

A Reevaluation of Canonical Categories in Flashbulb Memories

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To my Family

Thesis Abstract

A Reevaluation of Canonical Categories in Flashbulb Memories

Burcu Kaya Kizilöz

The aim of the present study is to reevaluate the canonical categories in flashbulb memories defined by Brown and Kulik (1977). Also, the present study is aimed to examine the relationship between canonical categories and event type, consequentiality, event memory, and cue type. It was predicted that canonical categories will differ for personal and public events. Also, regardless of the event type, type of canonical categories remembered is expected to be related to the cue type. Furthermore, a relation between canonical categories and consequentiality and event memory is predicted. The data for the study was gathered from the participant who attended university entrance exam in 1998, 1999, and 2000. The cancellation of the university entrance exam in 1999, September, 11 events in 2001 and bombing of the HSBC Bank in 2003 were used as events for flashbulb memories. A questionnaire for flashbulb memory, a consequentiality questionnaire and an event memory questionnaire was used. The results revealed that there was difference between 1998, 1999 and 2000 groups in terms of word counts, number of canonical categories remembered and flashbulb memory scores for personal events. It was found that the number and types of the canonical categories were affected by the event type, consequentiality, and being affected by the event. No significant effects were found for cue type.

Kisa Özet

Flas Bellekteki Kanonik Kategorilerin Yeniden Değerlendirilmesi

Burcu Kaya Kızılöz

Bu araştırmanın amacı Brown ve Kulik’de (1977) tanımlanan, flas bellekteki kanonik kategoriler yeniden değerlendirilmeştir. Ayrıca kanonik kategoriler ve olay türü, etki/önem derecesi, olay belleği ve ipucu türü arasındaki ilişki incelenmiştir. Kanonik kategorilerin kişisel ve toplumsal olaylar arasında fark göstereceği öngörülmüştür. Ayrıca olay tipinden bağımsız olarak, hatırlanan kanonik kategori türlerinin ipucu türüyle ilişkili olacağı öngörülmüştür. Ayrıca, kanonik kategoriler ve etki/önem derecesi ve olay belleği arasında bir ilişki öne sürülmüştür. Veriler öğrenci seçme sınavına 1998, 1999 ve 2000 yıllarında giren katılımcılardan toplanmıştır. 1999’da gerçekleşen öğrenci seçme sınavının iptali, 2001’de gerçekleşen 11 Eylül olayları ve 2003’de meydana gelen HSBC Bankası’nın bombalanması flas bellek olayları olarak kullanılmıştır. Bir flas bellek anketi, bir etki/önem anketi ve bir olay belleği anketi kullanılmıştır. Sonuçlar 1998, 1999 ve 2000 grupları arasında sözcük sayısı, hatırlanan kanonik kategori sayısı ve flas bellek skoru açısından fark olduğunu göstermiştir. Hatırlanan kanonik kategorilerin sayısının ve türünün olay türü, etki/önem derecesi, olay belleği ve olaydan katılımcı ya da bir yakının etkilenmiş olmasından etkilendiği bulunmuştur. İpucu türünün kanonik kategorilerin sayısı ve türüne anlamlı bir etkisi bulunamamıştır.

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1. INTRODUCTION

The term “flashbulb memory” was introduced to the literature by Brown and Kulik in 1977. They used the term flashbulb memory to define the memories for the circumstances in which a person first learned of a very consequential and very surprising event. According to the flashbulb memory hypothesis postulated by the authors, high values of surprise and consequentiality are requisite for the formation of flashbulb memories. The element of surprise initiates the formation and level of personal consequentiality determines the degree of elaboration of memory. Therefore, Brown and Kulik claimed that flashbulb memories can have different degrees of clarity and detail and there is a positive correlation between degrees of clarity and detail and personal consequentiality: the greater the level of personal consequentiality, the more clear and detailed the memory.

The authors stated that the flashbulb memory hypothesis has its roots in the neuropsychological theory called “now print” (Livingstone, 1967). In this theory, it is argued that when an event occurs it is first evaluated in terms of expectedness and surprise. Following that, a test for biological significance of the event is made. If the event passes this test and accepted as biologically significant, then the limbic system fires into the reticular system. This stimulation results in a spreading discharge distributed among the cortical hemispheres. As a result of these responses, the state of the brain is recorded as a memory and all circumstances tied to that event are

permanently registered. This theory overlaps with Brown and Kulik's Flashbulb Memory Hypothesis in several ways, however, unlike Brown and Kulik (1977), Livingstone (1967) argues that everything is captured and encoded just like a photograph.

To examine formation of flashbulb memories, Brown and Kulik conducted the first formal flashbulb memory study. Brown and Kulik (1977) used two criteria in the study. Based on the assassination of John F. Kennedy, the first criterion was that the public event had to be unexpected and novel, therefore surprising. The second criterion was that different groups within the society would rate the consequentiality of different events variously.

Brown and Kulik used forty white and forty black Americans as subjects. The age range of the white subjects was 20 to 54 with a median age of 27 and it was 20 to 60 with a median of 25 for the black subjects. 10 very unexpected novel events were selected to test their hypotheses to satisfy the first operation: the registration of novelty. The first event, assassination of J. F. Kennedy satisfied this operation. Besides this event, 8 more public events and a personal event like a death of a friend or family member included. The public events were the assassinations of Medgar Evers, J. F. Kennedy, Malcolm "X", Martin Luther King, Robert F. Kennedy, Ted Kennedy, George Wallace, Gerald Force, and the death of General Francisco Franco. Consequentiality should also be fulfilled for all of the subjects. Therefore the 8 public events were divided into two different types of events which can satisfy the need of consequentiality for both white and black Americans. Subjects were also asked to rate the consequentiality of the events in a five point scale.

Subjects were first given the definition of the flashbulb memories in a two page booklet. After that, they were asked the question “Do you recall the circumstances in which you heard that...?” for all of the events. If the subject answered the question positively, he /she was asked to write a free recall of the circumstances in any form or order and at any length he liked. After each event subjects were asked to rate the consequentiality of the event. The consequentiality was defined in the study as “In order to rate the consequentiality of an event you must try to imagine things that might have gone differently had if x lived”. Next, the subjects’ rehearsal rate was measured by asking how often they had related that account.

Brown and Kulik (1977) used three criteria of flashbulb effect. The first one was subjects’ response to the question as yes or no. Since a division made by a simple question is not absolute and cannot cover the content, number of words used in the narrative was used as the second criterion. This criterion also enabled to represent the fact that flashbulb memories varied in degree. The third criterion, a content coding of the circumstances written down in the narratives in terms of prevalent categories, was used to see the constancies and to make a better analysis of the content. As there was no previously defined content for memories to be accepted as flashbulb memories, the authors invented a rule to apply to the memories. The first author read all the memory descriptions and identified six classes of information reported on 50 percent or more of the accounts. These six classes were place, ongoing event, informant, affect in others, own affect and aftermath. These six classes of information were accepted to be canonical in memories as they were likely to be remembered but no one used all six categories at the same time. In addition to these categories, there were also classes of

information in the memories which were unique and could not be categorized. So the content of the information given by subjects in memories were all unique in a sense but they could also be categorized by the presence of six canonical categories.

For the personal events, five of the previous categories were identified: place, ongoing event, informant, own affect and aftermath. In addition, related to the nature of the question two additional categories were present: event and person. These seven categories were defined as the canonical categories for the personal events. In line with the public events, the memories for personal events also included unique information that could not be categorized.

For both the public and personal events, there were great variations between subjects in terms of the canonical categories used. Based on this, Brown and Kulik (1977) defined the criteria of a memory to be flashbulb as a yes answer to the question “do you remember the circumstances when you first heard x” and presence of at least one of the canonical category in the free recall of memories.

The first hypothesis of the study was that the degree of elaboration in flashbulb accounts measured in terms of the canonical categories would be positively related with consequentiality of the events. The second hypothesis was that, the degree of consequentiality, frequency of overt rehearsal and degree of elaboration would be positively correlated with each other.

In the analysis the consequentiality measured both with the race of the participants and the self reports were compared for ten events. The people who were more involved with civil rights were expected to be rated more consequential for black participants. The results showed that, black participants rated people involved more in

civil rights as more consequential. In addition, the relation between the consequentiality and overt rehearsal was very high. Consequentiality was also positively correlated with the elaboration of an account in canonical categories and length in words of memory descriptions. Also, rehearsals were also found to be related to content elaboration and word length in accounts.

This study showed that for the public events above a critical level of surprise and consequentiality subjects remember not only the factual detail regarding the event but also the circumstances in which they first learned that event. Also, from the content analysis of memory descriptions for such events, six categories that are place, informant, ongoing event, own affect, other affect and aftermath were found to be present on most of descriptions. In all groups and for all events, two or three canonical categories were present and for the assassination of John F. Kennedy four or more canonical categories were remembered. In addition, there was a positive correlation between the ratings of consequentiality and the number of the canonical categories present. However, the number of these categories present in descriptions varied greatly among subjects. Thus, Brown and Kulik (1977) accepted an account as flashbulb if one or more canonical categories were present. The descriptions of memories also included information that could not be placed in any of these categories. Most common examples of such information were descriptions as the color of the cloth participant wore that day and how the weather was or the name of informant.

1.1 The Importance of Canonical Categories

Presence or number of canonical categories has been the major criterion which flashbulb memory performance have been evaluated. Brown and Kulik (1977) used the following criteria for flashbulb memories in their research: A yes answer to the question “Do you recall the circumstances in which you first heard that...?” has to be given and at least one of the canonical categories have to be present in the free recall of the memory. Therefore it is proper to claim that canonical categories have a very important place in the flashbulb memory literature.

Forty-six of the studies published on flashbulb memories between 1977 and February 19, 2007 have been examined in terms of the types of the categories used (see table 1). The results showed that in total, 21 categories were used as canonical categories in different studies. The percentages of these 21 categories are given in table 2. The results of the analyses of these 46 studies showed that none of them questioned the existence or the characteristics of the canonical categories stated by Brown and Kulik (1977). In all of these 46 studies, only two studies (Rubin & Kozin, 1984h; Mackavey, Malley & Stewart, 1991) used free recall accounts to determine the canonical categories present and the aims of these studies were not to investigate the canonical categories.

The aim of the Rubin and Kozin study (1984) was to understand the similarities and differences between flashbulb memories and vivid memories. In order to do that, they asked the subjects to write down 3 of their clearest memories. Unlike Brown and Kulik, they did not use nationally important events as cues but to identify these memories as vivid memories Rubin and Kozin used the same operational criteria: the

subject must judge the memory account as flashbulb memory and one of the six canonical categories should be present. The memories were coded for the nature of the event, the person involved, the place, the ongoing event, own affect and aftermath. The informant and affect on others categories was excluded since most of the events described by the subjects lacked these categories. The results showed that memories had 4.50 (S.D. = 1.03) canonical categories present out of a possible 6. Rubin and Kozin stated that 71% of the memories contained extraneous details that did not fit any of the categories set by Brown and Kulik.

In the study by Mackavey, Malley and Stewart (1991), memories for autobiographically consequential experiences were examined by analyzing the autobiographies of 49 eminent psychologists. Since these type of memories share many characteristics of flashbulb memories, the narratives were coded for 4 of canonical categories; place, own affect, others' affect and ongoing activity. The results showed that in all memories of autobiographically consequential experiences, the percentages of the canonical categories were as follows: place 54%, own affect 30%, others' affect 9% and ongoing activity was not present. If these results are reevaluated according to the criteria set by Brown and Kulik (1977), only place category can be accepted as a canonical category, since Brown and Kulik accepted only the categories which were reported in 50 percent or more of the accounts as canonical categories. The findings from the two studies are in conflict with the data from Brown and Kulik. However, these findings did not say much about the nature of canonical categories in flashbulb memories because the narratives used in the study were not flashbulb memories though they share many characteristics of them.

Although these two studies gave valuable information about the canonical categories by using similar methods to Brown and Kulik (1977), they did not discuss the presence or the nature of the canonical categories. Other 44 studies did attempt to analyze the narratives to see whether these six categories are really canonical or there are more or less of them. However, when defining a memory as a flashbulb memory, canonical categories play a significant role. Therefore the nature of the canonical categories should be understood better.

1.2 Consequentiality and Canonical Categories

Consequentiality is defined as an important determinant of flashbulb memories (Brown&Kulik, 1977). In most of the studies on flashbulb memories, consequentiality was used as an important measure (Brown & Kulik, 1977; Wright, 1993; Cohen, Conway & Maylor, 1994; Conway, Anderson, & Larsen et al., 1994; Wright, Gaskell & O'Muircheartaigh, 1998; Winningham, Heyman Jr. & Dinnel, 2000; Tekcan & Peynircioglu, 2002; Niedzwienska, 2003; Luminet, Curci, & Marsh et al., 2004; Otani, Kusumi, & Kato et al., 2005). In their study, Brown and Kulik used two sets of events for white and Black Americans to have similar consequentiality levels for these two groups and the subjects were asked to rate the consequentiality of the events with a five-point scale. The results revealed that both groups reported significantly higher flashbulb memories for the events which were rated more consequential by them. Also the subjects reported significantly higher flashbulb memories for the events which were classified as more consequential for their groups by the authors. Brown and Kulik concluded that consequentiality is positively correlated with both the elaboration

of an account in canonical categories ($r = .786$ and $r = .883$) and account length in words ($r = .810$ and $r = .883$).

Conway et al. (1994) examined the formation of flashbulb memories and examined personal and national importance as secondary measures influencing flashbulb memory formation. To do that they asked subjects their memories about when they first heard of the resignation of Margaret Thatcher. United Kingdom citizens and non-citizens who were not residents at the time of resignation were used as subjects. The results revealed that there is relationship between flashbulb memories and both personal and national importance ($\eta^2 = 39.4$, $p < .01$ and $\eta^2 = 20.2$, $p < .01$, respectively). Flashbulb memories were found to be associated with moderate levels of personal importance and high levels of national importance. On contrary, non-flashbulb memories were found to be associated with moderate to low levels of personal importance and were equally distributed across the 3-point scale for national importance. The findings of Conway et al. study (1994) establish that the personal and national importance of an item is critical for flashbulb memory formation. The authors concluded that their findings support the original proposal that some events cause unusually detailed memories because of their consequentiality.

In another study Tekcan and Peynircioglu (2002) investigated the effect of aging on flashbulb memories. In the study, elderly Turks were asked how they heard the death of the first president of Turkey in 1939 and the inclusion of Hatay to the national borders of the country in 1939. In addition, both elderly and young adults were asked to remember the circumstances how they first heard of the death of the 8th president of Turkey in 1993. The subjects were also asked to report personal and national

importance for the events. The results revealed that only personal importance but not national importance had a significant effect on flashbulb memories.

However there are other studies which do not support Brown and Kulik's view (1977). In the study of Wright, Gaskell and O'Muircheartaigh (1998), by using two general population surveys of Great Britain, Margaret Thatcher resignation as Prime Minister and the Hillsborough football disaster were examined. When two events were compared, the results revealed that Hillsborough tragedy was more important but recollections for Thatcher's resignation were clearer. This result means that the event rated as more important does not produce clearer memories. Furthermore, the Hillsborough disaster was rated for its importance both by men and women and women rated the event as more important ($t(2092)=4.04, p<.001$). However men reported having clearer memories. The authors concluded that these two results contradict Brown and Kulik's (1977) view of consequentiality.

In a more recent study, Otani et al. (2005) investigated whether the nuclear accident that occurred in Japan in 1999 produced flashbulb memories among people living near the accident site who divided into three according to their distances to the accident location. Among other components, national and personal consequentiality was also rated by the subject. The results revealed that neither personal nor national consequentiality has any significant effect on flashbulb memory formation.

1.3. Event Memory and Flashbulb Memories

Flashbulb memory is defined as the recollection of the circumstances when a person first heard of an event, on the other hand event memory is defined as the recollection of the details of the event itself (Tekcan, Ece, Gülgöz, & Er, 2003). The

relationship between flashbulb memories and event memories is studied by several researches (Bohannon III, 1988; Finkenauer, Luminet, & Gisle, et al., 1998; Smith, Bibi, & Sheard, 2003; Pezdek, 2003; Nachson & Zelig, 2003).

In one of the early studies, Bohannon (1988) compared the flashbulb memories and the event memories of the Space Shuttle Challenger disaster between two groups: people who learned the event from another person and people who learned the event from the media. Subjects were asked to report both the details surrounding their discovery of the event and facts about the Challenger mission itself. The results stated that flashbulb memories of the discovery of the shuttle explosion and the event memory about the shuttle explosion are distinct cognitive phenomena since they were affected differently by delay. The accuracy of event memory declines dramatically over time whereas the accuracy of flashbulb memories were consistent.

Finkenauer et al. (1998) examined the relationship between flashbulb memories and event memories in their study in which they proposed an emotional-integrative model. 394 Belgian subjects volunteers participated to the study. The subjects were asked their flashbulb and event memories about the unexpected death of Belgian King Baudoin in 1993. The results showed that there is a significant relationship between these two types of memories ($r^2 = .286, p < .05$). Unlike Bohannon (1988), Finkenauer et al. stated that there is relation between the memory for the original event and flashbulb memories.

Nachson and Zelig (2003), conducted a study to clarify the differential nature of flashbulb and event memories by examining the memories of the assassination of the Israel's Prime Minister Itzhak Rabin and the circumstances in which the subjects

discovered the event. The authors predicted that flashbulb memories about the event would be reported with greater accuracy, consistency and vividness than the event memory. The results of the study contradicted Bohannon's (1988) finding which claims event memory is more prone to time delay. Furthermore, according to Nachson and Zelig (2003) these two types of memories show similar amounts of visual representations and similar levels of confidence in memory accuracy. The authors concluded that the distinction between flashbulb and event memories do not exist as Bohannon (1988) stated.

1.4. Present study

The overall aim of the present study aims to reevaluate the canonical categories defined by Brown and Kulik (1977). This is important because all research on flashbulb memories use one version or another of Brown and Kulik's (1977) categories as a measure of memory. Moreover, these categories were based on individuals' recall of a single event: John F. Kennedy assassination. First, Brown and Kulik study (1977) will be replicated with a larger sample of 200 people to obtain frequencies of different canonical categories.

Second, the effect of event type on the canonical categories will be investigated. In the present study, type of event has two dimensions. The two dimensions are a) whether the event is global or local, b) whether the event is public or private. A global event and two local events will be used to investigate the first dimension. These three events will be compared to see if there is a difference in the presence and number of canonical categories according to the first dimension. To investigate whether there is a difference between public and personal events, one event which can be considered as

public by one group and personal by the other group will be used. These two groups will be compared to see if there is difference between personal and public events in remembering the canonical categories.

In the Brown and Kulik study (1977), participants received a 2 page definition of the flashbulb memory concept with 2 canonical categories as examples and after that they received the events. In the present study, subjects will be divided into three groups and each group will receive a different type of flashbulb memory definition to see whether the type of definition affect type and number of canonical categories remembered.

Brown and Kulik (1977) stated that consequentiality is an indicator of the number of canonical categories present. In the present study, consequentiality will be used for the same purpose. However, whether there is a relation between consequentiality and the type of canonical categories remembered will also be investigated by asking the participants to rate the consequentiality of the events. Also, type of consequentiality (public/personal), initial time of consequentiality and duration of consequentiality and their effects on the number and type of the canonical categories remembered will be examined.

According to Brown and Kulik (1977), being more affected by the event may have an effect in the presence of flashbulb memories, therefore canonical categories. In the present study subjects will be asked if they or a person close them is affected by the event. The answers of the question will be used to investigate whether being affected by the event in some way has an impact on the type of canonical categories present.

To have a comprehensive understanding of flashbulb memories reported for these events, participant will be asked questions about their event memories for these events.

1.4.1. Hypotheses

The hypotheses of the present study are as follows:

1. Event type will have a significant effect on the canonical categories remembered.
2. More and different types of canonical categories will be remembered for personal events. This will be seen as higher scores on;
 - a) Number of words of flashbulb memory accounts
 - b) Flashbulb memory scores
 - c) Number of canonical categories present.
3. The word counts of flashbulb memory accounts number and types of the canonical categories remembered for the local event will be significantly different from the canonical categories remembered for the global event.
4. More and different types of canonical categories and will be remembered for the events with higher consequentiality ratings. This will be seen as higher scores in measures.
5. More and different types of canonical categories will be remembered when participants or someone close to them is affected by the event. This will be seen as higher scores in measures.
6. The type of cue given for flashbulb memories will have a significant effect on the number and type of the canonical categories remembered.

2. METHOD

2.1. Participants

135 subjects participated in the study. Of 135 subjects, 79 were females and 56 were males. The age range was between 24 and 32 and the range of years of education was between 11 and 19. 35 of the subjects participated in the university exam in 1998, 51 of them in 1999 and 49 of them in 2000. In all 135 subjects, 48 subjects received a questionnaire without a cue, 45 received the location cue and 42 received the informant cue. Distribution of groups along categories of age, years of education, cue type and OSS entrance year are presented in Table 3a, 3b and 3c.

2.2. Material

Each participant was given a booklet of 11 pages of questionnaires. In the first page, a definition of the flashbulb memories was given according to the definition of Brown and Kulik. Since one of the purposes of the study was to see to see the effect of instructions, there were three types of definitions. The first definition was as follows: “Flas bellek; önemli, beklenmedik ve duygusal boyutu olan toplumsal ya da bireysel olayların ilk kez öğrenildiği an ile ilgili ayrıntıların hatırlanmasına verilen isimdir. Olayın üzerinden çok uzun zaman geçse de **olayı öğrendiğiniz ana dair koşullar** net bir şekilde hatırlanabilir. Sizden istediğimiz bazı toplumsal olayları ilk öğrendiğiniz anda ne yaptığınızı ayrıntılı olarak anlatmanız. Sizden olaya ait bilgileri hatırlamanızı

degil, olayi ilk öğrendiginiz ana dair bilgileri hatirlamanizi istiyoruz.”. For the location and informant the first sentence was changed as ‘Flas bellek önemli, beklenmedik ve duygusal boyutu olan toplumsal ya da bireysel olayların ilk kez öğrenildiği an ile ilgili ayrıntıların hatırlanmasına (nerede vs.) verilen isimdir.’ and ‘‘Flas bellek önemli, beklenmedik ve duygusal boyutu olan toplumsal ya da bireysel olayların ilk kez öğrenildiği an ile ilgili ayrıntıların hatırlanmasına (kimden vs.) verilen isimdir.’’ respectively given as cues. After the definition, they were asked to remember the circumstances in which they first heard about three events: The cancellation of university entrance exam in May 1, 1999; the bombing of the World Trade Center, in September 11, 2001; the bombing of the HSBC building in Levent in November 20, 2003. Subjects were asked as if they remember the first time they heard about the events and if the answer is yes they will be asked to explain it in detail. After each event participants were asked if they or anyone closely related to them is affected by the events. After completing all events subjects were asked to rate the consequentiality of the event. The questionnaires were given in the appendix.

Participants were asked whether they remember the other bombing events which took place around the time when the HSBC building was bombed. Also for each event, event memory question derived from Tekcan et al. (2003) was presented.

2.3. Procedure

Participants were tested individually. First, the participants were informed that this study is about autobiographical memories and the definition of the flashbulb memories was read to them. Lastly they were given the booklets and the consent forms.

In each booklet, the definition of the flashbulb memories was in the first page. In one page the questions “..... ilk öğrendiginiz ani hatirliyor musunuz?” and “Hatirliyorsaniz lütfen ayrintili bir sekilde anlatiniz.” and in the second page the question “Bu olaydan siz ya da yakinlarinizdan biri dogrudan etkilendi mi?” were presented.

After that, participants were asked to rate the consequentiality of the event, type of consequentiality (public/personal), and duration of consequentiality in a five point scale where 1 means “hiç etkili/önemli degildi” and 5 means “çok etkili/önemliydi”. Initial time of consequentiality will be rated in 6 point scale where 1 means “hemen” and 6 means “1 yil sonra”. This procedure was repeated for all events

After all the questions were answered for all events, subject were asked event memory questions for all events. Also for the bombing of HSBC building, a question about the similar events which took place around the same time was asked.

3. RESULTS

Flashbulb memory scores, number of canonical categories present, number of words of flashbulb memory accounts, consequentiality scores and event memory scores were calculated for each subject and these served as the data for the analysis.

3.1. The Comparison of Events

The three events used in this study, cancellation of the university entrance exam OSS, September, 11 events and the bombing of the HSBC Bank were compared to see whether there are significant differences among them in terms of word counts, number of canonical categories present and flashbulb memory scores. Differences among events were expected since these three events vary in their degrees of psychological and physical distances to the subjects.

3.1.1. Comparisons for the 1999 Group

The comparison of events were made for the 1999 groups first because the cancellation of the OSS was a personal event for this group and therefore differences among personal and public events can be seen better.

3.1.1.1. Word Counts

The results of one-way repeated measures ANOVA revealed that word counts of OSS ($M = 65.98$, $SD = 71.30$), September, 11 events ($M = 37.16$, $SD = 31.50$) and the bombing of the HSBC Bank ($M = 37.04$, $SD = 29.53$) are significantly different $F(2,132) = 9.74$, $p < .05$. The pairwise comparisons showed that there are significant

difference between OSS and the September, 11 events and between OSS and the Bombing of the HSBC Bank. No significant differences were found between September, 11 events and the bombing of the HSBC Bank. The mean differences can be seen in figure 1.

3.1.1.2. Number of Canonical Categories Present

The results of the one-way repeated measure ANOVA showed that number of canonical categories for OSS ($M = 4.69$, $SD = 2.24$), September, 11 events ($M = 3.84$, $SD = 2.06$) and bombing of the HSBC Bank ($M = 3.51$, $SD = 1.89$) are significantly different $F(2,132) = 6.48$, $p < .05$. Pairwise comparisons revealed that OSS and the September, 11 events and OSS and the Bombing of the HSBC Bank were significantly different from each other.. No significant differences were found between September, 11 events and the bombing of the HSBC Bank. The mean differences can be seen in figure 2.

No significant results were found among three events in terms of flashbulb memory scores for the 1999 group.

3.1.2. Comparisons of the Whole Group

Previous research suggested that being psychologically close to the event have an effect on the details of the memories (Er, 2003; Pezdek, 2003). To examine these findings word counts, number of canonical categories present and flashbulb memories of all subjects were examined for the cancellation of OSS, September, 11 events and the bombing of the HSBC Bank.

3.1.2.1. Word Counts

Word counts of all subjects were examined to see whether there is a difference among the events. The results of the one-way repeated measures ANOVA revealed that word counts of OSS ($M = 41.93$, $SD = 53.78$) September, 11 events ($M = 38.38$, $SD = 28.64$) and the bombing of the HSBC Bank ($M=36.19$, $SD=38.09$) are not significantly different from each other.

3.1.2.2. Number of Canonical Categories Present

The results of one-way repeated measures ANOVA showed that number of canonical categories for OSS ($M = 3.14$, $SD = 2.55$), September, 11 events ($M = 4.03$, $SD = 2.03$) and the bombing of the HSBC Bank ($M=3.37$, $SD=2.14$) are significantly different $F(2,132) = 7.14$, $p < .01$. Pairwise comparisons revealed that OSS and September, 11 events and September, 11 events and the bombing of the HSBC Bank were significantly different from each other. There were no significant differences between the cancellation of OSS and the bombing of the HSBC Bank. The mean differences can be seen in figure 3.

3.1.2.3. Flashbulb Memory Scores

One-way repeated measures ANOVA is conducted to see whether there are significant differences between events in terms of flashbulb memory scores. The results showed that flashbulb memory scores for OSS ($M = 3.01$, $SD = 2.05$), September, 11 events ($M = 3.91$, $SD = 1.57$) and the bombing of the HSBC Bank ($M=3.55$, $SD=1.83$) are significantly different $F(2,132) = 9.50$, $p < .05$. Pairwise comparisons revealed that OSS and September, 11 events and OSS and the bombing of the HSBC Bank were significantly different from each other. The difference between

September, 11 events and the bombing of the HSBC Bank is also close to significance ($p=.055$). The mean differences can be seen in figure 4.

According to the results of the comparisons of event types, subjects produced significantly higher scores on the flashbulb memory measures for personal events. Furthermore, there was an effect of psychological distance. Subjects got higher scores on the number of canonical categories and flashbulb memory scores for the global event, September, 11 events.

3.2. Comparison of Participants according to OSS Entrance Year

To have a better understanding on how the canonical categories differ for personal events, the percentages of the recalled canonical categories for OSS were calculated. Percentages of the canonical categories present in recall of OSS exam details for OSS entrance years are given in table 4a. 1999 groups had 5 categories with percentages higher than 50 percent which is the criterion set by Brown and Kulik (1977) for the categories to be called canonical. These categories are informant/source, own affect, ongoing activity, aftermath and location. 1998 and 2000 groups had no category which can pass the 50 percent criterion.

To evaluate flashbulb memories, word counts, number of canonical categories present and flashbulb memory score set by Brown and Kulik (1977) was used as measures.

3.2.1 OSS Entrance Year and Word Counts

ANOVA is conducted to see difference between word counts of three OSS groups for all events. The results revealed that there is a significant difference between participant who entered the OSS in 1998, 1999 and 2000 in terms of word counts, $F(2,$

132)= 7.29, $p < .01$. Results of the post hoc analysis Tukey, showed that the 1999 group ($M = 65.98$, $SD = 71.30$) used more words than both the 1998 ($M = 23.54$, $SD = 32.13$) and the 2000 groups ($M = 30.02$, $SD = 32.30$) who were not different from each other. No significant differences were found in terms of the word counts for September, 11 Events and the bombing of HSBC Bank among three groups.

3.2.2 OSS Entrance Year and Number of Canonical Categories Present

To see the difference in terms of the number of canonical categories present an ANOVA is conducted. Results show that there is a significant effect of OSS entrance year on the number of canonical categories present in participants flashbulb memory accounts for the cancellation of the OSS, $F(2,132) = 19.35$, $p < .01$. Results of the post hoc analyses revealed that there is a difference between the 1999 group ($M = 4.69$, $SD = 2.24$) and others but there is no significant difference between 1998 ($M = 2$, $SD = 2.18$) and 2000 ($M = 2.35$, $SD = 2.33$) groups. No significant differences were found in terms of the number of canonical categories present for September, 11 Events and the bombing of the HSBC Bank among three groups.

3.2.3 OSS Entrance Year and Flashbulb Memory Score

The results of the ANOVA conducted to see the difference between the groups in terms of flashbulb memory scores for the cancellation of OSS revealed that there is a significant difference between groups, $F(2,132) = 18.34$, $p < .01$. According to the post hoc tests conducted flashbulb scores of the 1999 group ($M = 4.24$, $SD = 1.43$) is significantly higher than the other two and there is no significant difference between 1998 ($M = 2.14$, $SD = 2.21$) and 2000 ($M = 2.36$, $SD = 1.90$) groups. There is no

difference between groups in terms of flashbulb memory scores for September, 11 events and the bombing of the HSBC Bank.

The analyses performed to see whether there was a difference among subjects for personal and public events revealed that subjects had higher scores on flashbulb memory scores for the personal event. This result is in line with the event type comparison findings.

3.3. The Relationship between Being Effected by the Event and the Canonical Categories

Subjects were asked for each event even if they or a person close to them is affected by the event. For OSS 92, for September, 11 events 12 and for the bombing of the HSBC Bank 25 subjects stated that they or someone close to them is affected by the event. Means and standard deviations for all groups can be seen in table 5.

3.3.1 Being Affected by the Event and Word Counts

Analyses of Variance is conducted for all events to see whether there is a significant effect of being affected by event on the word counts of flashbulb memory accounts for OSS. The results revealed that there is a significant difference between participants who are affected by the OSS and who are not, $F(1, 133) = 21.59, p < .01$. Affected group had higher word counts with a mean of 55.62 (SD=59.42). There is no difference between groups in terms of word counts for September, 11 events and the bombing of the HSBC Bank.

3.3.2 Being Affected by the Event and Number of Canonical Categories Present

To see whether being affected by the event has a significant effect on the number of canonical categories presents, ANOVA was conducted for all events. The results

revealed that for the cancellation of OSS, participants recalled more numbers of canonical categories in their flashbulb memory accounts, $F(1, 133)= 31.509, p<.01$. For the bombing of HSBC Bank, a group of 24 participants were selected randomly from the data to eliminate the difference between the numbers of affected and not affected groups. The results revealed that the group affected by the event recalled significantly more canonical categories than the other group, $F(1,23)= 4.465, p<.05$. There is no difference between groups in terms of the number of canonical categories present for September, 11 events.

3.3.3. Being Affected by the Event and Flashbulb Memory Scores

ANOVA is conducted for all events to examine whether being affected by the event has a significant effect on flashbulb memory scores. Results showed that participants who were affected by the cancellation of the university entrance exam from all groups had significantly higher flashbulb memory scores for that event than the participants who were not, $F(1,133)= 37.385, p<.01$ and the participants affected by the bombing of the HSBC BANK had significantly higher flashbulb memory scores for that event than the others, $F(1,23)= 4.041, p<.05$. No significant effect for September 11 events was found.

Analyses conducted to see whether there was an effect of being affected by the event had an effect on canonical categories revealed that there was effect on all flashbulb memory measures for the cancellation of the university exam. For the bombing of the HSBC Bank, there was an effect of being affected by the event on flashbulb memory scores and number of canonical categories present. For the September, 11 events, no significant effect was found.

3.4. Consequentiality and Canonical Categories

For examining the relation between canonical categories and consequentiality, a consequentiality questionnaire was formed after Tekcan et al. (2003) and subjects' scores were calculated. Analysis of variance was conducted to see whether OSS entrance year has an effect on the consequentiality scores given for the cancellation of the OSS and results revealed that all groups are significantly different from each other $F(2,127)= 115.11, p<.01$. The means of consequentiality scores for 1998, 1999 and 2000 groups are 16.48 (SD=3.58), 21.10 (SD=3.87) and 18.70 (SD=4.17) respectively.

3.4.1. Consequentiality and Word Counts

Results of the Pearson Correlation revealed that that there is significant relationship between consequentiality and word count for OSS ($r=.252, p<.01$). No significant results were found for the word counts of September, 11 events ($r=.013, p>.05$) and the bombing of the HSBC Bank ($r=.149, p>.05$).

3.4.2. Consequentiality and Number of Canonical Categories

To examine the relationship between consequentiality and the number of the canonical categories present Pearson Correlation was conducted. The results showed that there is significant relationship between these two variables for OSS ($r=.284, p<.01$) and for the bombing of the HSBC Bank ($r= .252, p<.01$), but not for the September, 11 events ($r=.030, p>.05$).

3.4.3. Consequentiality and Flashbulb Memory Score

Results of the analyses performed showed that there is significant relationship between consequentiality and flashbulb memory score for OSS ($r=.342, p<.01$), and for

the bombing of the HSBC Bank ($r=.292$, $p<.01$). No significant results were found for the September, 11 events ($r=.007$, $p>.05$).

3.4.4. Personal versus National Consequentiality

Word counts, number of canonical categories present and flashbulb memory scores for all events were analyzed to see relationship between them and personal and national consequentiality. The results showed that there are significant relations between personal consequentiality and word counts ($r=.302$, $p<.01$), number of canonical categories present ($r=.335$, $p<.01$), and flashbulb memory scores ($r=.358$, $p<.01$) for the cancellation of OSS. No significant results were found for national consequentiality.

For the bombing of the HSBC Bank, there are significant relations between word counts, number of canonical categories present and flashbulb memory and personal consequentiality ($r=.271$, $p<.01$; $r=.375$, $p<.01$; $r=.376$, $p<.01$ respectively). No significant relations were found for national consequentiality.

Neither for personal nor for national consequentiality, no significant relations were found for the September, 11 events.

The analyses revealed there was a relationship between consequentiality and canonical memories in line with the previous research (Brown & Kulik, 1977; Tekcan & Peynircioglu, 2002). The results showed that especially the personal consequentiality had an effect on the canonical categories remembered.

3.5. Event Memory and Canonical Categories

To examine the relationship between canonical categories and event memory, event memory questions were asked for each event and subjects' scores were

calculated. Analyses of variance was conducted to see whether OSS entrance year has an effect on the event memory scores and results revealed that 1999 group has significantly higher event memory scores from 1998 and 2000 groups $F(2,132)=15.51, p<.01$. There was no difference between 1998 and 2000 groups. The means of event memory scores for 1998, 1999 and 2000 groups are 1.71 (SD=1.01), 2.68 (SD=.81) and 1.77 (SD=1.04) respectively.

3.5.1. Event Memory and Word Counts

Results of the Pearson Correlation revealed that that there is significant relationship between event memory scores and word count for OSS ($r=.200, p<.05$) and for the bombing of the HSBC Bank ($r=.175, p<.05$). No significant results were found for the relationship between word counts of September, 11 events and event memory scores.

3.5.2. Event Memory and Number of Canonical Categories

The relationship between event memory and the number of the canonical categories present was examined by conducting Pearson Correlation. The results showed that there is significant relationship between these two variables for OSS ($r=.335, p<.01$) and for September, 11 events ($r=.287, p<.01$) and for the bombing of the HSBC Bank ($r=.264, p<.01$).

3.5.3. Event Memory and Flashbulb Memory Score

Results of the Pearson Correlation performed showed that there is significant relationship between consequentiality and flashbulb memory score for OSS ($r=.329, p<.01$), and for September, 11 events ($r=.299, p<.01$) and for the bombing of the HSBC Bank ($r=.359, p<.01$).

The results revealed that there was a relationship between event memory and flashbulb memory scores and number of canonical categories present for all events. For the OSS and the bombing of the HSBC Bank, there was a relationship between event memory and word counts. For the September, 11 events, no significant relations were found for the word counts.

3.6. Comparisons of the Cue Type

The effect of cue type given in the instructions on the canonical categories remembered was evaluated. The percentages of canonical categories for cue types were given in tables 6a, 6b and 6c.

3.6.1. Comparisons of the Cue Type for OSS

The means of word counts according to cue type for OSS were $M= 40.79$, $SD= 34.53$ for without cue; $M= 39.04$, $SD= 58.73$ for location cue; $M= 46.31$, $SD= 65.99$ for informant cue. Analyses of Variance is conducted between cue groups for OSS in terms of word counts ($F(2,132)= .212$, $p>.05$) and no significant effect of cue type was found.

For the cancellation of OSS, means of the number of the canonical categories for without cue, location cue and informant cue situations were $M= 3.50$, $SD= 2.46$; $M= 2.78$, $SD= 2.50$; $M= 3.50$, $SD= 2.70$ respectively. The results of the ANOVA conducted revealed that there was no effect of cue type on the number of canonical categories remembered for OSS, $F(2,132)= .930$, $p>.05$.

The means of flashbulb memory scores according to cue type for the cancellation of OSS were $M= 3.27$, $SD= 1.98$ for without cue; $M= 2.62$, $SD= 1.88$ for location cue; $M= 3.14$, $SD= 1.28$ for informant cue. Analyses of Variance is conducted between cue

groups for OSS in terms of flashbulb memory scores ($F(2,132)= 1.28, p>.05$) and no significant effect of cue type was found.

3.6.2. Comparisons of cue type for the September, 11 events

For September, 11 events means of word counts of without cue, location cue and informant cue situations were $M= 39.48, SD= 24.41$; $M= 37.78, SD= 30.30$; $M= 37.76, SD= 31.78$ respectively. The results of the ANOVA conducted revealed that there was no effect of cue type on the number of canonical categories remembered for September, 11 events, $F(2,132)= .054, p>.05$.

Means of without cue, location cue and informant cue situations of number of canonical categories present for September, 11 events were $M= 4.23, SD= 1.58$; $M= 3.87, SD= 1.96$; $M= 3.98, SD= 2.54$ respectively. The results of the ANOVA conducted revealed that there was no effect of cue type on the number of canonical categories remembered for September, 11 events, $F(2,132)= .385, p>.05$.

The means of flashbulb memory scores according to cue type for the September, 11 events were $M=4.14, SD=1.30$ for without cue; $M=3.84, SD=1.47$ for location cue; $M=3.71, SD=1.92$ for informant cue. Analyses of Variance is conducted between cue groups for September, 11 events for flashbulb memory scores ($F(2,132)= .899, p>.05$) and no significant effect of cue type was found.

3.6.3. Comparisons of cue type for the bombing of the HSBC Bank:

For the bombing of the HSBC Bank, means of word counts according to cue type were $M=30.69, SD= 28.84$ for without cue; $M= 37.16, SD= 38.24$ for location cue; $M= 41.43, SD=49.04$ for informant cue. Analyses of Variance is conducted between

cue groups for OSS in terms of word counts ($F(2,132) = .865, p > .05$) and no significant effect of cue type was found.

For the number of canonical categories present for the bombing of the HSBC Bank, the means according to the cue type were for without cue $M=3.44, SD=1.99$; for location cue $M=3.13, SD=2.20$; informant cue $M=3.55, SD=2.25$. Results of the ANOVA conducted revealed that there was no effect of cue type on the number of canonical categories present for the bombing of the HSBC Bank, $F(2,132) = .440, p > .05$.

The means of flashbulb memory scores according to cue type for the bombing of the HSBC Bank were $M=3.68, SD=1.77$ for without cue; $M=3.3, SD=1.85$ for location cue; $M=3.64, SD=1.88$ for informant cue. The results of the ANOVA conducted revealed that there was no effect of cue type on flashbulb memory scores for the bombing of the HSBC BANK, $F(2,132) = .500, p > .05$.

According to the results of the present study, no significant relations were found between cue type and canonical categories.

4. DISCUSSION

The main aim of the present study is to reevaluate the canonical categories in flashbulb memories set by Brown and Kulik (1977). Also, the relationship between the canonical categories and cue type, event type, consequentiality, and event memory was investigated.

4.1. The Comparison of Events

4.1.1. Comparisons for the 1999 Group

The results supported hypothesis 1 for the word counts and number of canonical categories present for OSS, September, 11 events and the bombing of the HSBC Bank. There are significant difference between OSS and the September, 11 events and between OSS and the Bombing of the HSBC Bank. No significant differences were found between September, 11 events and the bombing of the HSBC Bank. The personal event is significantly different from other events in terms of elaboration. It can be concluded that having personal relations with the event is a more important indicator than the distance to event.

Although significant results were found for the number of canonical categories present, no significant results were found among three events in terms of flashbulb memory scores for the 1999 group. The reason behind this situation is this: 1999 group remembered several other categories like time, activity before, other present and day

of week better than the other two groups. However, this information is excluded from the analysis because these categories were not defined as canonical categories by Brown and Kulik (1977) and therefore not included in flashbulb memory scores.

4.1.2. Comparisons of the Whole Group

Word counts of all subjects were examined to see whether there is a difference among the events. The results revealed that word counts of OSS, September, 11 events, and the bombing of the HSBC Bank are not significantly different from each other.

The results showed that number of canonical categories for OSS, September, 11 events, and the bombing of the HSBC Bank are significantly different from each other. OSS and September, 11 events and September, 11 events and the bombing of the HSBC Bank were significantly different from each other. But there were no significant differences between the cancellation of OSS and the bombing of the HSBC Bank. Since these two events are both local this result is understandable.

However, there was a different situation for flashbulb memory scores. OSS and September, 11 events and OSS and the bombing of the HSBC Bank were significantly different from each other. The difference between September, 11 events and the bombing of the HSBC Bank is also close to significance. Due the difference between the results of the number of canonical categories and flashbulb memory scores, it can be stated that none of them can efficiently measure canonical categories alone.

Furthermore, on contrary with the hypothesis 1, mean scores of the global event September 11, events were higher than the local event, the bombing of the HSBC Bank. There are two reasons explaining this result. First of all, September, 11 events

had greater consequentiality than other events and its consequences still affects the world. Second, September, 11 events caused several action of United States and one of them was the invasion of Iraq, which is a neighboring country. These two conditions may have caused higher degrees of rehearsals for the flashbulb memory accounts of the event and therefore higher scores.

4.2. Comparison of Participants According to OSS Entrance Year for the Cancellation of the University Entrance Exam

According to the results, only 1999 group had categories with percentages higher than 50 percent which is the criteria set by Brown and Kulik for a category to be accepted as canonical. These categories are informant/source, own affect, ongoing activity, aftermath and location. This result is in accordance with the second hypothesis of the present study, since the cancellation of the exam is a personal event for the participant who took the exam in 1999. The categories which passed the 50 percent criteria were consistent with the original canonical categories set by Brown and Kulik (1977) for personal event. In Brown and Kulik study, canonical categories for personal events were defined by using subjects own personal memories. In the present study, a controlled event was used and Brown and Kulik's canonical categories for personal events were supported with strong evidence.

4.2.1. OSS Entrance Year and Word Counts for the Cancellation of the OSS

The results revealed that there is a significant difference between participant who entered the OSS in 1998, 1999 and 2000 in terms of word counts. 1999 group used more words than both the 1998 and the 2000 groups who were not different from each other. No significant differences were found in terms of the word counts for

September, 11 Events and the bombing of HSBC Bank among three groups. These results provided support for the hypothesis 2a. Brown and Kulik (1977) used word counts as the measure of the elaboration of the memory. According to these results it can be claimed that participant had a stronger elaboration for personal memories.

4.2.2 OSS Entrance Year and Number of Canonical Categories Present for the Cancellation of OSS

In accordance with hypothesis 2b, results showed that there was a significant effect of OSS entrance year on the number of canonical categories present in participants' flashbulb memory accounts for the cancellation of the OSS. Results of the post hoc analyses revealed that there is a difference between the 1999 group and others but there is no significant difference between 1998 and 2000 groups.

4.2.3 OSS Entrance Year and Flashbulb Memory Score for the Cancellation of the OSS

There is a significant difference between groups in terms of the flashbulb memory scores which was set by Brown and Kulik. According to the post hoc tests conducted flashbulb scores of the 1999 group is significantly higher than the other two and there is no significant difference between 1998 and 2000 groups. There is no difference between groups in terms of flashbulb memory scores for September, 11 events and the bombing of the HSBC Bank.

4.3. The Relationship between Being Affected by the Event and the Canonical Categories

Hypothesis 5 stated that participants who were or someone close to them was affected by the event will have higher scores on words counts, number of canonical

categories present, and flashbulb memory scores. The results revealed that there is a significant difference between participants who are affected by the event and who are not in the predicted direction.

In the case of OSS, affected groups had higher word counts. There is no difference between groups in terms of word counts for September, 11 events and the bombing of the HSBC Bank.

In terms of the number of the canonical categories present and the flashbulb memory scores, there was a significant difference of being affected by the event for the cancellation of the university entrance exam and the bombing of the HSBC Bank. There is no difference between groups in terms of the number of canonical categories present for September, 11 events. Except the September, 11 events, the result revealed that having personal relations with the event caused better elaboration of the memories and flashbulb memories with higher numbers of canonical categories.

However, the case of September, 11 events should be approached carefully since there was a great gap between the numbers of affected and not affected participants. Among 135 participants, only 12 stated that they or someone close to them was affected by the event and it was impossible to make a statistically meaningful comparison.

4.4. Consequentiality and Canonical Categories

There is significant relationship between consequentiality and word counts for OSS. No significant results were found for the word counts of September, 11 events and the bombing of the HSBC Bank. The only difference is found for the OSS event which has personal effects for most of the subjects (92 of them stated that they or

someone close to them is affected by the events). This result may be due to the fact that personal consequentiality has a stronger effect on flashbulb memories (Tekcan & Peynircioglu, 2002).

In terms of flashbulb memory scores and number of canonical categories present, the results showed that there is significant relationship between consequentiality and the two variables for OSS and for the bombing of the HSBC Bank. No significant results were found for the September, 11 events. Again, this result may be due to the fact that both events have higher numbers of participants affected from the event in some way and therefore had higher personal consequentiality ratings.

4.4.1. Personal versus National Consequentiality

In accordance with the previous studies (Brown & Kulik, 1977; Tekcan and Peynircioglu, 2002), the results showed that there are significant relations between personal consequentiality and word counts, number of canonical categories present, and flashbulb memory scores for the cancellation of OSS, and the bombing of the HSBC Bank. No significant results were found for national consequentiality.

Neither for personal nor for national consequentiality, no significant relations were found for the September, 11 events.

4.5. Event Memory and Canonical Categories

In accordance with the previous studies (Nachson & Zelig, 2003), there are significant relationships between event memories and number of canonical categories and flashbulb memory scores for OSS and for September, 11 events and for the bombing of the HSBC Bank.

OSS entrance year has an effect on the event memory scores and results revealed that 1999 group has significantly higher event memory scores from 1998 and 2000 groups. There was no difference between 1998 and 2000 groups. It can be concluded that event memories are stronger for personal events.

There is significant relationship between event memory scores and word count for OSS and for the bombing of the HSBC Bank, in accordance with the previous studies (Nachson & Zelig, 2003) No significant results were found for the relationship between word counts of September, 11 events and event memory scores. this result may be due to the fact that the cancellation of OSS and the bombing of HSBC Bank were more personal for the subjects than the September, 11 events.

4.6. Comparisons of the Cue Type

Between cue groups for all events in terms of word counts, number of canonical categories present and flashbulb memory scores, no significant results were found. However the types of canonical categories which can pass the 50 percent criteria is different for different cue types. For the cancellation of the OSS, without cue group remembered location and informant categories. However, there were no canonical categories which can pass the 50 percent criteria in the location cue group and in the informant cue group, only own affect can be remembered.

For the September, 11 events, all group remembered three canonical categories: location, ongoing activity and informant. But still, the percentages of the without cue group and the location cue group were almost same for location. Furthermore, without cue remembered informant category better than the informant group and the

percentage of location cue and informant cue group were almost same for that category.

For the bombing of the HSBC, both informant cue and without cue groups remembered location category better than the location cue group. The same case applied for the informant category. Both without cue and location cue groups remembered that category better than the informant cue group.

These results are consistent with previous studies (Brown & Hall, 1979; Nobel & Schiffrin, 2001) Brown and Hall (1979) examined the effect of part-list cueing on retrieval of information from semantic memory and found that there was an overall inhibitory effect of cued, relative to non-cued, recall. The results of the present study can be explained due to the inhibitory effect of cued recall.

4.7. Conclusion

In this study, the canonical categories defined by Brown and Kulik (1977) were reevaluated. It was found that the number and types of the canonical categories were affected by the event type, consequentiality, and being affected by the event. These findings might give to direction to further studies on flashbulb memories and canonical categories.

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6. TABLES

Table 1: Types of Canonical Categories Used in Flashbulb Memories since 1977

Year	Study	Location	Time	Ongoing Activity	Others Present
1977	Brown & Kulik	✓		✓	✓
1977	Yarmey & Bull	✓	✓		✓
1983	Winograd & Killinger	✓		✓	
1984	Rubin & Kozin	✓		✓	✓
1984	Pillemer	✓		✓	✓
1987	Pillemer, Koff, & Rhinehart	✓		✓	
1988	Bohannon	✓	✓	✓	
1988	Pillemer & Goldsmith			✓	✓
1988	McCloskey, Wible, & Cohen	✓		✓	
1989	Christianson	✓	✓	✓	✓
1991	Mackavey & Stewart	✓		✓	✓
1993	Wright	✓	✓	✓	✓
1993	Morley			✓	
1993	Weaver	✓		✓	
1994	Conway, Anderson & Larsen et al.	✓		✓	✓
1994	Cohen, Conway, & Maylor	✓		✓	✓
1996	Neisser, Winograd, & Bergman et al.	✓	✓	✓	✓
1996	Scott & Ponsoda	✓		✓	✓
1996	Terr, Bloch, & Michel et al.	✓			✓
1998	Finkenauer, Luminet, & Gisle et al.	✓	✓	✓	✓
1999	Christianson & Engelberg	✓	✓	✓	✓
2000	Winningham, Hyman, & Dinnel	✓	✓	✓	
2000	Schmolck, Buffalo, Squire	✓	✓	✓	✓
2001	Tekcan	✓	✓	✓	✓
2002	Tekcan & Peynircioglu	✓		✓	✓
2002	Davidson & Glisky	✓	✓	✓	✓
2003	Nachson & Zelig	✓		✓	✓
2003	Niedzwienska				
2003	Talarico & Rubin	✓	✓	✓	✓
2003	Pezdek	✓	✓	✓	✓
2003	Lee & Brown	✓	✓	✓	✓
2003	Kvavilashvili, & Mirani et al.	✓	✓	✓	✓
2003	Er	✓	✓	✓	✓
2003	Tekcan, Ece, Gülgöz, & Er	✓	✓	✓	✓
2003	Smith, Bibi, & Sheard	✓	✓	✓	✓
2004	Budson, Simons, & Sullivan et al.				
2004	Luminet, Curci, & Marsh et al.	✓	✓	✓	✓
2004	Weaver & Krug	✓	✓	✓	✓

Table 1. continued.

Year	Study	Location	Time	Ongoing Activity	Others Present
2005	Wolters & Goudsmith	✓	✓	✓	✓
2005	Davidson, Cook, & Glisky et al.	✓	✓		✓
2005	Otai, Kusumi, & Kato et al.	✓		✓	✓
2005	Bernsten & Thomsen	✓	✓	✓	✓
1988	Reynolds & Thakooshian	✓		✓	
2003	Paradis, Solomon, & Florer et al.	✓	✓	✓	✓
2005	Curci	✓	✓	✓	✓

Table 1. continued.

Year	Study	Informant	Own Affect	Affect on Others	Aftermath
1977	Brown & Kulik	✓	✓	✓	✓
1977	Yarmey & Bull				
1983	Winograd & Killinger	✓	✓	✓	✓
1984	Rubin & Kozin		✓		✓
1984	Pillemer	✓	✓	✓	✓
1987	Pillemer, Koff, & Rhinehart		✓	✓	✓
1988	Bohannon	✓			
1988	Pillemer & Goldsmith		✓	✓	
1988	McCloskey, Wible, & Cohen	✓			
1989	Christianson				
1991	Mackavey & Stewart		✓	✓	
1993	Wright				
1993	Morley				
1993	Weaver				
1994	Conway, Anderson, & Larsen et al.	✓	✓	✓	
1994	Cohen, Conway, Maylor	✓	✓	✓	
1996	Neisser, Winograd, & Bergman et al.	✓			
1996	Scott & Ponsoda	✓			
1996	Terr, Bloch, & Michel et al.		✓	✓	
1998	Finkenauer, Luminet, & Gisle et al.		✓	✓	✓
1999	Christianson & Engelberg				
2000	Winningham, Hyman, & Dinnel	✓	✓		
2000	Schmolck, Buffalo, & Squire	✓	✓	✓	
2001	Tekcan	✓			
2002	Tekcan & Peynircioglu	✓			
2002	Davidson & Glisky	✓			
2003	Nachson & Zelig	✓	✓	✓	✓
2003	Niedzwienska				
2003	Talarico & Rubin	✓			
2003	Pezdek	✓			
2003	Lee & Brown				
2003	Kvavilashvili & Mirani et al.	✓			
2003	Er				
2003	Tekcan, Ece, Gülgöz, & Er	✓			
2003	Smith, Bibi, Sheard	✓			
2004	Budson, Simons, & Sullivan et al.				
2004	Luminet, Curci, & Marsh et al.	✓			

Table 1. continued.

Year	Study	Informant	Own Affect	Affect on Others	Aftermath
2004	Weaver & Krug		✓	✓	
2005	Wolters & Goudsmith	✓			
2005	Davidson, Cook, & Glisky et al.	✓			
2005	Otai, Kusumi, & Kato et al.	✓	✓	✓	✓
2005	Bernsten & Thomsen	✓			
1988	Reynolds & Thakooshian				
2003	Paradis, Solomon, & Florer et al.				
2005	Curci	✓			

Table 1. continued.

Year	Study	Nature of event	Reaction	Clothes	First Thought
1977	Brown & Kulik	✓			
1977	Yarmey & Bull				
1983	Winograd & Killinger				
1984	Rubin & Kozin	✓			
1984	Pillemer				
1987	Pillemer, Koff, & Rhinehart				
1988	Bohannon			✓	
1988	Pillemer & Goldsmith	✓	✓		
1988	McCloskey, Wible, & Cohen		✓		
1989	Christianson			✓	✓
1991	Mackavey & Stewart				
1993	Wright				
1993	Morley				✓
1993	Weaver			✓	
1994	Conway, Anderson, & Larsen et al.				
1994	Cohen, Conway, & Maylor				
1996	Neisser, Winograd, & Bergman et al.				
1996	Scott & Ponsoda				
1996	Terr, Bloch, & Michel et al.				
1998	Finkenauer, Luminet, & Gisle et al.	✓	✓	✓	
1999	Christianson & Engelberg				
2000	Winningham, Hyman, & Dinnel				
2000	Schmolck, Buffalo, Squire				
2001	Tekcan			✓	
2002	Tekcan & Peynircioglu				
2002	Davidson & Glisky				
2003	Nachson & Zelig				
2003	Niedzwienska				
2003	Talarico & Rubin				
2003	Pezdek				
2003	Lee, Brown				
2003	Kvavilashvili & Mirana et al.				
2003	Er				
2003	Tekcan, Ece, Gülgöz, & Er				
2003	Smith, Bibi, & Sheard				
2004	Budson, Simons, & Sullivan et al.				
2004	Luminet, Curci, & Marsh et al.				

Table 1. continued.

Year	Study	Nature of event	Reaction	Clothes	First Thought
2004	Weaver & Krug			✓	
2005	Wolters & Goudsmith				
2005	Davidson, Cook, & Glisky et al.				
2005	Otai, Kusumi, & Kato et al.				
2005	Bernsten & Thomsen			✓	
1988	Reynolds & Thakoooshian				
2003	Paradis, Solomon, & Florer et al.				
2005	Curci				

Table 1. continued.

Year	Study	Activity after Event	Date of Event	Day of Week	Change in Ongoing Activity
1977	Brown & Kulik				
1977	Yarmey & Bull	✓			
1983	Winograd & Killinger	✓			
1984	Rubin & Kozin				
1984	Pillemer				
1987	Pillemer, Koff, & Rhinehart				
1988	Bohannon			✓	
1988	Pillemer & Goldsmith		✓		
1988	McCloskey, Wible & Cohen				
1989	Christianson				
1991	Mackavey & Stewart				
1993	Wright				
1993	Morley				✓
1993	Weaver				
1994	Conway, Anderson, & Larsen et al.				
1994	Cohen, Conway, Maylor				
1996	Neisser, Winograd, & Bergman et al.				
1996	Scott & Ponsoda	✓			
1996	Terr, Bloch, & Michel et al.	✓			
1998	Finkenauer, Luminet, & Gisle et al.		✓		
1999	Christianson & Engelberg				
2000	Winningham, Hyman, & Dinnel				
2000	Schmolck, Buffalo, & Squire	✓			
2001	Tekcan				
2002	Tekcan & Peynircioglu				
2002	Davidson & Glisky	✓			
2003	Nachson & Zelig				
2003	Niedzwienska				
2003	Talarico & Rubin				
2003	Pezdek				
2003	Lee & Brown				
2003	Kvavilashvili & Mirani et al.				
2003	Er				
2003	Tekcan, Ece, Gülgöz, & Er				
2003	Smith, Bibi, & Sheard				
2004	Budson, Simons, & Sullivan et al.				
2004	Luminet, Curci, & Marsh et al.		✓	✓	✓

Table 1. continued.

Year	Study	Activity after Event	Date of Event	Day of Week	Change in Ongoing Activity
2004	Weaver & Krug				
2005	Wolters & Goudsmith				
2005	Davidson, Cook, & Glisky et al.	✓			
2005	Otai, Kusumi, & Kato et al.				
2005	Bernsten & Thomsen				
1988	Reynolds & Thakooshian				
2003	Paradis, Solomon, & Florer et al.				
2005	Curci				

Table 1. continued

Year	Study	First Thing Said after Event	First Thing Thought after Event	Activity before Event	Mode of Discovery	Weather
1977	Brown & Kulik					
1977	Yarmey & Bull			✓		
1983	Winograd & Killinger					
1984	Rubin & Kozin					
1984	Pillemer					
1987	Pillemer, Koff, & Rhinehart				✓	
1988	Bohannon					✓
1988	Pillemer & Goldsmith					
1988	McCloskey, Wible and Cohen					
1989	Christianson					
1991	Mackavey & Stewart					
1993	Wright					
1993	Morley					
1993	Weaver					
1994	Conway, Anderson, & Larsen et al.					
1994	Cohen, Conway, Maylor					
1996	Neisser, Winograd, & Bergman et al.					
1996	Scott & Ponsoda					
1996	Terr, Bloch, & Michel et al.					
1998	Finkenauer, Luminet, & Gisle et al.					
1999	Christianson & Engelberg					
2000	Winningham, Hyman, & Dinnel					
2000	Schmolck, Buffalo, & Squire					
2001	Tekcan					
2002	Tekcan & Peynircioglu					
2002	Davidson & Glisky					
2003	Nachson & Zelig					
2003	Niedzwienska					
2003	Talarico & Rubin	✓				
2003	Pezdek	✓	✓			
2003	Lee & Brown					
2003	Kvavilashvili & Mirani et al.					
2003	Er					
2003	Tekcan, Ece, Gülgöz, & Er					
2003	Smith, Bibi, & Sheard					
2004	Budson, Simons, & Sullivan et al.					
2004	Luminet, Curci, & Marsh et al.					

Tablw 1. continued.

Year	Study	First Thing Said after Event	First Thing Thought after Event	Activity before Event	Mode of Discovery	Weather
2004	Weaver & Krug					
2005	Wolters & Goudsmith					
2005	Davidson, Cook, & Glisky et al.			✓		
2005	Otai, Kusumi, & Kato et al.					
2005	Bernsten & Thomsen					
1988	Reynolds & Thakooshian					
2003	Paradis, Solomon, & Florer et al.					
2005	Curci					

Table 2: Percentage of Frequencies of Canonical Categories Used in the Studies between 1977 And 2005

categories	yes	no
Location	89.4	10.6
Ongoing Activity	85.1	14.9
Others Present	71.7	28.3
Informant	56.5	43.5
Time	51.1	48.9
Own Affect	32,6	67,4
Affect on Others	28,3	71,7
Aftermath	17,4	82,6
Activity after Event	15.2	84.8
Clothes	15.2	84.8
Nature of Event	8.7	91.3
Reaction	6.5	93.5
Date of Event	6.5	93.5
First Thought	4.3	95.7
Day of Week	4.3	95.7
change in ongoing activity	4.3	95.7
Activity before Event	4.3	95.7
First Thing Told after Event	2.2	97.8
First Thing Said after Event	2.2	97.8
mode of discovery	2,,2	97.8
weather	2.2	97.8

Table 3a: Distribution of Subjects according to OSS Entrance Year and Cue Type

	1998	1999	2000
no cue	12	17	19
location	11	16	17
informant	12	18	13

Table 3b: Means and Standard Deviations of Age with Respect to OSS Entrance Year

	N	Mean	SD
Group			
1998	35	26,77	,942
1999	51	26,12	1,211
2000	49	25,14	,935

Table 3c: Means and Standard Deviations of Age with Respect to Cue Type

<u>Group</u>	<u>N</u>	<u>Mean</u>	<u>SD</u>
no cue	48	25,73	,939
location	44	25,89	1,301
informant	43	26,21	1,406

Table 4a: Percentages of Canonical Categories for the OSS among Groups

	1998	1999	2000
Location	31,4	56.9	36.7
Time	5,7	21.6	12.2
on going activity	20	64.7	30.6
activity before	5,7	21.6	2
change in on going activity	0	7.8	0
aftermath	17,1	58.8	8.2
others present	11,4	39.2	14.3
informant	40	72.5	38.8
own affect	31,4	66.7	32.7
affect of others	8,6	5.9	12.2
first thought	20	29.4	28.6
first thing said after event	2,9	11.8	10.2
first told	0	9.8	6.1
day of week	2,9	3.9	0
weather	0	0	2
clothes	2,9	0	0

Table 4b: Percentages of Canonical Categories for All Subjects

	OSS	SEP. 11	HSBC
Location	43	64.4	67.4
Time	14.1	6.3	6.7
ongoing activity	40.7	61.5	40.7
activity before	10.4	9.6	9.6
change in on going activity	3	3.7	11.1
aftermath	29.6	38.5	46.7
others present	23	29.6	11.9
informant	51.9	77	64.4
own affect	45.2	43	37.8
affect of others	8.9	11.9	10.4
first thought	26.7	32.6	17.8
first thing said after event	8.9	5.9	2.2
first told	5.9	10.4	4.4
day of week	2.2	0.7	2.2
weather	0.7	5.2	2.2
clothes	0.7	2.2	0

Table 5: Means of Word Counts, Number of Canonical Categories Present and Flashbulb Memory Scores for the Cancellation of OSS, September, 11 Events and the Bombing of the HSBC Bank According to Being Affected by the Event

	OSS				September 11				HSBC			
	Yes		No		Yes		No		Yes		No	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Word Counts	55.62	59.42	12.63	17	30.42	23.70	39.15	29.04	49.96	47.86	33.21	36.48
Number of Canonical Categories Present	3.90	2.47	1.51	1.88	3.83	1.58	4.05	2.08	4.17	2.22	3.20	2.09
Flashbulb Memory Scores	3.67	1.78	1.60	1.89	4	.95	3.90	1.62	4.25	1.51	3.40	1.86

Table 6a: Percentages of Canonical Categories for the Cancellation of OSS According to Cue Type

	combined	w/o cue	location	informant
location	43	50	40	38,1
time	14,1	16,7	13,3	11,9
ongoing activity	40,7	41,7	37,8	42,9
activity before event	10,4	6,3	6,7	19
change in ongoing activity	3	4,2	0	4,8
aftermath	29,6	29,2	22,2	38,1
other present	23	29,2	24,4	14,3
informant	51,9	60,4	46,7	47,6
own affect	45,2	45,8	37,8	52,4
affect of others	8,9	8,3	2,2	16,7
first thought	26,7	35,4	26,7	16,7
first thing said after event	8,9	12,5	8,9	4,8
first thing told after event	5,9	6,3	6,7	4,8
day of week	2,2	4,2	2,2	0
weather	0,7	0	2,2	0
clothes	0,7	2,1	0	0

Table 6b: Percentages of Canonical Categories for the Cancellation of September 11 Events According to Cue Type

	combined	w/o cue	location	informant
location	64,4	68,8	68,9	54,8
time	6,3	6,3	8,8	4,8
ongoing activity	61,5	60,4	64,4	59,5
activity before event	9,6	10,4	11,1	7,1
change in ongoing activity	3,7	2,1	2,2	7,1
aftermath	38,5	37,5	37,8	40,5
other present	29,6	33,3	24,4	31
informant	77	87,5	71,1	71,4
own affect	43	43,8	37,8	47,6
affect of others	11,9	16,7	2,2	7,1
first thought	32,6	35,4	24,4	38,1
first thing said after event	5,9	4,2	11,1	24
first thing told after event	10,4	6,3	11,1	14,3
day of week	0,7	0	0	2,4
weather	5,2	6,3	2,2	7,1
clothes	2,2	2,1	2,2	2,4

Table 6c: Percentages of Canonical Categories for the Cancellation of the Bombing of HSBC Bank According to Cue Type

	combined	w/o cue	location	Informant
location	67,4	70,8	64,4	66,7
time	6,7	8,3	11,1	0
ongoing activity	40,7	50	37,8	33,3
activity before event	9,6	6,3	6,7	16,7
change in ongoing activity	11,1	16,7	8,9	7,1
aftermath	46,7	56,3	35,6	47,6
other present	11,9	6,3	8,9	21,4
informant	64,4	68,8	66,7	57,1
own affect	37,8	29,2	35,6	50
affect of others	10,4	42	8,9	19
first thought	17,8	14,6	15,6	23,8
first thing said after event	2,2	0	6,7	0
first thing told after event	4,4	4,2	4,4	4,8
day of week	2,2	4,2	0	2,4
weather	2,2	4,2	0	2,4
clothes	0	0	0	0

7. FIGURES

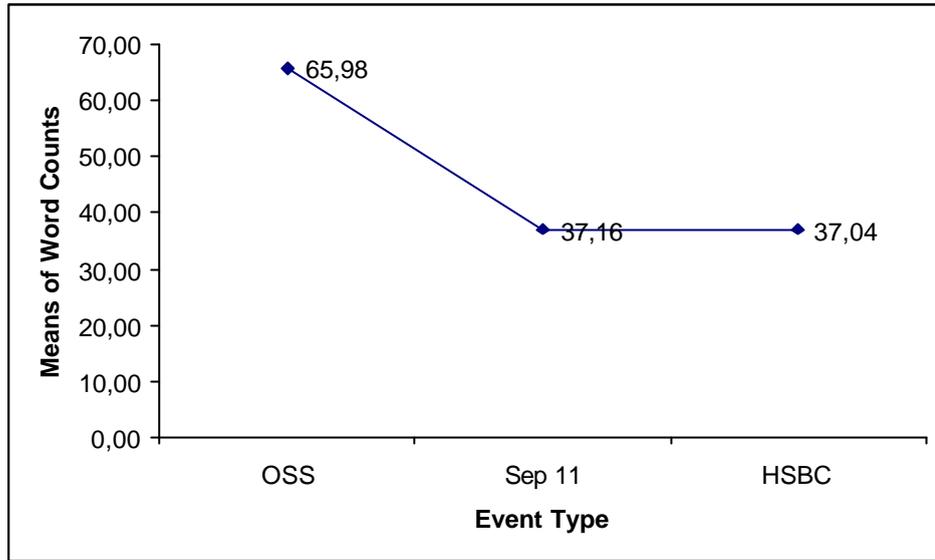


Figure 1: Means of 1999 Group for word counts for all events

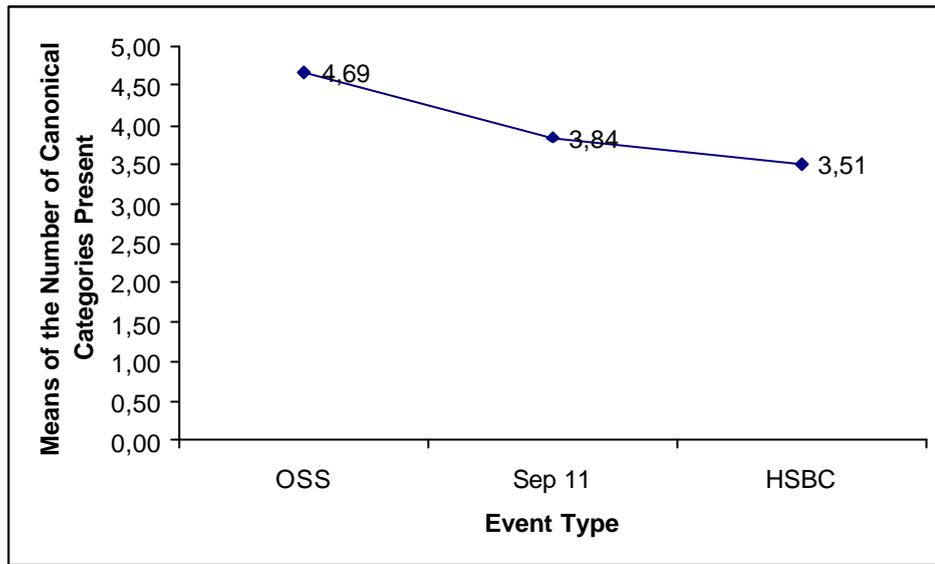


Figure 2: Means of number of canonical categories present for 1999 group for all events

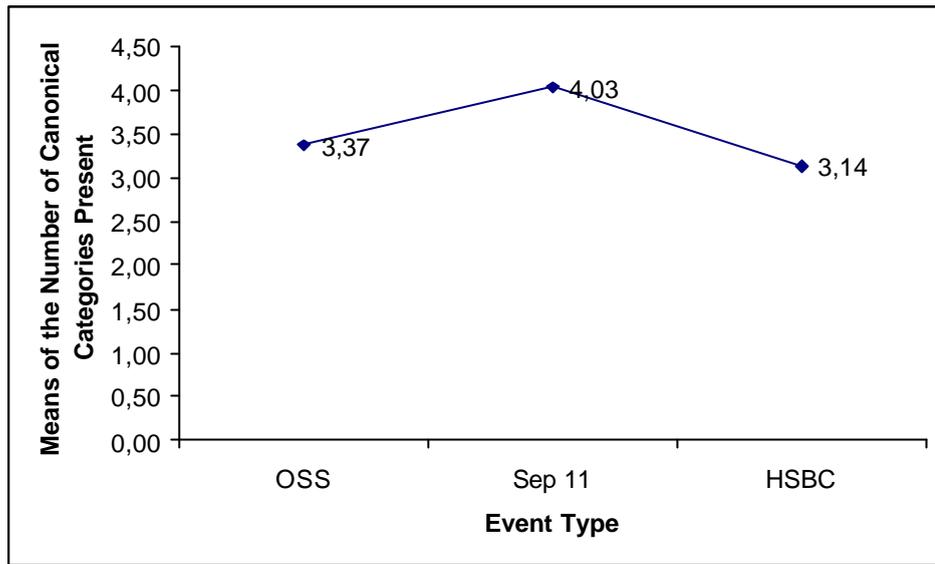


Figure 3: Means of number of canonical categories present

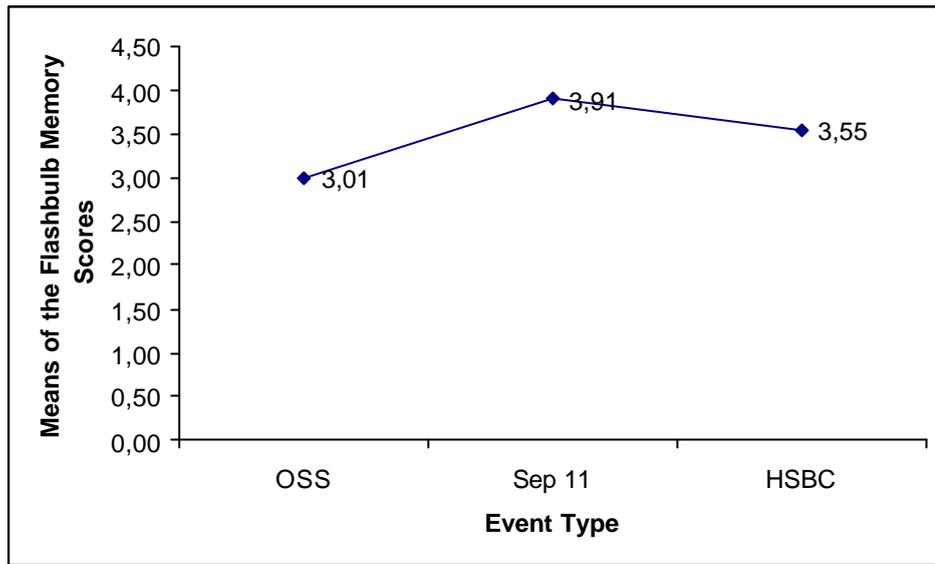


Figure 4: Means of flashbulb memory scores

APPENDIX A: FLASHBULB MEMORY INSTRUCTION WITHOUT CUE

Flas bellek önemli, beklenmedik ve duygusal boyutu olan toplumsal ya da bireysel olayların ilk kez öğrenildiği an ile ilgili ayrıntıların hatırlanmasına verilen isimdir. Olayın üzerinden çok uzun zaman geçse de olayı öğrendiğiniz **ana dair koşullar** çok net bir şekilde hatırlanabilir. Sizden istediğimiz bazı toplumsal olayları **ilk öğrendiğiniz anda** ne yaptığınızı ayrıntılı olarak anlatmanız. Sizden, olaya ait bilgileri hatırlamanızı **değil, olayı öğrendiğiniz ana dair bilgileri hatırlamanızı istiyoruz.**

APPENDIX B: FLASHBULB MEMORY INSTRUCTION WITH LOCATION CUE

Flas bellek önemli, beklenmedik ve duygusal boyutu olan toplumsal ya da bireysel olayların ilk kez öğrenildiği an ile ilgili ayrıntıların hatırlanmasına (nerede vs.) verilen isimdir. Olayın üzerinden çok uzun zaman geçse de olayı öğrendiğiniz **ana dair koşullar** çok net bir şekilde hatırlanabilir. Sizden istediğimiz bazı toplumsal olayları **ilk öğrendiğiniz anda** ne yaptığınızı ayrıntılı olarak anlatmanız. Sizden, olaya ait bilgileri hatırlamanızı **değil, olayı öğrendiğiniz ana dair bilgileri hatırlamanızı istiyoruz.**

APPENDIX C: FLASHBULB MEMORY INSTRUCTION WITH INFORMANT CUE

Flas bellek önemli, beklenmedik ve duygusal boyutu olan toplumsal ya da bireysel olayların ilk kez öğrenildiği an ile ilgili ayrıntıların hatırlanmasına (kimden vs.) verilen isimdir. Olayın üzerinden çok uzun zaman geçse de olayı öğrendiğiniz **ana dair koşullar** çok net bir şekilde hatırlanabilir. Sizden istediğimiz bazı toplumsal olayları **ilk öğrendiğiniz anda** ne yaptığınızı ayrıntılı olarak anlatmanız. Sizden, olaya ait bilgileri hatırlamanızı **değil, olayı öğrendiğiniz ana dair bilgileri hatırlamanızı istiyoruz.**

APPENDIX D: FLASHBULB MEMORY QUESTIONNAIRE FOR THE
CANCELLATION OF UNIVERSITY ENTRANCE EXAM

1 Mayıs 1999 da Öğrenci Seçme Sınavının iptal edildiğini ilk öğrendiğiniz anı hatırlıyor musunuz?

Hatırlıyorsanız lütfen ayrıntılı bir şekilde anlatınız.

APPENDIX E: FLASHBULB MEMORY QUESTIONNAIRE FOR THE
SEPTEMBER, 11 EVENTS

11 Eylül 2001'de Dünya Ticaret Merkezi'ne yapılan saldırıyı ilk öğrendiğiniz anı hatırlıyor musunuz?

Hatırlıyorsanız lütfen ayrıntılı bir şekilde anlatınız.

APPENDIX F: FLASHBULB MEMORY QUESTIONNAIRE FOR THE BOMBING
OF THE HS BC BANK

20 Kasim 2003'de Levent'teki HSBC bankasinin bombalandigini ilk öğrendiginiz ani hatirliyor musunuz?

Hatirliyorsaniz lütfen ayrintili bir sekilde anlatiniz.

APPENDIX G: CONSEQUENTIALITY QUESTIONNAIRE

APPENDIX H: EVENT MEMORY QUESTIONNAIRE

1. 1 Mayıs 1999'da Öğrenci Seçme Sınavı neden iptal edilmisti?
2. Sınavın iptaline neden olan olay nerede gerçekleşti?
3. Sınav haftanın hangi günü iptal edildi?
4. İkinci sınav ne zaman yapıldı?
5. 11 Eylül 2001'de Dünya Ticaret Merkezi'ne yapılan saldırıda kaç uçak kullanıldı?
6. Aynı gün başka nerelere saldırı düzenlenmisti?
7. Saldırıları ilk kim üstlendi?
8. 20 Kasım 2003'de Levent HSBC bankasının bombalanması olayını ilk kim üstlendi?
9. Aynı gün İstanbul'da başka yerlerde saldırılar gerçekleşti?
10. Saldırı saat kaçta gerçekleşti?
11. HSBC bankasının bombalanmasıyla aynı günlerde İstanbul'un farklı bölgelerinde benzer saldırılar gerçekleşti. Bu olaylardan hatırladıklarınızı yazınız.