus Accident Memories

There are different approaches as to how repetitiveness or uniqueness of a memory will affect its proneness to interference. Script theory, source monitoring theory, and the standard consolidation theory suggested that as an event is repetitively experienced, it is highly likely that the details of the event would be confused and changed in different recalls. The script theory suggested this effect since repeated events share a core abstract script, which represents the common features of a repeated event category. Therefore, with each recall the event script is activated in the person's mind, making the specificity of the details likely to be lost and the memory to be semanticized, which increases the likelihood of

changing its episodic details. Source monitoring theory, on the other hand, suggests that as there are many shared features of repeated events, the source of an episodic detail might be harder to distinguish in the person's mind. That is, the questions of which event had happened in a particular time and place, and whom were involved in that event gets more difficult as the event is experienced repeatedly. The standard consolidation theory, similar to script theory, assumes that repeated events share a common abstract property, that would be activated in the person's mind every time a similar event is experienced. Through this reactivation, the previously experienced similar events come into a labile state where their memories could be re-organized. On the basis of these assumptions, it was hypothesized that episodic details of the holiday memories will change more than that of the accident memories. However, an alternative hypothesis was proposed on the basis of multiple trace theory, which suggests that the details of repeated events would be better preserved compared to those of unique memories, as they would be registered into multiple traces, which would enable the person to remember those details with ease.

4.3.1. Time

The two alternative hypotheses were tested and the analyses revealed that for the day information, none of the hypotheses were supported by the data. The day detail did not change from first recall to the second neither in holiday nor in accident memories. The month detail changed more in the accidents than in the holidays. But the year detail changed more in the holidays than in the accident. It seems that the hypothesis that was based on the multiple trace theory was supported for the month change, whereas the hypothesis that predicted the opposite effect was supported by the data for the year change. However, there is a caveat regarding the change in month detail, which is, the frequency of reporting the month detail was 7% lower in the first session than in the second session, therefore the results might have been affected by the differences in this frequency.

The observed changes in year detail in repeated events (holidays) could be explained by the standard consolidation theory, the script theory or the source monitoring theory. It is a limitation of the design of this study that distinguishing between these three theories is not possible. However, it is certain that the common aspects of a repeated event category are activated when people recall an event from that category, therefore the likelihood of confusing the details increases.

4.3.2. Place

Two alternative hypotheses were tested and the data showed that the place detail did not change across the two recall sessions neither in the holiday nor in the accident memories. Thus, none of the alternative hypotheses were supported by the current data. This could be due to the importance of place detail in the event categories that were specifically chosen in this particular study. Participants only recalled holiday or accident memories, where place information both would be very important in the general structure of the event. For the one thing, the holidays are planned in a specific place, therefore it is likely that participants particularly encoded place information into their event memory, which decreased the chance of changing this detail in later recalls. Similarly, accidents, although not planned as holidays, happen in a particular place that would probably be marked in the person's mind with a negative connotation. Thereby, it is likely that people better encode the place detail of an accident, compared to any other event happening daily, so that she remembers it well in different recalls.

4.3.3. People

The two alternative hypotheses were tested. The analyses showed that the other people detail changed more in the holidays than in the accidents. Multiple trace theory fails to explain this result, along with the results obtained for the change in the year detail, since both results are inconsistent with its predictions. It seems that repeated events are more open to

changes when it comes to the information about who else was involved in a particular event. In fact, it is likely that this information would be confused for the events experienced in holidays since the person might have had a few of similar experiences, each of which with a different person, and it gets harder to remember who was there with him when it actually happened. In this regard, the source monitoring theory seems to be best explaining the difference in the other people detail reported in two recall sessions.

4.4. Other Characteristics that Affect a Memory's Proneness to Interference

4.4.1. Rehearsal

It was predicted that the more rehearsed a memory is, the less the episodic details would change. This prediction was only confirmed for the change in month detail in accident memory. No significant effect of rehearsal was found on change in any of the episodic details, in any of the memory types. However, there is a caution that the amount of rehearsal of the memories were not as high as expected, in fact it was under the mean rehearsal score in all event types (see Table 2). Thus, it could be that the effect could have been observed if more rehearsed memories had been investigated.

4.4.2. Rehearsal in the Last Week

Rehearsal in the last week was expected to affect the amount of change in the episodic details of the memories due to the fact that if the participants thought of the events, or shared the events within the last week, the likelihood of new information incorporation would increase. Therefore, it was included as a covariate in the analyses. The effect of rehearsal in the last week on the change in day and month details was significant in accident memories. No other significant effect of rehearsal in the last week was observed.

4.4.3. Emotional Intensity

Emotional intensity, similar to rehearsal, was expected to affect the change in episodic details of the memories. It was predicted that as the emotional intensity increases the likelihood of changing the details would also increase. The analyses showed that emotional intensity did not affect the change in the day and month details. The effect of emotional intensity on the change in year detail was significant only in accident memories. Since day detail did not change across the two recalls in any of the memory types, this result is not unexpected. That the month detail, although changed significantly between the two recalls, was not affected by the emotional intensity might be explained by that emotional intensity was close to average in the events, with accident memories being a little higher in intensity than the two holidays. The fact that the effect of emotional intensity on the change in year detail was only observed in accidents might be explained by the higher ratings in emotional intensity in accident memories than the two holiday memories. Also, that emotional intensity affected the change in year but not the change in month detail in accidents could be related to the low frequency of month report (10% lower) than the frequency of year report. The effect of emotional intensity on the change in month details might have been observed if the participants all retrieved the month of their accident memories.

4.4.4. Effect of Different Interference Conditions

The interference effects were predicted differently for the groups, based on the interference manipulations that the groups have gone through. Interference was induced in the first group by making them remembering one of their previous holiday memories, besides the ones they told in the first recall session. Therefore, the effect of interference was expected to be the highest in this group. The second group was asked to imagine a future holiday and talk about it in the second session. Since future imagination has been shown to use the similar

brain networks with remembering past events, it was expected that the effect of interference due to imagination would be high in this group. Interference was induced by making participants read another person's memories in the third and fourth groups, with a difference in the content of the memories. The content of the memory that was read in the third group was a holiday memory whereas the content of the memory that was read in the fourth group was a school memory. Since the third group read a memory with a similar content (holiday), it was expected that the effect of interference would be higher in the third group than the fourth group. The last group was the control group, therefore no interference, change in details, were expected in this group.

The amount of change in the year, place and other people details was not different among the interference groups. When it came to the change in the day detail, the fourth group was different than the other groups, but only in the accident memory. This group had the higher change in day detail in accidents. This is interesting since interference was induced by a school event, not by an accident. But it might be that since the accident and school events are both different than holidays, the two events might have interfered with one another, whereas the holiday represented another distinct category of events. However, one must be cautious in interpreting this finding since the change in day detail was not significant when the groups were merged.

The groups were also different in remembering the month information. The third group, which read another person's holiday memory, was the only group who had changed the month detail in recent holiday. This group was also the highest to change the month detail in the remote holiday. The first group, where interference was induced by asking participants to recall another one of their holiday memories, had the second highest change in the month details in remote holiday. The second group, which was asked to imagine a future holiday followed the first group and had the lowest change in the month detail in the remote holidays.

The other groups, the fourth and the fifth, did not have a difference in the month information they provided between the two sessions.

In general, the groups did not differ from one another in changing the day, year, place and other people information. The only difference was observed in the amount of change in month detail in both holiday memories, but the observed difference did confirm the hypotheses only partially. It is surprising that the highest interference occurred in the third group, in which the interfering event memory was of another person's. First of all, this is against the prediction of multiple trace theory, which would predict the difference to be observed in accident memory rather than holiday memories. Source monitoring theory cannot account for this finding, too. This is because the source monitoring theory would predict the person to get confused about the source of an event detail, the event itself, but the interfering memory was not one of the participants' own memories in this case. The standard consolidation theory is also very unlikely to explain this difference, since the participants read and talked about the interfering event only once, and then they retrieved their own memories. Thereby, it is unlikely that the interference had occurred during consolidation of their own memories. The only plausible explanation could be offered by the script theory, that is, reading another person's holiday memory had activated the script of a holiday in the participants' minds, therefore interfered with the upcoming retrieval of their own memories. The difference between the first group and the second group in remembering the month detail was found to be as expected. Remembering one's own holiday memories increased the mistakes in remembering the month detail of a previously reported holiday memory more than imagining a future holiday. However, since this effect was only observed in the change of month detail, but not in any other episodic details, and only for remote holidays, this hypothesis, too, was partially confirmed. In fact, this might have been observed here only since it is harder to remember the month of an event that took place at least ten years ago.

4.5. Overall Discussion

The current study investigated the factors that affect the extent to which interference occurs in autobiographical memory. The age of memory was found to be an important factor that predicted the way memories were affected from interference. Remote memories, compared to recent ones, were found to be affected more from interference, that is, episodic details changed more in remote memories. This finding is inconsistent with the previous research by Wichert et al (2011), who found no difference between recent and remote memories in being disrupted by interference. However, it is consistent with the transformation hypothesis as Winocur and Moscowitch (2011) suggested in a recent review. Accordingly, memories when they are initially coded are hippocampus-dependent, and more context-specific, therefore the episodic details are more preserved. However, by the time they are consolidated, they lose their hippocampus-dependency, become more context-general, and become more semantic. This could explain why remote memories show more changes in episodic details, that is their episodic details are either already lost, or they are more open to confusion and suggestions compared to the episodic details of a recent memory.

The findings of the current study represent unique results as previous research did not investigate specifically the episodic details that change or remain same in time in autobiographical event memories. Although St. Jacques et al (2013) and Craig et al (2014) was able to show some changes that occur in autobiographical memory due to interfering information, these studies did not focus on the type of details that change. In this regard, the current study is a first attempt to make this investigation. In addition, Craig et al (2014) had found that control group with no interference had better memory retention compared to interference groups, but the current study did not find such a difference between the control and interference groups. This could be again because of the difference in the targeted memories of the two studies. Craig et al found this effect on episodic memory (specifically,

memory of word lists) whereas the current study was on autobiographical event memories. In this regard, current study is a new attempt to understand how different interference conditions, including control, affected autobiographical memory.

4.6. Limitations and Suggestions for Future Research

One issue that may have implications in the findings is that the interference was manipulated in the beginning of the second session, right before the second recall of the memories. It might have been better if the manipulations were completed in the end of the first session, so as to give time for their consolidation into the participants' memory. It might have been that during this consolidation the real difference between the different interference manipulations might have been observed. In fact, Winocur and Moscowitch (2011) suggested that the interference affects one's event memory when presented at the time that memory is being reviewed by the person. In addition, having five groups in the design resulted in a reduced number of participants in each group, therefore decreased the power of the Chi-square analyses that were performed. One future goal might be to increase the number of participants in these groups, or conduct the study with a few less groups. Lastly, participants were asked to retrieve holiday and accident memories, which have opposite emotional valence, although may have similar emotional intensity. The negative nature of accident memories might have impacted the participants' remembering besides the experimental protocols. Future studies should try a comparison between event categories that are also similar in emotional valence.

CHAPTER 5

CONCLUSION

Autobiographical memory has long been investigated yet there are unconvincing and inconsistent findings regarding how the details of an autobiographical memory is preserved or changed. This research might be accepted as a preliminary effort to investigate the specific event details that change and/or remain same across different retrievals of an event, particularly when exposed to interference. In this sense, this research was an exploratory attempt, and it is valuable in that it showed the details that changed and remained same in an event memory in different recall sessions. Besides, this study attempted to investigate the factors that may contribute to the change in or preservation of memory details, such as the age of the memory its characteristics on a repetitiveness-to-uniqueness scale, rehearsal and emotional intensity. One particular strength of this study was to test different alternative hypotheses in these investigations, which raised more questions for the future studies.

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APPENDICES

Appendix 1: Autobiographical Memory Questionnaire

EK 1: Otobiyografik Bellek Ölçeği

-Birinci Seans (İlk Görüşme)-

"Bu araştırma Koç Üniversitesi Psikoloji Bölümü tarafından yürütülmekte olup etik kurul onaylıdır. Vereceğiniz bilgiler, kimlik bilgilerinizin anonim tutulması şartı ile Psikoloji Araştırmaları laboratuvarında tutulacaktır ve üçüncü kişilerle paylaşılmayacaktır."

1. Hatırladığınız olayı, bu olay dahilinde neler olduğunu tanımlayınız.

2. Buna benzer bir olayı hangi sıklıkta yaşadınız? Lütfen sayı veriniz (hayatı boyunca kaç kez).

3. Buna benzer bir olayı hangi sıklıkta yaşadınız? Lütfen 1-5 arasında bir sıralama veriniz.

1 Hiçbir zaman	2 Nadiren	3 Ara Sıra	4 Çok sık	5 Her zaman

4. Bu olay ne zaman gerçekleşti? Lütfen gün/ay/yıl olarak tam tarih vermeye çalışınız.

5. Olayın söylediğiniz zamanda gerçekleştiğinden ne kadar eminsiniz?

1 Çok az	2	3 Orta	4	5 Çok fazla

6. Bu olay nerede gerçekleşti? Lütfen spesifik olunuz.

7. Olayın söylediğiniz yerde gerçekleştiğinden ne kadar eminsiniz?

1 Çok az	2	3 Orta	4	5 Çok fazla

8. Bu olay gerçekleştiğinde yanınızda kimler vardı/ kimler olaya dahildi?

9. Bu olayla ilgili kaç kez konuştunuz?

1 Hiç konuşmadım	2	3	4	5 Sürekli konuşurum

10. Bu olay hangi sıklıkta aklınıza geliyor?

1 Hiçbir zaman	2	3	4	5 Her zaman

11. Bu olay geçmişte yaşadığında duygusal olarak ne derece yoğundu?

1 Çok düşük	2	3 Orta	4	5 Çok yüksek

12. Bu olayı şu an hatırladığınızda duygusal olarak ne derece yoğun?

1 Çok düşük	2	3 Orta	4	5 Çok yüksek

Appendix 2: Memory Questionnaire for Imagined Future Holiday

EK 5: Gelecek Tatil Hayaline İlişkin Bellek Ölçeği

"Bu araştırma Koç Üniversitesi Psikoloji Bölümü tarafından yürütülmekte olup etik kurul onaylıdır. Vereceğiniz bilgiler, kimlik bilgilerinizin anonim tutulması şartı ile Psikoloji Araştırmaları laboratuvarında tutulacaktır ve üçüncü kişilerle paylaşılmayacaktır."

1. Gelecekte yaşayacağınız bir tatili hayal ediniz ve anlatınız.

2. Geçmişte bu hayaldekine benzer bir tatiliniz oldu mu?

3. Bu tatil sizce ne zaman gerçekleşecek? Lütfen gün/ay/yıl olarak tahmini bir tarih vermeye çalışınız.

4. Böyle bir tatilin gerçekleşeceğine ne kadar inanıyorsunuz?

1 Çok az	2	3 Orta	4	5 Çok fazla

5. Bu tatil sizce nerede gerçekleşecek? Lütfen spesifik olunuz.

6. Böyle bir tatilin söylediğiniz yerde gerçekleşeceğine ne kadar inanıyorsunuz?

1 Çok az	2	3 Orta	4	5 Çok fazla

7. Bu tatile gittiğinizde yanınızda kimler olacak?

8. Bu tatili önceden hayal ettiniz mi?/ planladınız mı?

1 Hiç hayal etmedim	2	3 Orta	4	5 Sürekli hayal ediyorum

9. Bu tatili hangi sıklıkta hayal ediyorsunuz?

1 Çok düşük	2	3 Orta	4	5 Çok yüksek

10. Bu tatili şu an hayal ettiğinizde duygusal olarak ne derece yoğun hissediyorsunuz?

1 Çok düşük	2	3 Orta	4	5 Çok yüksek

11. Sizce bu tatile gittiğinizde duygusal olarak ne derece yoğun hissedeceksiniz?

1 Çok düşük	2	3 Orta	4	5 Çok yüksek

Appendix 3: Memory Questionnaire for Given Holiday Memory

EK 6: Okutulan Yaz Tatili Anısına İlişkin Bellek Ölçeği

"Bu araştırma Koç Üniversitesi Psikoloji Bölümü tarafından yürütülmekte olup etik kurul onaylıdır. Vereceğiniz bilgiler, kimlik bilgilerinizin anonim tutulması şartı ile Psikoloji Araştırmaları laboratuvarında tutulacaktır ve üçüncü kişilerle paylaşılmayacaktır."

1. Okuduğunuz olayı, bu olay dahilinde neler olduğunu tanımlayınız.

2. Buna benzer bir olayı siz yaşadınız mı?

3. Yaşadığınız olay ile bu olay ne kadar benziyor?

1 Çok az	2	3 Orta	4	5 Çok fazla

4. Okuduğunuz olay tahminen ne zaman gerçekleşti? Lütfen gün/ay/yıl olarak tahmini bit tarih vermeye çalışınız.

5. Olayın söylediğiniz zamanda gerçekleştiğinden ne kadar eminsiniz?

1 Çok az	2	3 Orta	4	5 Çok fazla

6. Okuduğunuz olay tahminen nerede gerçekleşti? Lütfen spesifik olunuz.

7. Olayın söylediğiniz yerde gerçekleştiğinden ne kadar eminsiniz?

1 Çok az	2	3 Orta	4	5 Çok fazla

8. Bu olayda kimler vardı/ kimler olaya dahildi?

9. Sizce bu olay duygusal olarak ne derece yoğundu?

1 Çok düşük	2	3 Orta	4	5 Çok yüksek

10. Bu olayı siz yaşasanız duygusal olarak ne derece yoğun hissederdiniz?

1 Çok düşük	2	3 Orta	4	5 Çok yüksek

Appendix 4: Memory Questionnaire for Given School Memory

EK 7: Okutulan Okul Anısına İlişkin Bellek Ölçeği

"Bu araştırma Koç Üniversitesi Psikoloji Bölümü tarafından yürütülmekte olup etik kurul onaylıdır. Vereceğiniz bilgiler, kimlik bilgilerinizin anonim tutulması şartı ile Psikoloji Araştırmaları laboratuvarında tutulacaktır ve üçüncü kişilerle paylaşılmayacaktır."

1. Okuduğunuz olayı, bu olay dahilinde neler olduğunu tanımlayınız.

2. Buna benzer bir olayı siz yaşadınız mı?

3. Yaşadığınız olay ile bu olay ne kadar benziyor?

1 Çok az	2	3 Orta	4	5 Çok fazla

4. Okuduğunuz bu olay tahminen ne zaman gerçekleşti? Lütfen gün/ay/yıl olarak tahmini bir tarih vermeye çalışınız.

5. Olayın söylediğiniz zamanda gerçekleştiğinden ne kadar eminsiniz?

1 Çok az	2	3 Orta	4	5 Çok fazla

6. Okuduğunuz bu olay tahminen nerede gerçekleşti? Lütfen spesifik olunuz.

7. Olayın söylediğiniz yerde gerçekleştiğinden ne kadar eminsiniz?

1 Çok düşük	2	3 Orta	4	5 Çok yüksek

8. Bu olayda kimler vardı/ kimler olaya dahildi?

9. Sizce bu olay duygusal olarak ne derece yoğundu?

1 Çok düşük	2	3 Orta	4	5 Çok yüksek

10. Bu olayı siz yaşasanız duygusal olarak ne derece yoğun hissederdiniz?

1 Çok düşük	2	3 Orta	4	5 Çok yüksek

Appendix 5: Autobiographical Memory Questionnaire –Revised for the Second Session

EK 8: Otobiyografik Bellek Ölçeği

İkinci Seans (İkinci Adım)

"Bu araştırma Koç Üniversitesi Psikoloji Bölümü tarafından yürütülmekte olup etik kurul onaylıdır. Vereceğiniz bilgiler, kimlik bilgilerinizin anonim tutulması şartı ile Psikoloji Araştırmaları laboratuvarında tutulacaktır ve üçüncü kişilerle paylaşılmayacaktır."

1. Hatırladığınız olayı, bu olay dahilinde neler olduğunu tanımlayınız.

2. Buna benzer bir olayı hangi sıklıkta yaşadınız? Lütfen sayı veriniz.

3. Buna benzer bir olayı hangi sıklıkta yaşadınız? Lütfen 1-5 arasında bir sıralama veriniz.

1 Hiçbir zaman	2 Nadiren	3 Ara Sıra	4 Çok sık	5 Her zaman

4. Bu olay ne zaman gerçekleşti? Lütfen gün/ay/yıl olarak tam tarih vermeye çalışınız.

5. Olayın söylediğiniz zamanda gerçekleştiğinden ne kadar eminsiniz?

1 Çok az	2	3 Orta	4	5 Çok fazla

6. Bu olay nerede gerçekleşti? Lütfen spesifik olunuz.

7. Olayın söylediğiniz yerde gerçekleştiğinden ne kadar eminsiniz?

1 Çok az	2	3 Orta	4	5 Çok fazla

8. Bu olay gerçekleştiğinde yanınızda kimler vardı/ kimler olaya dahildi?

9. Bu olayla ilgili kaç kez konuştunuz?

1 Hiç konuşmadım	2	3 Orta	4	5 Sürekli konuşurum

10. Bu olayla ilgili son bir hafta içinde kaç kez konuştunuz? Lütfen sayı veriniz.

11. Bu olayda yer alan kişilerle son bir hafta içinde bu olay hakkında konuştunuz mu?

12. Bu olay hangi sıklıkta aklınıza geliyor?

1 Hiçbir zaman	2	3	4	5 Her zaman

13. Bu olay hakkında son bir haftadır kaç kere düşündünüz? Lütfen sayı veriniz.

14. Bu olay duygusal olarak ne derece yoğundu?

1 Çok düşük	2	3 Orta	4	5 Çok yüksek

15. Bu olayı şu an hatırladığınızda duygusal olarak ne derece yoğun?

1 Çok düşük	2	3 Orta	4	5 Çok yüksek

Appendix 6: Holiday Memory Read by Group 3

Tatil Anısı

10 yıl kadar önce, tatile giderken o sıcakta klimasız arabamızla yollardayız. Dahiyane küçük ablam ve ben arka üçlüde tıklım tıklım gitmekten sıkılmışız. Gerçi büyük ablam da muhakkak memnun değildir halinden ya, sessizdi garibim.

E tatil yolu zaten; kucağımıza varana kadar eşya. Annem yine toplamış da toplamış. Biz bizi görmüyoruz o çeşit. Babam her dağ suyu gördüğü yolda durur, alışkanlık. Elini yüzünü yıkar. Kapıları açıp biz de cereyan yaparız manuel, o gelene kadar. O sırada büyük ablam da inmiş su içmeye. Neyse babam arabayı çalıştırdı ve her zaman ki repliğiyle "tamam mıyız?" dedi. Biz de kendi repliğimizle "tamamız" dedik. Biz kim? Sıcaktan bunalan, dili dışarda yolculuk yapan, küçük abla ve ben. Babam sürdü arabayı. Hadi ben ortada oturmaktan sıkılmışım, pencereden bakamıyorum diyecek kadar küçüktüm de bu suça alet olmuştum. E ablam? O orta birdi sanırım. Arka koltuğu iki kişi paylaşmayı düşünecek kadar küçüktü o da. Küçüktük nihayetinde.

Büyük ablam önce şaşırdı, arabaya bakmakla yetindi. Sonra koşsa da ne çare. Biz de ablama görünmeyecek kadar uzaklaşana kadar el sallayacak kadar vefalı kardeşlerdik hani. Allahım nasıl bir mutluluk, nasıl bir keyif. En katıla katıla güldüğüm zamanı temsil eder sanırım.

Sonrasında babam u dönüşü yapmak için daha da gitmek zorunda kalmış ve bize de daha da kızar olmuştu. Büyük ablam da biz dönene kadar ağlamaktan bir hal olmuştu. Biz ise onca azara rağmen hala göz göze gelince gülebiliyorduk.

Şimdi düşündüğümde acıklı olaymış.

Appendix 7: School Memory Read by Group 4

Okul Anısı

10 sene önce lisede, Edebiyat dersi sınavından iki saat öncesinde yaşadığımız olay şöyle oldu: Dersimiz boş. Müdür de başımızda bir hoca olsun diye iki saat sonra bizi sınav yapacak olan hocayı yollamış. Hocamız gelir gelmez aklınıza takılan sormak istediğiniz bir şey olursa sorabilirsiniz der ve masasına kurulur. Bazı kız arkadaşlar derhal hocanın yanına gider ve hocam şuradan çıkar mı buradan çıkar mı diye sorular sormaya başlarlar. Ben de en önde oturan iki kız arkadaşımın yanına giderim, maksat bir saat geyik çevirmek. Ama hocanın masasının etrafı çevrili olduğundan sandalyenin arkasından geçmeye çalışırım ve o da ne? Çok saygıdeğer hocamızın iki saat sonra yapacağı sınavın aslı çantadan dışarı fırlamış, öylece açıkta duruyor. Derhal üç soruyu ezberleyişim ve koşa koşa sırama dönüşümün ardından kalan 7 soruyu da almamız ve beş dakikadan daha kısa bir sürede 10 soruluk sınavın tüm sorularını öğrenmemizle olay başlar.

Ama sadece soruları bilmek yetmez tabi, cevapları da bilmek lazım. Onu da yoluna koyarız: Karışık bir sıra ile bütün soruları hocaya sorarız ve hoca her soruyu cevaplar. Lakin her soru ile birlikte şaşırmış bir yüz ifadesi takınır. Dersin bitiminde sınıftan çıkarken de "çocuklar sınavı görünce çok şaşıracaksınız" deyip çıkar. Tabii bütün sınıf 100 alır.