

THE ROLE OF DIRECT AND GENERATIVE RETRIEVAL
IN ACCESS TO INVOLUNTARY AND VOLUNTARY
AUTOBIOGRAPHICAL MEMORIES

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Thesis Abstract

Pınar Ersoy, “The Role of Direct and Generative Retrieval in Access to Involuntary and Voluntary Autobiographical Memories”

Two distinct retrieval mechanisms were used in access to autobiographical memories, namely direct and generative retrieval. To date, memories accessed through direct and generative retrieval were only compared in voluntary remembering context. In addition, previous studies comparing involuntary (IAMs) and voluntary (VAMs) autobiographical memories did not take this distinction into account. Since involuntary autobiographical memories (IAMs) were also argued to be accessed through direct retrieval, the present study aimed to compare IAMs with directly retrieved (DR-VAMs) and generated memories (GEN-VAMs) separately. IAMs and VAMs were collected in two consecutive sessions by using Vigilance Task and Galton-Crovitz cue-word technique, respectively. Same 62 individuals (44 female, 18 male) participated in both sessions. The results revealed that IAMs were similar to DR-VAMs in many aspects, although the latter was deliberately recalled. Specifically, both IAMs and DR-VAMs were retrieved faster than GEN-VAMs. They had more emotional impact on rememberer and they included more specific events, compared to GEN-VAMs. However, the difference in specificity was found to be caused by the personal relevance of the cue; when same cues were used to trigger IAMs and VAMs, higher specificity of IAMs disappeared. Additionally, it was observed that phenomenology of deliberate and spontaneous recollections of the same recent events were not different. Overall, the present findings suggest that most of the differences between IAMs and VAMs result from direct and generative retrieval distinction, rather than deliberate or spontaneous recall of memories.

Tez Özeti

Pınar Ersoy, “İstemli ve İstemsiz Otobiyografik Anılara Ulaşmada Doğrudan ve Üretilmiş Geri Çağırmanın Rolü”

Otobiyografik anılara ulaşmada, doğrudan ve üretilmiş geri çağırma olarak bilinen iki farklı mekanizma işlemektedir. Günümüze dek yapılan çalışmalarda, bu iki geri çağırma mekanizması ile ulaşılan anılar yalnızca istemli hatırlamada test edilmiştir. Ek olarak, istemli ve istemsiz otobiyografik anıları karşılaştıran çalışmalar, bu geri çağırma mekanizmalarını dikkate almamıştır. İstemsiz otobiyografik anıların da doğrudan geri çağırma ile ulaşıldığı argümanından yola çıkarak, bu çalışma, istemsiz otobiyografik anıları (İOA), doğrudan geri çağırılan (D-OA) ve üretilerek geri çağırılan istemli otobiyografik anılar (Ü-OA) ile ayrı ayrı karşılaştırmayı amaçlamıştır. İstemsiz anılar Uyanıklık Görevi, istemli anılar Galton-Crovitz anahtar sözcük metodu kullanılarak iki ayrı oturumda toplanmıştır. Çalışmaya, her iki oturuma da katılan 62 kişi (44 kadın, 18 erkek) dahil edilmiştir. Araştırma sonucunda ortaya çıkan bulgulara göre, D-OA istemli bir şekilde hatırlanıyor olmasına karşın, çoğu özelliği açısından, aynı geri çağırma mekanizmasını kullanan İOA ile benzerlik göstermektedir. Spesifik olarak, İOA ve D-OA, Ü-OA ile kıyaslandıklarında, duygusal etkileri daha yüksek, daha çabuk hatırlanan, ve daha belirgin (spesifik) olaylara dair anılar olmuşlardır. Fakat, aynı sözcükler ile tetiklenen istemli ve istemsiz anılar arasında belirginlik açısından anlamlı bir fark bulunmaması, belirginlikte geçmişte bulunan farkların sözcüklerin kişisel ilintilerinden kaynaklandığına işaret etmektedir. Ek olarak, aynı olaya dair kasıtlı bir biçimde ya da kendiliğinden hatırlanan anılar arasında fenomenolojik özellikler açısından bir fark saptanmamıştır. Kısaca, bulgular, istemli ve istemsiz anılar arasındaki farkların genel olarak, kasıtlı ya da kendiliğinden oluşan bir hatırlamadan ziyade, geri çağırma mekanizmalarından ileri geldiğine işaret etmektedir.

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To my father...

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CHAPTER I

INTRODUCTION

Even though the distinction between involuntary and voluntary remembering was made as early as the nineteenth century in Ebbinghaus' pioneering work on memory (Ebbinghaus, 1885/1913, p.2), it took almost a century for involuntary autobiographical memories to become a topic of investigation in cognitive psychology until Berntsen called attention to it in 1996. Involuntary autobiographical memories (IAMs) are the memories of personal experiences that are remembered without the person's conscious attempt of retrieving it (Berntsen, 1996). In other words, IAMs spontaneously pop up in our minds in everyday life, usually during when we are not engaged in an attention-demanding task or activity (Ball, 2007; Johannessen & Berntsen, 2010). As a relatively new area, studies mostly focused on the frequency of involuntary remembering and the characteristics of those memories, as well as the similarities and differences between involuntary and voluntary autobiographical memories (VAMs) (e.g., Berntsen, 1998; Berntsen & Hall, 2004; Rasmussen & Berntsen, 2011). In a similar vein, the present study aimed to contribute to the accumulative knowledge by investigating what makes these spontaneous memories different from deliberate counterparts. Specifically, the present study aimed to identify the differences originating from retrieval mechanisms and those originating from intention of remembering.

Theoretical Explanation of Involuntary Remembering

IAMs are considered instances of what Conway called "direct retrieval" (Conway, 2001a; Conway, 2005; Conway & Pleydell-Pearce, 2000). According to the Self-Memory-System (SMS) framework, there are different conceptual structures in which memories are represented. As being the highest structural level after "themes", "life-

time periods” store memories from a period of one’s life that belong to the same theme. Life-time periods hold new cues to make the search process channeled to “general events”. General event structures have components that represent the summaries of events that occurred within each particular life-time period. Similarly, general event structures also provide new cues to reach “event-specific knowledge base” in which specific episodic memories are stored. Thus, according to the SMS framework, autobiographical memory remembering is a hierarchical process in which the sought-for-information is reached after some “search-evaluate-elaborate” processes are achieved, as demonstrated first by Norman and Bobrow (1979). When an individual starts *searching* for a memory, the activated knowledge is *evaluated*, and the search is continued by *elaboration* of the cue if it is not terminated by access to the sought-for-information. When a search cycle is initiated, the activation spreads through the autobiographical knowledge structures with the elaboration of the cue. This elaboration continues with further elaborations that are usually related to the person’s current goals, named as “working self” (Conway, 2001b; Conway, 2005). In other words, cue elaboration lasts until the information spreads from life-time periods (e.g., *high school years*) to the general events (e.g., *a school trip in high school years*), and eventually to the event-specific knowledge (e.g., *losing keys in that trip*) where an individual or associated phenomenological record is accessed (Conway 2001a). This iterative process is called as “generative retrieval”. “Although the probability is low” as Conway (2001b) argued, reaching a memory without this generative cycle is also possible, as called by “direct retrieval” (see Figure 1). Direct retrieval occurs when the cue is capable of directly activating event-specific knowledge; therefore it does not require an iterative search on the knowledge base. In this case, once a cue activates event-specific knowledge, the memory is constructed; then the activation spreads through the higher-

order knowledge structures (general events and lifetime periods), and then it is linked to the working self (Conway, 2001a; Conway, 2005). In sum, although being rare occurrences (Conway, 2001b), Conway argued that involuntary spontaneous memories are those accessed through direct retrieval and usually they are events experienced very recently (i.e., in the last twenty-four hours) since they are highly related to current active goals (Conway, 2005).

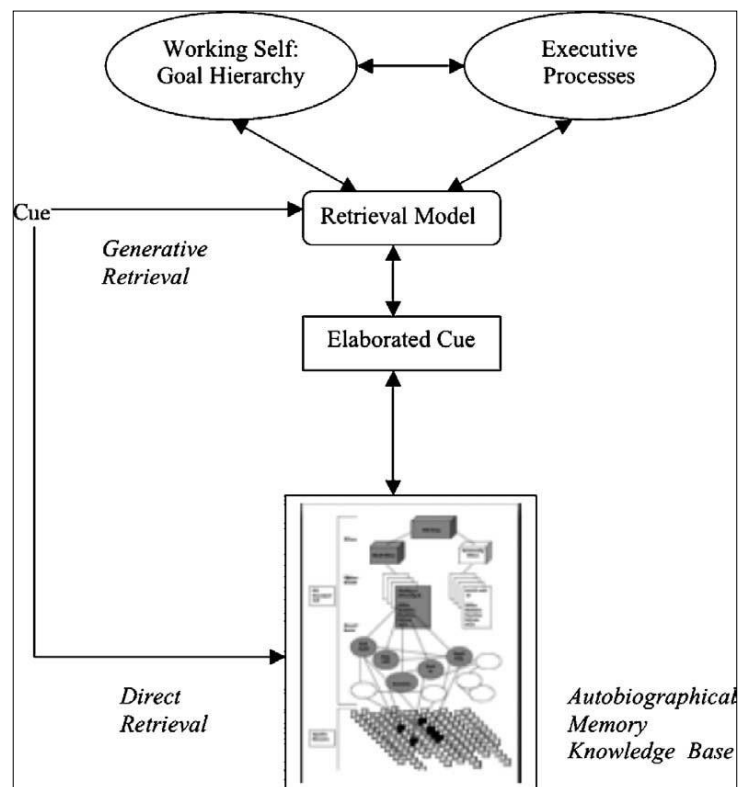


Figure 1: Direct and generative retrieval according to Conway's SMS (Conway, 2005)

Although Conway's SMS framework clearly explains the differences between direct and generative retrieval as well as how they occur, there is not much experimental work examining them. To my knowledge, there are some early studies which could be considered in line with this direct – generative retrieval distinction, as well as a few recent studies (e.g., Addis, Knapp, Roberts, & Schacter, 2012; Uzer, Lee, & Brown, 2012) which demonstrated both kinds of retrieval.

Conway and Bekerian (1987; Experiment 2) asked participants to list a number of personal life-time periods from their own lives, and to write some general events that happened during each period. Four or five months later, the same participants retrieved specific autobiographical memories either in response to these general events (i.e., personal history cues) or to some other semantic cues. Average retrieval times of memories cued by semantic words were around 3.5 seconds, while memories triggered by personal history cues were retrieved in around two seconds. These faster retrieval times can be considered as more of a product of direct retrieval since the cues directly activated the event-specific knowledge structure. In addition, participant rated the memories given in response to personal history cues as more important and more frequently rehearsed than they memories cued by general action or other semantic cues (Conway & Bekerian, 1987; Experiment 3). In order to examine the process of retrieval, Haque and Conway (2001) used a probe paradigm in which participants were stopped either at two, five, or thirty seconds after they started to the memory search, and they were asked to verbalize their thoughts. Verbal protocols were then coded by experimenters as lifetime periods, general events, and specific memories. The results were clearly in line with the hierarchical structure of SMS framework; most of the lifetime events were given at the two-second-probe, while most of the general events were given at the five-second-probe and most of the specific memories were given at the thirty-second-probe. However, there was still a high number of specific memories (almost 20%) that were remembered until the two-second-probe and these were explained as instances of direct retrieval (Haque & Conway, 2001; Experiment 1 & 2).

St. Jacques and colleagues (2011) used the SenseCam to elicit autobiographical memories, which is a wearable device that takes many photographs during one's everyday life without disrupting it. Participants wore the SenseCam during a week when

they also recorded their daily experiences on a diary. Researchers then compared the memories cued by SenseCam images and by the phrases taken from these diaries in terms of phenomenological characteristics. Memories triggered by SenseCam images were found to be rated higher in terms of vividness and reliving. Although both cues were personally relevant, it can be argued that SenseCam pictures were more likely to facilitate direct retrieval of memories, and therefore resulted in higher ratings of phenomenological properties (St. Jacques, Conway, & Cabeza, 2011). Given evidence indicating that personally relevant cues facilitate direct access to the memories (e.g., Conway & Bekerian, 1987), Addis and colleagues (2012) conducted an fMRI study in which they examined memories accessed through direct and generative retrieval in two groups of participants. They asked participants in direct retrieval condition to recall an event in the pre-scan session with the aim of creating personalized cue phrases to promote direct retrieval in the scan session. Generative retrieval group, on the other hand, was requested to imagine future events in pre-scan session. In the scan session, all participants were asked to remember a specific memory in response to the cues; however, direct retrieval group was cued by personal cue phrases, while generative retrieval group was cued by the same words as those used in the pre-scan session. They found that retrieval times of autobiographical memories in direct retrieval condition was shorter than those in generative retrieval condition. These directly retrieved memories were also rated as more detailed and more personally significant than memories accessed through generative retrieval. Event recency and field/observer perspective ratings were similar in two conditions. In addition, the analyses of fMRI data suggested that activations found in lateral prefrontal and temporal regions in generative retrieval group indicated strategic search operations (Addis et al., 2012).

Uzer et al. (2012) conducted a study on the prevalence of direct and generative retrieval in VAMs. They used a think-aloud procedure to investigate the retrieval processes of autobiographical memories in response to cue words. They argued that the vocalizations indicating search (descriptions of search processes, comments about cue words, and utterances), and silence or vocalizations without search (non-verbalization, verbalization of the reported memory, and staying silent) corresponded to generative and direct retrieval, respectively. These verbal protocols strongly overlapped with the retrieval times of directly retrieved and generated memories, as well as with the participants' self-reports on strategy (i.e., "whether or not the memory had come immediately to mind / whether or not they actively searched for memory", and information used (i.e., "This memory was triggered by the cue word, so I did not have to use information about my life to help me recall this memory" / "This memory was not triggered by the cue word, so I had to use information about my life to help me recall this memory") (See Moscovitch, 1989, as cited in Moscovitch & Melo, 1997, for a similar approach to strategic retrieval¹). Thus, this study provided evidence that people could correctly identify their retrieval mechanisms; in other words, self-report data on retrieval mechanisms are reliable. Perhaps the most important finding of this study was that the overall frequency of direct retrieval (nearly 60%) was higher than that of generative retrieval (Uzer et al. 2012), which contradicted Conway's arguments on direct retrieval as being rare occurrences (Conway, 2001b).

Considering the studies discussed above, there appears to be a problem in the IAM literature regarding the comparison of IAMs and VAMs. The studies which

¹ Moscovitch (1989; as cited in Moscovitch, & Melo, 1997) classified retrieval processes as *associative* and *strategic* retrieval, which corresponds to *direct* and *generative* retrieval in Conway's (2005) terms. He argued that by engaging in strategic processes one can define the memory problem, use personal or general knowledge, evaluate the recovered memory, and finally place it to the temporal-spatial context in relation to other events.

compared IAMs and VAMs disregarded the high frequency of direct retrieval in voluntary remembering (Uzer et al., 2012). That is to say, if direct retrieval occurs at least as frequently as generative retrieval in voluntary remembering, then a basic comparison between IAMs and VAMs simply reflects a comparison between direct retrieval and a combination of direct *and* generative retrieval. As I will discuss later, although comparative studies of IAMs and VAMs found some consistent results on similarities and differences (e.g., Berntsen, 1998; Berntsen & Rubin, 2002), there are also some inconsistent findings (e.g., Berntsen, 1998; Johannessen & Berntsen, 2010). These inconsistent findings might well be caused by neglecting the retrieval mechanism distinction; high frequency of direct retrieval in VAMs might hinder the differences. In addition, although involuntary memories are seen as examples of direct retrieval, all studies examining direct and generative retrieval were based on voluntary memories. Thus, there is no empirical evidence showing that VAMs elicited by direct retrieval and IAMs share common characteristics. Thus, the most important aims of the present study are to compare IAMs and VAMs by looking at directly retrieved (DR-VAMs; hereafter) and generated voluntary memories (GEN-VAMs; hereafter) separately, as well as to provide empirical evidence on shared characteristics of IAMs and DR-VAMs.

Characteristics of Involuntary Autobiographical Memories

The studies on IAM were mostly conducted by using the structured diary method to collect memory reports (e.g., Berntsen, 1998; Mace, Atkinson, Moeckel, & Torres, 2011). In this method, participants were first asked to record their IAMs at the time of occurrence, and then answer questions about these memories later in the day at an appropriate time. Survey method was also used in IAM research, especially to identify the frequency of IAM instances (e.g., Berntsen & Rubin, 2002). More recently, a

number of studies were conducted using laboratory tasks with the aim of collecting IAMs in a controlled environment (e.g., Ball, 2007; Schlagman & Kvavilashvili, 2008).

Frequency of Involuntary Memories

Berntsen and Rubin (2002) asked participants how frequently they remember an IAM, and found that frequency estimations were generally in between “some times a year” and “some times a month”. In fact, these estimations were quite low, especially considering that IAMs may be unnoticed or forgotten easily (Berntsen, 1996).

Rather than asking participants to estimate how frequently they experience any involuntary memory, Rubin and Berntsen (2009) first specified the events (either an important event from last week, or an event from their Confirmation day which is a landmark event in Danish culture), and then asked participants to estimate the frequency of spontaneous recollection of those events. The results indicated that the frequency of IAMs of those events were as high as VAMs (Rubin & Berntsen, 2009). More recently, Rasmussen and Berntsen (2011) provided participants with a mechanical counter which helps them to simply identify the exact number of IAMs and VAMs during a day. IAMs were found to be more than three times as frequent as VAMs, which indicates that involuntary remembering is a basic mode of remembering, rather than an exception. Considering IAMs could also pop up in our minds after we deliberately remember an autobiographical memory (Mace, 2006), as well as just after another IAM (i.e. chaining) (Mace, 2005), these results might even be underestimating the frequency of IAMs.

These high frequencies of IAMs are in line with those found in the VAM studies for DR-VAM occurrences (Uzer et al., 2012). Altogether, the literature suggests that direct retrieval, either involuntary or voluntary, is a basic mode of remembering personal past.

Identification of Triggers

The most famous example of a cue triggering an IAM is that of Marcel Proust's. When his mother serves tea and *madeleine* cookies to Proust, the smell of the cookies suddenly takes him to a Sunday morning at which his aunt gave him these cookies after dipping in her tea (Proust, 1928/1998). The cues triggering IAMs can be sensory/perceptual as in the example of Proust's, as well as abstract (e.g, thought, words, or phrases) or they can be state (e.g., being ill, feeling happy) (Mace, 2004). It was found that abstract cues were more likely trigger an IAM (Mace, 2004). According to another classification, cues can either be external, internal, or mixed (e.g., Berntsen, 1996) with a high prevalence of being external (Berntsen, 2001; Berntsen & Hall, 2004).

Studies consistently found that while there are some IAMs that come to mind with no identifiable trigger, in most of the cases (almost 85%), individuals could identify what makes them to remember that specific IAM (e.g., Berntsen, 1996; Kvavilashvili & Schlagman, 2011; Mace, 2005). In addition, identifying the trigger is so usual in involuntary remembering that individuals reported more surprise after a memory comes to their minds if they could not identify the trigger (Ball & Little, 2006).

Retrieval Times

Retrieval times can be described as the time passed from appearance of a cue until it triggers a memory. It can be measured in laboratory tasks by subtracting the presentation time of the cue from the time an individual indicates s/he has a memory. Three methods have been used to measure retrieval time. The first one is Continuous Word Association Task (CWAT); in which the participants had to say the first words that came to their minds in a continuous free association procedure (Ball, 2007). After

nearly half a minute, they were stopped by the experimenter and requested to identify IAMs that they had experienced during the task, if any. In another laboratory task (Schlagman & Kvavilashvili, 2008), participants were told that they were in a concentration experiment, and they had to say “yes” out loud when they saw a trial composed of vertical lines, rather than horizontal lines. The trials also contained some phrases; however, the participants were instructed that the words were serving as distracters, so they had to ignore them and concentrate on the lines. They were also given information about what an IAM is, and asked to click on mouse if they had any IAM during the vigilance task. The vertical lines appeared so infrequently that the task did not require much attention allocation, which promoted mind wandering (see Giambra, 1989, for a similar task used in a mind-wandering study). The third task was generated by Berntsen and colleagues with the aim of controlling the encoding phase in the laboratory. In this task, they presented some pictures paired with sounds to the participants in the encoding phase, and investigated the spontaneous memories of the pictures during subsequent sound location task (Berntsen, Staugaard, & Sorensen, 2013). Although the memories were not autobiographical in nature, this study still gave an idea of retrieval times of the spontaneous recollections, compared to deliberate ones.

Table 1. Studies with Comparison of Retrieval Times (RTs) of Memories

<u>Studies</u>	<u>Mean Retrieval Times (sec.)</u>			
	<u>IAMs</u>	<u>VAMs</u>	<u>Direct Retrieval</u>	<u>Generative Retrieval</u>
Ball, 2007	3.80*	NA		
Berntsen, Staugaard, & Sorensen, 2013	5.10*	7.20		
Schlagman, & Kvavilashvili, 2008; Study 1	5.06*	9.74		
Schlagman, & Kvavilashvili, 2008; Study 2	4.61*	10.13		
Addis, Knapp, Roberts, Schacter, 2012			5.13*	8.20
Uzer, Lee, & Brown, 2012; Study 1			~4.00*	~14.00
Uzer, Lee, & Brown, 2012; Study 2			~3.00*	~10.00
Uzer, Lee, & Brown, 2012; Study 3			~3.50*	~9.00

* Significantly shorter RTs compared to the counterparts.

As seen in Table 1, in all studies, IAM retrieval occurred in around four seconds after the participants were presented with the cue. In addition, the differences between retrieval times of IAMs and VAMs are significant in both three studies which compared them (Schlagman & Kvavilashvili, 2008; Berntsen, Staugaard, & Sørensen, 2013) and in another study using CWAT (Jones & Steel, 2012)². As indicated in Table 1, DR-VAMs had also similar retrieval times to those found in IAM studies. In addition, they had significantly shorter retrieval times than GEN-VAMs (Addis et al., 2012; Uzer et al., 2012). However, since there is no empirical evidence regarding this similarity, clearly there is a need to compare DR-VAMs, GEN-VAMs and IAMs in the same study.

Similarities and Differences between IAMs and VAMs

Perhaps the most distinctive characteristic of IAMs is their higher specificity. As opposed to being memories of sequential events occurred in more than one day or summarized events that occur repeatedly, specific memories are those which focused on one particular event which culminates in the same day or lasts until the next morning (Singer & Blagov, 2002). IAMs, compared to VAMs, were found to be highly specific by almost all work including diary studies (e.g., Berntsen, 1998; Mace et al., 2011; Watson, Berntsen, Kuyken, & Watkins, 2013) and laboratory studies (Schlagman & Kvavilashvili, 2008), as well as another procedure in which IAMs were examined (Mace, 2006). There is only one inconsistent finding regarding specificity; Rubin, Boals, and Berntsen (2008) found that IAMs were less specific than VAMs. However, in this study, participants were asked to remember a *specific* VAM from the same period that they reported an IAM. This might have led the participants use their IAMs as

² Jones and Steel's (2012) work is not included to Table 1 since they did not report the retrieval times of IAMs and VAMs.

cues, and since they were highly personal, VAMs triggered by this cue might even have been more specific.

To my knowledge, specificity of memories accessed through direct and generative retrieval was not examined directly before. However, there is evidence coming from a trauma study. Traumatized individuals were known as having difficulties on remembering specific episodes of their trauma memories. In this study, researchers used two different autobiographical memory tasks to promote direct and generative retrieval. They found that the memories of non-traumatized group were more specific than those of traumatized group, in the task that leads to generative retrieval. However, this difference was disappeared in direct retrieval task (Hauer, Wessel, Geraerts, Merckelbach, & Dalgleish, 2008). These findings can be interpreted as direct retrieval more likely allows someone to remember specific memories, even in a sample of people who usually could not generate these specific episodes. However, since no study compared specificity of IAMs and directly retrieved VAMs, there is a need of a more focused examination.

IAMs and VAMs were also compared in terms of phenomenological qualities. To date, only two studies (Berntsen & Hall, 2004; Rubin et al., 2008) focused directly on these properties. Berntsen and Hall (2004) were interested in reliving qualities of IAMs. Higher mood impact and more physical reactions were associated with IAMs; therefore, they concluded that IAMs instigate more emotional reliving than VAMs. Rubin and his colleagues (2008) used Autobiographical Memory Questionnaire (AMQ) developed by Rubin, Schrauf, & Greenberg (2003) to identify phenomenological properties in many aspects. IAMs were found to be less likely associated with the knowledge of setting where the event occurred, compared to VAMs. In addition, IAMs came to the participants as a less coherent story than it came in VAMs. Furthermore, IAMs retrieved

more often in field (first person) perspective than observer (third person) perspective, compared to VAMs (Rubin et al., 2008). However, recent work could not replicate this finding regarding the perspective in memories (Johannessen & Berntsen, 2010; Mace et al., 2011).

Although there is not much work on the memories' centrality to self, Rubin et al. (2008; Experiment 2) found that IAMs were less likely to be related to one's life story than VAMs (but see Berntsen & Jacobsen, 2008, for inconsistent results³). Using three questions of the Centrality of Event Scale (CES; Berntsen & Rubin, 2006), Johannessen and Berntsen (2010) later supported these results by indicating that IAMs, compared to VAMs, were less central to identity, less central to life story, and IAMs were less likely to be used as reference points for future than VAMs.

Berntsen (2010) argued that schema-inconsistent events were more likely to pop up in one's mind spontaneously, rather being retrieved as a result of a deliberate search. Considering the self-relevance of the cue words may also play a role in reminding self-related events, the most effective comparison here should be that of different IAMs and VAMs given in response to the same cue word. Following same reasoning, one should expect that participants deliberately remember events that are more central to their identity and life story in response to the cue words that had triggered less central events as IAMs before.

IAMs and VAMs also share some common characteristics, which basically offer that they are operating on the same episodic memory system (Berntsen, 2010). For instance, there is no difference between the life span distributions of IAMs and VAMs

³ Bertnsen and Jacobsen (2008) did not find a difference on life story relatedness of IAMs and VAMs. Both Berntsen and Jacobsen's (2008) and Rubin et al.'s (2008) studies were diary studies. However, participants were requested to retrieve a VAM in response to a cue word in the former, while the memories were not restricted to be triggered by a cue word in the latter. Rather, the participants only had to deliberately recall a personal event in Rubin and colleagues' study (Rubin et al., 2008; Experiment 2).

(Schlagman, Kliegel, Schulz, & Kvavilashvili, 2009). Reminiscence bump is evident for only positive IAMs, just as likely it appears for only positive VAMs (Berntsen & Rubin, 2002). Similarly, any differences were found on intensity of experiences (e.g., Berntsen & Jacobsen, 2008), usualness of events (e.g., Berntsen, 1998; Schlagman, & Kvavilashvili, 2008; but see Berntsen, & Hall, 2004 for inconsistent results), as well as concern relatedness of memories (e.g., Johannessen & Berntsen, 2010). Event recency of IAMs also did not differ from VAMs (e.g., Mace et al., 2011; Rubin et al., 2008; but see Berntsen, 1998 and Johannessen, & Berntsen, 2010 for inconsistent findings). This is in line with Addis et al.'s (2012) work which examined DR-VAMs and GEN-VAMs, and could not find any differences on memory ages.

However, many other comparisons in the literature could not reveal such consistent findings. These inconsistent results were especially about valence of the memories and the frequency of rehearsal. Although IAMs are usually recollections of positive events, rather than negative events (e.g., Berntsen, 2001; Finnbogadottir & Bertnsen, 2013, Brewin & Soni, 2011), when they were compared with VAMs, there appeared contradictory findings. Most of the studies could not find significant differences between IAMs and VAMs in terms of the valence of events (e.g., Johannessen & Berntsen, 2010; Mace et al., 2011). However, there are evidences indicating IAMs being more positive (Berntsen, 1998; Watson, Berntsen, Kuyken, & Watkins, 2012) or less positive (Berntsen, & Hall, 2004; Berntsen, & Jacobsen, 2008) than VAMs. Similarly, although some evidence exists indicating that IAMs were memories of events that are less rehearsed compared to VAMs (e.g., Berntsen, 1998; Johannessen & Berntsen, 2010), mostly no difference was found between the two in terms of rehearsal (e.g., Berntsen & Hall, 2004; Schlagman & Kvavilashvili, 2008; Watson et al., 2012).

Experiences at Memory Retrieval

By definition, the retrieval moments of IAMs are different from those of VAMs since IAMs are not accessed through a deliberate search. However, this is not the only difference in terms of experiences at retrieval. IAMs were more likely to occur in such moments that individuals were not concentrated on their ongoing tasks or activities (e.g., Berntsen & Jacobsen, 2008; Johannessen & Berntsen, 2010). In addition, IAM retrieval was found to be more likely followed by physical reactions, such as laughing, smiling, crying etc., than VAM retrieval (e.g., Berntsen & Hall, 2004; Johannessen & Berntsen, 2010). Similarly, spontaneous remembering of an event could change individuals' mood more often than VAMs could do (Berntsen & Hall, 2004; Rubin et al., 2008; Berntsen, 1996); however, usually mood change is only evidenced for negative direction (Berntsen & Jacobsen, 2008; Johannessen & Berntsen, 2010).

Abovementioned evidence reflects the distinction between IAM and VAM remembering. However, it is not clear whether these differences were originating from the retrieval mechanism or retrieval intention. Even if the memory characteristics of DR-VAMs and IAMs are similar because they share the same retrieval mechanism, they may differ from each other in terms of mood change and physical reaction if being on retrieval mode is responsible for these differences.

The Present Study

The main purpose of the present study was to compare IAMs with DR-VAMs and GEN-VAMs separately. Although IAMs and DR-VAMs have similar retrieval times (e.g., Schlagman & Kvavilashvili, 2008; Uzer et al., 2012) as well as frequencies of remembering (e.g. Rasmussen & Berntsen, 2011; Uzer et al., 2012), and although IAMs are mostly conceptualized as direct retrieval instances (e.g., Conway, 2005); there is no

evidence supporting that the two have similar memory properties. To my knowledge, this work is the first to identify possible similarities between the IAMs and DR-VAMs in the same study.

Considering inconsistent findings regarding the differences between involuntary and voluntary memories (e.g., Berntsen, 1998; Johannessen & Berntsen, 2010), it can be argued that direct retrieval in VAMs might hinder the differences between IAMs and VAMs. Thus, as opposed to the existing studies which took VAMs as a combination of direct and generative retrieval, the present study aimed to take into account the retrieval mechanisms while comparing IAMs and VAMs.

As an additional issue, by using different cue types, the present study aimed to control personal relevance of the cue-words and to investigate pure effects of intention to retrieve a memory. In most of the comparative studies, new words or phrases (i.e., different than those had triggered IAMs) were used to trigger VAMs (e.g., Bertnsen, 1998; Berntsen & Hall, 2004). Thus, personal relevance of the cues triggering IAMs and VAMs could not be controlled. To my knowledge, only two studies attempted to use the same cues in their voluntary and involuntary memory sessions. In Schlagman and Kvavilashvili's (2008) study, some of the cue phrases were those which had triggered an involuntary memory before; however, they did not compare the characteristics of these IAMs and VAMs cued by the same phrases. More recently, Berntsen et al. (2013) used same set of cues (pictures and sounds) to elicit involuntary and voluntary memories. However, as they used between subjects design, the involuntary and voluntary memories came from different participants even if they were triggered by the same cue set. In addition, memories in Berntsen et al. were not personally experienced events; rather, they were only recollections of the task material (Bertnsen et al., 2013). Therefore, the present design is the first to allow a comparison between the same

participants' IAMs and VAMs triggered by the same cues. The present work was also the first to compare spontaneous and deliberate retrieval of the same memories. Making individuals to retrieve the same memories both involuntarily and voluntarily allowed us to see the pure contribution of "intention" (i.e., being on a retrieval mode) to the characteristics of memories.

Based on existing work, the main hypotheses of the present study were as follows:

- (1) Retrieval times of IAMs will be equal to DR-VAMs, while both will be shorter than that of GEN-VAM.
- (2) Phenomenological qualities of IAMs will not differ from qualities of DR-VAMs.
- (3) The events remembered as IAMs will be less central to identity and life story than those remembered as GEN-VAMs.
- (4) IAMs will be more specific than GEN-VAMs.
- (5) Participants will report (a) more physical reaction and (b) more mood change for IAMs, than both DR-VAMs and GEN-VAMs.

Due to the exploratory nature, it was difficult to state specific expectations related to the following issues:

- (6) *Specificity* of different memories triggered by the *same cue-words*:
 - a. If IAMs are more specific than VAMs since they are triggered by more personally relevant cues which facilitates spontaneous association between the cue and the personal experience (Berntsen, 2009, p. 22; p. 93), then IAMs and VAMs triggered by the same cues should not differ in their specificity, because the cues will be the same in personal relevance.

- b. On the other hand, if personal relevance of the cues does not have an effect on the specificity of IAMs, then IAMs should again be more specific than VAMs, even in response to the same cue-word.

(7) *Centrality of different events triggered by the same cue-word:*

- a. If a deliberate search makes people to retrieve more central and schema-consistent events (See Berntsen, 2010) possibly because of earlier inclusion of “working self” to the retrieval processes (Conway, & Pleydell-Pearce, 2000), then GEN-VAMs should be more central to life story and identity than IAMs, even in response to the same cue-word.
- b. On the other hand, if IAMs were found to be less central than VAMs in earlier studies because IAMs were more likely to be triggered by cues which are less related to one’s life story, then possible differences between GEN-VAMs and IAMs should be disappeared since both memories will be triggered by the same cue-word.

(8) *Phenomenological characteristics of the same memories retrieved as both involuntarily and voluntarily:*

- a. If phenomenological experience does not rely on retrieval intention, the phenomenological characteristics of IAMs and VAMs of the same memories should not differ from each other.
- b. On the other hand, if the phenomenological experiences of remembering the same events are affected by deliberate search for memories, then differences between IAMs and VAMs should be observed.

CHAPTER II

METHOD

Participants

120 undergraduate students (86 female, 34 male; $M_{\text{age}} = 21.24$, $SD_{\text{age}} = 2.52$) from Bogazici University participated in the first session. All participants were Turkish native speaker, except three individuals whose mother tongue was Kurdish. Their data was not discarded since they were very fluent in Turkish (Fluency ratings: $M = 4.67$ in 5-point Likert scale).

Ten participants' data were excluded due to following reasons: Five participants' all IAMs were rated high on voluntariness of remembering measure, indicating these were "voluntary" memories given in response to the words in the task (Voluntariness ratings: $M = 6.33$, $SD = 0.52$); two participants explicitly stated that they deliberately tried to remember memories; one participant did not follow the task instructions; one participant already knew that there would be another session for memories; and one 44-year-old participant was excluded because his/her age was outlier. Thus, all descriptive analyses of IAMs were based on remaining 110 participants (79 female, 31 male; $M_{\text{age}} = 21.06$, $SD_{\text{age}} = 1.41$).

Among all individuals attended to the first session, 93 who reported at least one past event were invited to the second session. 70 of them (49 female; 21 male; $M_{\text{age}} = 21.04$, $SD_{\text{age}} = 1.37$) were enrolled and participated. The participants were not informed that two sessions were dependent. Instead, they were told that recipients of this invitation e-mail were randomly selected among those who were taking two undergraduate courses. Participants were given one extra course-credit for their participation to each session. They were tested individually in the computer lab,

scheduled by appointment. Written informed consents were provided by all participants for each session and debriefing was given to them via e-mail when the whole data collection phase was over.

Eight participants' data from this second session were discarded due to following reasons: One did not follow the instructions; seven were those whose data were already excluded from Session-I. Thus, descriptive analyses of VAMs and comparative analyses of IAMs and VAMs were based on these remaining 62 participants (44 female; 18 male; $M_{\text{age}} 21.05$, $SD_{\text{age}} = 1.41$).

Materials and Procedure

Overall procedure included two consecutive sessions, in which IAMs and VAMs were collected, respectively. Most of the participants came to the VAM session approximately two weeks later than their IAM sessions; fifteen of them came in the third week following their participation in the IAM session.

Session I – Involuntary Autobiographical Memories

After Informed Consent form (see Appendix A) was provided, the participants were told that the experiment was about concentration. Their task was to detect some rarely presented target screens by saying “yes” out loud. In order to increase credibility, participants were provided with a microphone which they believed to record their responses. They were instructed to press the space bar if any task-unrelated-thought (TUTs; memories, future plans, dreams etc.) came to their minds during the task. When they pressed the space bar, they then classified their thoughts as memories, future events or current thoughts with the help of the experimenter, and they filled out the related questionnaire (Memory Questionnaire, Future Thoughts Questionnaire, or Current Thoughts Questionnaire). At the end of the task, participants were provided with new

questions regarding each memory and future thoughts they reported. Lastly, they answered to some demographic questions (see Appendix B). The whole procedure in Session-I took about one hour. Figure 2 illustrates the procedure used in this session.

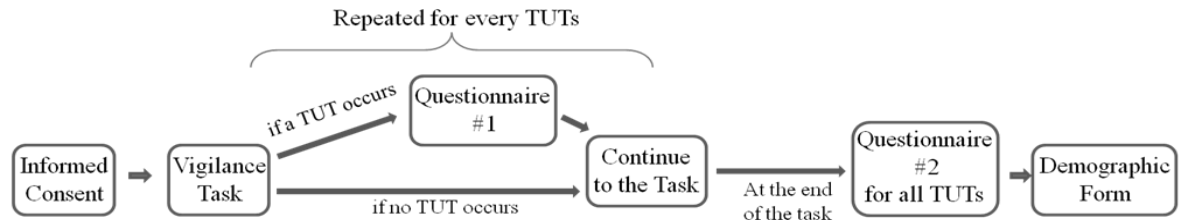


Figure 2. Procedure used in Session-I

Vigilance Task

The “vigilance task” was originally developed by Schlagman and Kvavilashvili (2008), and was also used later in other IAM studies (e.g., Ceylan, Batool, & Mazzoni, 2013; Kvavilashvili & Schlagman, 2011). In the original Vigilance Task, participants were informed about IAMs beforehand, and asked to report IAM occurrences during the so-called attention task (Schlagman & Kvavilashvili, 2008). However, this might have led individuals to actively search for a memory, which in turn could have made the distinction between VAMs and IAMs blurred (Berntsen, 2010). To prevent this, in the present study, participants were not informed about involuntary memories; rather, they were requested to identify *any* involuntary TUTs that could come to mind during the task⁴ by pressing space bar.

The task was created in E-Prime 2.0 software. During the task, 800 stimuli (785 target, 15 non-target) were presented, each lasted for 1.5 second. Target stimuli were randomly chosen from six different patterns of black horizontal lines (ranging from four

⁴ There are some IAM studies in which the task was used with this kind of modification (Batool, & Mazzoni, 2011; Barzykowski, 2013; Plimpton, Pattel, & Kvavilashvili, 2013). Although the number of reported memories in the present study was expected to be less than the original work (6 – 7 memories), sufficient number of memories were believed to be triggered by this methodology (See Plimpton et al., 2013; for evidence of memories being reported more than future thoughts or current thoughts).

to eight lines) on a white screen, and they appeared once in every 40-60 trials (i.e., 60-90 seconds). Non-target stimuli were randomly chosen from twelve different patterns of black vertical lines (ranging from four to eight lines) on a white screen. In addition to lines, both target and non-target stimuli contained of a word written in 18-point Courier New font at the center of the screens. These words were expected to trigger some spontaneous thoughts, including memories. Words⁵ were used instead of phrases with the aim of minimizing deliberate thoughts or memories. While words in fifteen target trials were presented in fixed order, those in 785 non-target trials were presented randomly. Thus, any trigger words occurred with the same line patterns for non-target trials. In addition, with this randomization, probability for a specific word to trigger a memory just because of its position in the experiment was equalized. When the task was paused by the participant (i.e., when some TUTs popped up in minds), a white blank screen was presented until the experimenter resumed the task after questionnaires were filled out. Twelve practice trials (9 non-target, 3 target) were presented at the beginning. The task continued until all 800 trials were presented or it was terminated by the experimenter if the participant reported many TUTs so s/he would not have time to fill in the second questionnaire in his/her scheduled one-hour slot.

Word Selection for Vigilance Task

A pool of 1400 words was created to select the words that would be used in the experiment. Six hundred words were taken from Turkish word norms dictionary (Tekcan & Göz, 2005); thus, their imageability, concreteness, and frequency norms were available. The remaining 800 words were randomly chosen from the word frequency dictionary of written Turkish (Göz, 2003). Since only frequency norms were

⁵ Different from IAM occurrences in real life, the cues were always verbal in this task. However, this was not expected to decrease external validity because most reported cues in the literature were abstract cues, which include phrases or words that heard or read by individuals (Mace, 2004).

available for these 800 words; two pretests⁶ were conducted in order to have imageability and concreteness norms via an online survey website of social sciences.

A total of 820 words⁷ were rated in terms of imageability and concreteness on 7-point Likert scales ranging from 1(*the least*) to 7(*the most*) in the pretests. Each word was rated by a minimum of 42 individuals of the total sample of 584 participants (414 participants in Pretest I: $M_{\text{age}} = 25.14$, $SD_{\text{age}} = 3.50$; 170 participants in Pretest II: $M_{\text{age}} = 24.92$, $SD_{\text{age}} = 3.30$). Eight independent coders rated 1400 words in terms of emotional valence. Among 966 words with a minimum of 75% agreement (an agreement of at least six coders) on valence, 800 were chosen (see Appendix C) for the vigilance task (115 positive, 570 neutral, 115 negative). Average agreement rate for emotional valence of the selected words was 88%. Positive and negative words were both rated lower in imageability and concreteness than neutral words ($ps < .05$), but they did not differ from each other ($ps > .05$). The frequency of positive words were higher than negative words ($p = .04$), while the neutral words were the highest in word frequency. All words on target screens were neutral in emotional valence, and there was no difference between words on target and non-target screens in terms of frequency, imageability, as well as concreteness ($ps > .05$). The lengths of the words varied between 3 and 12 characters.

⁶ The second pretest was conducted due to a technical error occurred in the first pretest. In sum, imageability and concreteness ratings of 591 words came from the first pretest, while ratings of 229 words came from the second pretest.

⁷ Imageability and concreteness ratings of 20 of these 820 words were actually available in Tekcan and Göz (2005) dictionary. Since the ratings in pretests were collected from a different sample than those had recruited by Tekcan and Göz (2005), these 20 words were included to the pretest with the purpose of comparison. Among 40 comparisons of the imageability and concreteness ratings for these 20 words; only four words were rated higher than before ($ps < .05$) in terms of imageability, and four other words were rated higher than before ($ps < .05$) in terms of concreteness. All other 32 comparisons did not reveal significant differences (all $ps > .05$).

Questionnaires

There were three questionnaires, namely, Memory Questionnaire (see Appendix D), Future Thoughts Questionnaire (see Appendix E), and Current Thoughts Questionnaire (see Appendix F). Participants were provided with the related questionnaire according to the type of the TUT they reported during the vigilance task. Future thoughts questionnaire and current thoughts questionnaire helped to conceal the main aim of the present research, and responses to those questionnaires were not included to any analyses.

Memory Questionnaire and Future Thoughts Questionnaire were divided into two parts. While the participants filled out Questionnaire-1 immediately after retrieval or thinking, they filled out Questionnaire-2 at the end of the all procedure for all memories or future thoughts in the reported sequence. While the questions in Questionnaire-1 were related to that specific experience of remembering the event, the questions in Questionnaire-II were mostly on the events' nature rather than the qualities of memories.

Eleven questions from the Autobiographical Memory Questionnaire (AMQ; Rubin et al., 2003) were included in the Memory Questionnaire-I. These items are *reliving, see, hear, emotions, talk, setting, spatial layout, remember/know, back in time, story, real/imagine*. For each item, participants made a judgment on a 7-point Likert scale, ranging from 1(*not at all*) to 7(*as if it were happening right now*) or from 1(*not at all*) to 7(*completely*). In the Questionnaire-I, there were also ten additional questions. Responses to *vividness, surprise, concentration* and *purposefulness* items were rated in a range from 1(*not at all*) to 7(*completely*), and ratings of *mood change* were in a range from -3 (*extremely negative*) to +3 (*extremely positive*). In addition, participants

identified the *perspective (field / observer / both two perspectives)* that they remembered the event from, as well as they indicated if *chaining* occurred while remembering the event (*no chaining / last event in the chain / first event in the chain*). They also wrote the *trigger* if they could identify it and their *physical reaction* if they gave following the memory. Lastly, participants were asked to write a word as a *memory heading* which they believed to describe the memory.

In the Memory Questionnaire-II, a space was provided for participants to write their memories as much detailed as they could. In addition, there were thirteen questions. Two questions were taken from AMQ, namely *thought rehearsal* and *talk rehearsal*, and they were rated in a 7-point Likert scale ranging from 1(*never*) to 7(*very frequently*). Five questions were taken from Centrality of Event Scale (CES; Berntsen & Rubin, 2006). These items, namely *importance*, *central to life story*, *effects on experiences*, *effects on future*, and *turning point*, were rated in a 7-point Likert scale ranging from 1(*definitely disagree*) to 7(*definitely agree*). Participants also rated *expectedness*, *frequency of remembering*, and *goal relatedness* of memories in a range from 1(*not at all*) to 7(*completely*), as well as *valence* of memories in a range from -3(*extremely negative*) to +3(*extremely positive*). They were also required to indicate their *age at the time of the event* and *specificity* of memory (*occurred once / merged event / extended event*) in Questionnaire-II.

The Future Thoughts Questionnaires was adapted from a mental time travel study (Berntsen & Jacobsen, 2008), and it included similar questions to those were asked in Memory Questionnaires. Similarly, participants were required to write their future thoughts and to respond to the additional questions provided in the Questionnaire-II. Current Thought Questionnaire, on the other hand, only includes questions regarding

the vividness, imagery, and emotional valence of the thoughts, and there was no Questionnaire-II for current thoughts.

Session II – Voluntary Autobiographical Memories

Participants were invited to the second session via e-mail, and they were said that they were chosen randomly from the courses that they enrolled in. To increase credibility, none of the participants' two sessions were conducted by the same experimenter or in the same room.

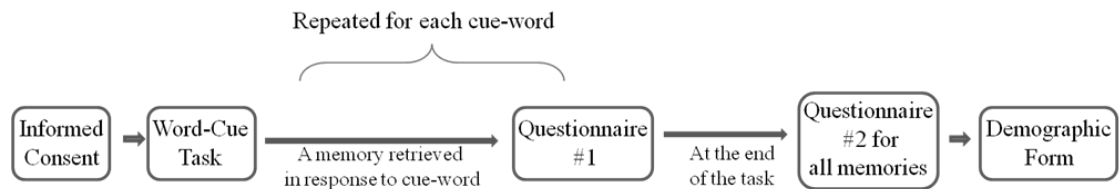


Figure 3. Procedure used in Session-II

As Figure 3 illustrates, after reading the Informed Consent form (see Appendix G), participants were told about the aim of the experiment except that the two sessions were related. They were provided with cue words on a computer screen, and requested to remember a personal past event with the help of each word. In addition, they were told that sometimes we can retrieve a memory immediately with no or little effort, while sometimes it requires us to search for that memory in our minds. In any case, their task was to press the space bar as soon as they retrieved a memory. Similar to the IAM session, participants had to fill out the Questionnaire-I immediately after they retrieved a memory, while they filled out the Questionnaire-II for each memory at the end of the session. Similar to Session-I, participants were provided with a demographic form (see Appendix H) after filling out the other questionnaires. The whole procedure took approximately forty-five minutes.

Word-Cue Task

There were three types of cues; namely, *new-cues* (different from those used in IAM session), *same-cues* (those identified by participants as triggers of their IAMs in the first session), and *own-cues* (those written by participants as “memory headings” representing their IAMs in the first session). Using own-cues generated by the participants was expected to remind them the same events that were remembered as IAMs before (see Addis et al. 2012, for a similar methodology).

The word-cue task was generated in E-Prime 2.0 software. All participants were presented with three new-cues. Three word-sets each of which included one positive, one neutral and one negative word were used randomly across participants. There was also one more word-set for supplementary words, including one word for each valence category (see Appendix I). If the participant could not retrieve any VAM in response to the presented new-cue in sixty seconds, a supplementary word from the same valence category was presented.

The same-cues were randomly chosen from the words that the participant had specified as triggers in IAM session, and own-cues were randomly chosen from the words that the participant wrote as memory headings. Thus, the number of same-cues and own-cues varied across participants, and depended on how many IAMs they reported in the first session.

New-cues and same-cues were shown in a random order. However, own-cues were presented at the end in order to prevent participants realizing that two sessions were dependent. Each word was written in 18-point Courier New font at the center of the screen, and was presented on the screen until the participant pressed the space bar to indicate that s/he retrieved a memory. If one did not press the space bar in one minute,

the program gave an alternative cue word with the same valence for new-cues, or passed through the next word for same-cues or own-cues.

Word Selection for Word-Cue Task

Twelve words (4 positive, 4 neutral, 4 negative) were chosen from the same pool (see Word Selection for Vigilance Task section, for details of the word pool) among the words with 88% agreement on their valence. The positive, negative, and neutral words did not differ in terms of imageability, concreteness, and word frequency (all $ps > .05$). In addition, the words in word-cue task were comparable to those used in vigilance task in terms of imageability and concreteness (all $ps > .05$).

The same-cues and own-cues were different words for all participants since the cues were taken from each individual's own IAM questionnaire. Following rules were implemented when choosing same-cues and own-cues: An individual was never presented with both the same-cue and own-cue of a memory; for each memory, either the same-cue or the own-cue was used. If the participant reported an even number of IAMs in the first session, number of same-cues and own-cues given to the participant were the same (e.g., if four IAMs were reported, two trigger words were used as same-cues and two memory headings were used as own-cues). However, if the number of IAMs reported in the first session was an odd number; then the number of either the same-cues or own-cues were one more than the other, randomly (e.g., if five IAMs were reported, either three same-cues and two own-cues or two same-cues and three own-cues were used). If an IAM was not triggered by the words in Vigilance Task but triggered by something else, only own-cue of that memory was used. Lastly, if the participants wrote the trigger word as memory heading (e.g., for a memory triggered by

“lamb”, memory heading is also “lamb”), those words were accepted as same-cues, rather than own-cues.

Questionnaires

Only the Memory Questionnaire was used in Session II (see Appendix J). The same items as those included to the questionnaire in Session-I were used, except for *concentration, purposefulness, and trigger*. Instead, there were two additional questions taken from a study conducted by Uzer and colleagues (2012); namely *strategy (come immediately to mind / actively searched for / cannot decide)* and *information used (triggered by the cue word – so no use of information about life / not triggered by the cue word – so had to use information about life)* in the Questionnaire-I. Questionnaire-II was exactly the same as that of Session I.

Coding and Data Analysis

In order to assure all memories are autobiographical in nature, two independent coders read and classified the narratives. Only one memory was classified not to be autobiographical; but that was from a participant whose data was discarded due to another reason. In addition, specificity of memories was coded by based on a manual generated by Singer and Blagov (2002). According to that manual, memories can be coded as specific (unique occurrences and events last for less than a day), episodic (sequential events last for more than a day), or generic (equivalent events occurring in a period of time repeatedly). All memories were coded by two independent coders. The inter-coder agreement was satisfactory (Cohen's $\kappa = .087$ for three categories of specificity). Disagreements on coding of some memories were resolved after discussion.

Those events which coded as episodic and generic were later collapsed as “summarized” events.

DR-VAMs and GEN-VAMs were classified by using the participants’ answers to the related questions. Uzer et al. (2012) provided evidence for reliability of self-reports on the ability to distinguish the retrieval mechanisms. Memories were identified as DR-VAMs if the participants indicated that the memory had come immediately to their mind and that they did not use information about their lives to retrieve the memory. On the other hand, memories were coded as GEN-VAMs if the participants indicated the opposite. If the participants’ self-reports on these two questions were not in the same direction, or if the participants chose “cannot decide” option for the strategy question, those memories were discarded from this classification.

Since the data came from multiple observations from the same participants, they could not be treated as independent. Thus, the ratings given by a participant for memories of each type were averaged, and majority of analyses were conducted by using these average scores.

CHAPTER III

RESULTS

The present study aimed to answer three questions: Firstly, how similar or different are IAMs, DR-VAMs, and GEN-VAMs in terms of retrieval time, phenomenology, centrality to self, specificity, and the experiences at retrieval? Secondly, when cued by the same word, do IAMs and VAMs differ in terms of events' specificity and centrality to self? And lastly, does remembering an event involuntarily or voluntarily lead to different phenomenological experiences, or not?

In the following sections, first, descriptive findings regarding IAMs and VAMs will be reported. Then, the findings regarding comparison of three memory types will be reported. Afterwards, the findings related to IAMs and VAMs triggered by the same cue as well as involuntary and voluntary recollections of the same events will be presented. And finally, findings of some important exploratory analyses will be mentioned.

Descriptive Analyses

There has not been much study in which Vigilance Task with this kind of modification was used to collect IAMs. Similarly, DR-VAMs and GEN-VAMs have not been collected in response to same-cues or own-cues before. Thus, data coming from the two sessions were first analyzed separately in order to show the task properties and to justify the tasks were appropriate to collect IAMs and VAMs.

Involuntary Autobiographical Memory Session

One hundred and ten participants' data were included to descriptive analyses regarding IAMs. Eight memories with high ratings of voluntariness ($M = 6.25$, $SD = 0.46$), one memory with a retrieval time higher than three standard deviations above the mean

retrieval time (z value = 6.85) were excluded. In addition, two participants later confessed that they had been thinking one of their reported events for a long time and they did not retrieve them during the task; thus, two memories of those participants were also excluded from the analyses. Finally, 110 participants' 168 memories ($M = 1.53, SD = 1.34$), 65 future thoughts ($M = 0.59, SD = 0.84$), and 112 current thoughts ($M = 1.02, SD = 1.33$) were further analyzed.

Task-Unrelated-Thoughts

A one-way repeated measures ANOVA revealed that there was a significant effect of TUT type on the number of reports, $F(2, 218) = 17.82, p < .001, MSE = 1.36, \eta_p^2 = .14$. The participants reported memories significantly more than they reported future thoughts ($p < .001$) or current thoughts ($p < .01$). The number of reported current thoughts was also significantly higher than the number of future thoughts ($p < .01$). Distribution of the number of participants according to how many times they reported a memory, future thought, or current thought can be seen in Table 2.

Table 2. The Number of Participants According to How Many Times They Reported A TUT

	<u>Any report</u>	<u>Once</u>	<u>Twice</u>	<u>Three Times</u>	<u>Four Times</u>	<u>Five Times</u>	<u>Six Times</u>
Memories	26	39	21	13	7	4	0
Future Thoughts	67	24	16	3	0	0	0
Current Thoughts	53	27	15	10	2	1	2

Predictors of Number of IAMs

In the Vigilance Task, participants did not have to read the words since their task was only related to the direction of lines; however, it was expected that they would automatically read the words, and therefore the words would trigger IAMs. Participants indicated that they read almost 60% of the words during the task ($M = 58.70, SD =$

31.41). Linear regression analyses showed that, as expected, the reported percentage of reading words significantly predicted the number of memories, $\beta = .25$, $t(106) = 2.65$, $p < .01$; $R^2 = .06$, $F(1, 108) = 7.03$, $p < .01$.

There was no difference between male and female participants in terms of number of TUTs, $t(108) = .86$, $p > .05$, as well as number of IAMs reported, $t(108) = 1.54$, $p > .05$. In addition, no experimenter effect was found on the number of TUTs, $F(4, 105) = 0.47$, $MSE = 4.72$, $p > .05$, as well as on the number of IAMs reported, $F(4, 105) = 0.56$, $MSE = 1.82$, $p > .05$. Furthermore, there was no correlation between participants' ratings of difficulty in concentrating on lines and the number of IAMs they reported, $r = .10$, $p > .05$. Lastly, the number of reported IAMs was not related with the line pattern that was presented along with the trigger word. In other words, the words which were presented with low (4 or 5), moderate (6), or high (7 or 8) number of non-target lines triggered IAMs almost equally, $\chi^2(4, N = 106) = 5.98$, $p > .05$.

Triggers of IAMs

IAMs were triggered mostly by the words in Vigilance Task, significantly more than other identified triggers and non-identifiable triggers, $\chi^2(2, N = 168) = 184.96$, $p < .001$. 82.7% of all memories were triggered by a word (73.8%) or by more than one word (8.9%). While 6.5% of the memories were triggered by any other cues (e.g., computer lab, lines in the task etc.), 10.7% of the memories had unidentified triggers.

More than a half of the IAMs (56.8%) were triggered by neutral words; while 27.3% of the IAMs were triggered by negative words and 15.8% were triggered by positive words. It should be noted that although the number of negative and positive words used in the task was equal, the number of neutral words was much higher than the two. Thus, likelihood of triggering an IAM for each valence category were

calculated for each participant by dividing the number of memories given in response to each valence category to the total number of words seen in the same category. The results of one-way repeated measures ANOVA showed that valence of the words had an effect on likelihood of triggering IAMs, $F(2, 218) = 7.87$, $MSE = .11$, $p < .001$, $\eta_p^2 = .07$. Pairwise comparisons adjusted with Bonferroni revealed that negative words ($M = 0.30$, $SD = 0.37$) were more likely to trigger IAMs, compared to neutral words ($p = .01$) as well as positive words ($p = .06$). Neutral words ($M = 0.13$, $SD = 0.17$) and positive words ($M = 0.17$, $SD = 0.37$) were not different from each other ($p > .05$). In addition, as seen in Figure 4, positive words triggered more likely positive IAMs, neutral words triggered more likely neutral IAMs, and negative words triggered more likely negative IAMs, Fisher's exact value = 31.86, $p < .001$.

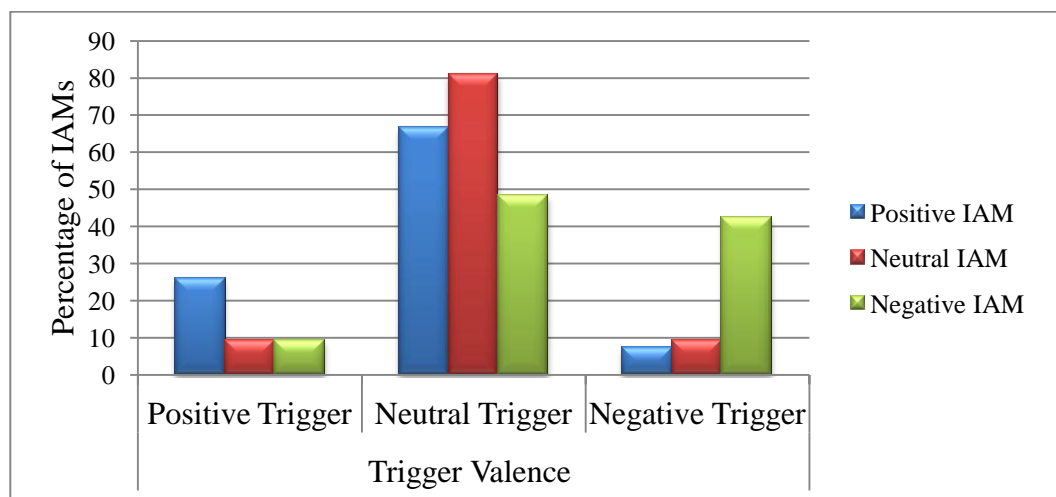


Figure 4. Percentages of positive, negative, and neutral IAMs triggered by different cues

Voluntary Autobiographical Memory Session

As mentioned above, the analyses were based on 62 participants' data. In addition, five VAMs that were the counterparts of discarded IAMs because these memories were rated high in terms of voluntariness of remembering. Three VAMs-DR that had retrieval times greater than three standard deviations (z values = 3.08, 4.05, and 4.46) were also

not included in the analyses. Thus, analyses were based on 62 participants' 289 memories (175 memories in response to new-cues, 56 memories in response to same-cues, and 58 memories in response to own-cues).

Predictors of number of reported VAMs

Participants' perceived difficulty in remembering memories in response to cue words was moderate ($M = 2.25$, $SD = 0.62$). However, when percentages of giving a VAM in response to all cue types were analyzed, the results indicated that participants could give a VAM in response to most of the cue words ($M = 0.87$, $SD = 0.17$). When percentages of giving a VAM in response to new-cues were analyzed only, similar results were obtained ($M = 0.86$, $SD = 0.21$). These findings indicated that words that were used in the task were appropriate to trigger a VAM.

In order to see whether a particular word-set condition allowed participants to retrieve more VAMs compared to others, percentages of giving a memory in response to three new-cues were compared for participants in three different word-set conditions. One way between subjects ANOVA revealed that there was only a marginally significant effect of being in different word-set conditions on the number of reported memories, $F(2, 59) = 3.05$, $MSE = .04$, $p = .06$. Cue words in WordSet1 triggered less VAMs than WordSet2 did ($p = .06$); but there was no difference in the other comparisons (all $ps > .10$). In addition, when percentages were calculated by dividing the number of VAMs to the number of new-cues *and* the supplementary new-cues presented, this difference disappeared, $F(2, 59) = 1.88$, $MSE = .04$, $p > .05$. These results indicated that one word-set group was not advantageous over the others.

Similar to Session-I, no experimenter effect was found on percentages of giving a memory, $F(4, 57) = 0.83$, $MSE = .03$, $p > .05$. In addition, there was no difference

between females' ($M = 0.89, SD = 0.16$) and males' ($M = 0.83, SD = 0.20$) percentages of reporting VAMs in response to all presented cues, $t(60) = 1.36, p > .05$.

Distribution of Direct and Generative Retrieval

VAMs accessed through direct and generative retrieval were classified according to the answers of *strategy* and *information used* questions. Only the memories with answers to these two questions in the same direction were classified as DR-VAMs or GEN-VAMs; otherwise they were not classified as such.

In response to all three cue types, 45.3% of VAMs were accessed through direct retrieval, 37.4% of VAMs were accessed through generative retrieval, while 17.3% remained unclassified. Considering the high likelihood of same-cues and own-cues triggering VAMs-DR, the distribution for only VAMs given in response to new-cues were analyzed. As seen in Figure 5, half of the VAMs in response to new-cues were accessed through generative retrieval. Analyses showed that participants more frequently used generative retrieval, compared to direct retrieval when looking for an autobiographical past event⁸, $\chi^2(1, N = 144) = 8.03, p < .01$.

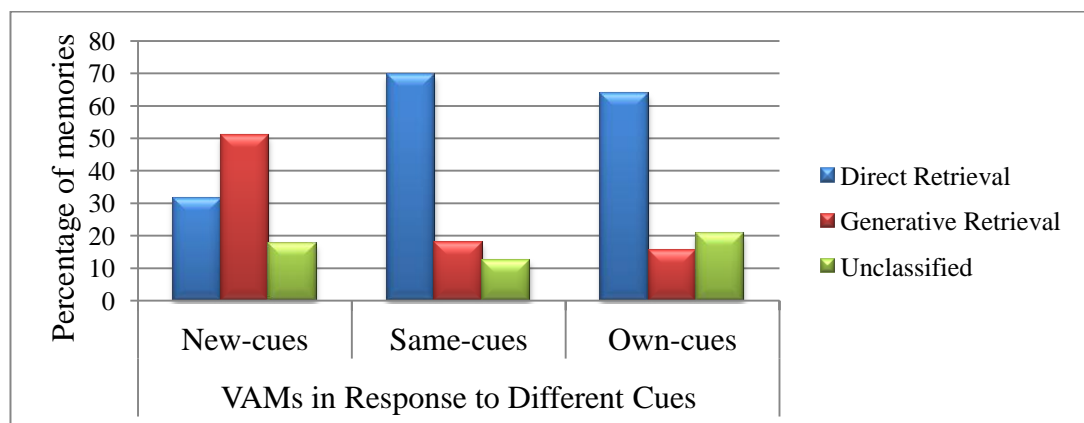


Figure 5. Percentages of VAMs accessed through direct and generative retrieval

⁸ Distribution of VAMs were also analyzed only for participants who were given new cues before the same cues. Since new-cues and same-cues were presented randomly to participants, those who saw same cues before the new cues might have decided that the memories were instances of direct retrieval only if they were the same events. However, the results did not change, $\chi^2(1, N = 116) = 5.83, p < .05$. Again, participants used more likely generative retrieval (49%), compared to direct retrieval (31%).

On the other hand, Figure 5 also shows that most of the memories given in response to same cues and own cues (70% and 64%, respectively) were retrieved directly.

Compared to VAMs-GEN occurrences, VAMs-DR were more frequent both in memories given in response to same-cues, $\chi^2(1, N = 46) = 17.04, p < .001$, and to own-cues, $\chi^2(1, N = 49) = 17.16, p < .001$.

Comparison of IAMs, DR-VAMs, and GEN-VAMs

All findings regarding the comparison of three types of memories were based on the same 62 participants' 127 IAMs, 55 DR-VAMs, and 89 GEN-VAMs given in response to new-cues.

Retrieval Times

Retrieval times of the memories were calculated similarly in two sessions; the presentation time of the cue word was subtracted from the time that the participant pressed the space bar. Due to the nature of the task, calculating retrieval time was only possible for memories which were triggered by the words in the task in the IAM session. Thus, only 105 IAMs which were triggered by words could be included to the analyses. In addition, retrieval time data of two VAMs were excluded since participants stated that they forgot to press the space bar when they actually retrieved the memory. Therefore, 54 DR-VAMs and 88 GEN-VAMs were included. However, all participants did not report both DR-VAMs and GEN-VAMs; so the comparison of three memory types were based on 23 participants who reported memories of each type, namely IAMs, DR-VAMs, and GEN-VAMs.

The results of one way repeated measures ANOVA indicated that there was an effect of memory type on retrieval times, $F(1.18, 25.93) = 18.19, MSE = 8288.25, p <$

.001⁹, $\eta_p^2 = .45$ (see Table 3). As expected, pairwise comparisons using Bonferroni adjustments indicated that retrieval times of IAMs ($M = 4.33$, $SD = 3.85$) and DR-VAMs ($M = 4.71$, $SD = 4.11$) were not different from each other ($p > .05$). However, GEN-VAMs ($M = 18.53$, $SD = 14.35$) took longer to retrieve than both IAMs ($p = .001$) and DR-VAMs ($p < .001$). Figure 6 depicts the difference between three types of memories in terms of retrieval time.

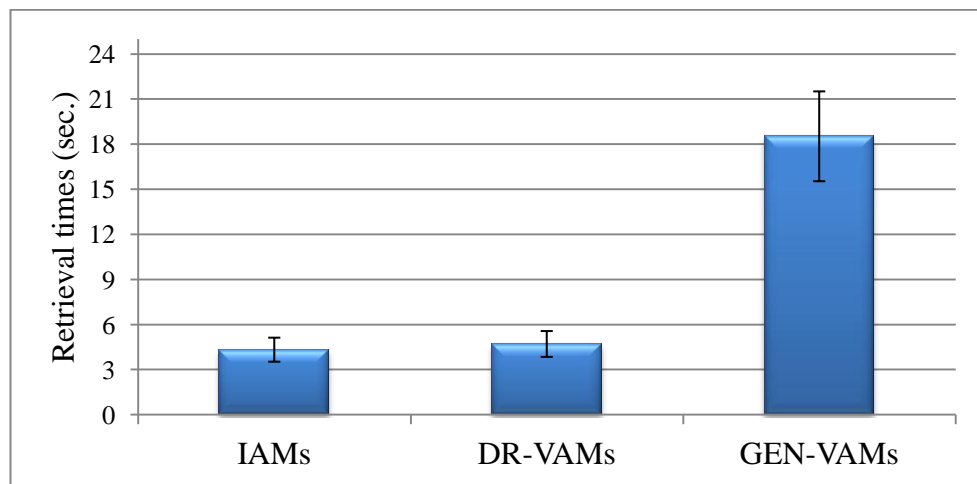


Figure 6. Retrieval times of IAMs, DR-VAMs, and GEN-VAMs

Considering that there were some participants who had only one memory for a type, all retrieval times could not be the averages of more than one memory given for a type. In order to have one data-point for each kind of memory, retrieval times of the first reported memories of IAMs, DR-VAMs, and GEN-VAMs were also analyzed (see Figure 7). The results of one way repeated measures ANOVA suggested that there was a similar effect of memory type on retrieval times, $F(2, 34) = 11.79$, $MSE = 3171.70$, $p < .001$, $\eta_p^2 = 0.41$; meaning that retrieval times of first IAMs ($M = 3.37$, $SD = 3.57$) and first DR-VAMs ($M = 4.28$, $SD = 4.15$) were not different from each other ($p > .05$),

⁹ Since sphericity assumption of within subjects ANOVA was violated as Mauchly's test indicated, $\chi^2(2) = 25.06$, $p < .001$, degrees of freedom values were corrected by using Greenhouse-Geisser estimates ($\epsilon = 0.59$).

while first GEN-VAMs ($M = 11.68$, $SD = 8.13$) took longer to retrieve compared to both first IAMs and first DR-VAMs ($ps < .01$)¹⁰.

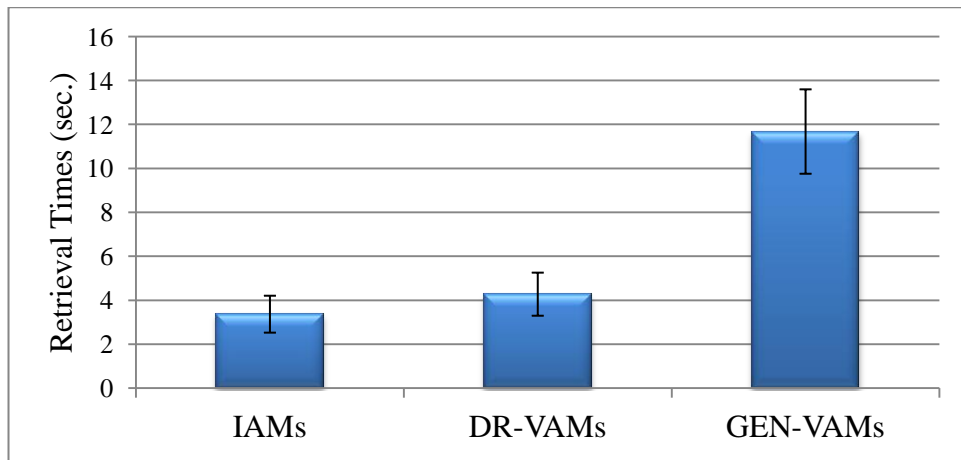


Figure 7. Retrieval times of first reported IAMs, DR-VAMs, and GEN-VAMs

Phenomenology

Only participants who reported memories in all three types were included in the analyses ($n = 32$). Similar to previous analyses, IAMs were compared with DR-VAMs and GEN-VAMs which were given only in response to new cues. All pairwise comparisons were adjusted with Bonferroni correction. Figure 8 depicts all findings regarding phenomenological differences¹¹, and statistical details can be seen in Table 3.

Metacognitive Judgments

Separate repeated measures ANOVAs were conducted to investigate whether there was an effect of memory type on metacognitive measures, namely *reliving*, *back in time*, *remember/know*, and *real/imagine*.

¹⁰ Analysis of first memories depended on 18 participants' IAMs, DR-VAMs, and GEN-VAMs, because some participants' first memories were triggered with some other cues, rather than the words in the task.

¹¹ Phenomenological differences were also analyzed by including only first memories given to each type. Separate ANOVAs yielded similar findings for vividness and measures of metacognitive components. It was important to mention that any significant difference was obtained between IAMs and DR-VAMs. Furthermore, in addition to the significant differences between DR-VAMs and GEN-VAMs ($ps < .05$), ratings of IAMs were also significantly higher than GEN-VAMs for remember/know ($p = .068$) and real/imagine ($p = .007$) measures. No difference were found for measures of component processes.

Table 3. Analyses of Variances and Descriptive Statistics for Retrieval Times and Phenomenology in Different Memory Types

	ANOVA			Descriptives					
	Type of Memories (IAMs, DR-VAMs, GEN-VAMs)			IAMs		DR-VAMs		GEN-VAMs	
	<i>df</i>	<i>F</i>	η_p^2	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
<u>Retrieval Times (RT)</u>									
<i>Average RT</i>	(1.18, 25.93)	18.19***	.453	4.33 _a	3.85	4.71 _a	4.11	18.53 _b	14.34
<i>RT for first memories</i>	(2, 34)	11.79***	.410	3.37 _a	3.57	4.28 _a	4.15	11.68 _b	8.13
<u>Metacognitive Judgments</u>									
<i>Reliving</i>	(2, 62)	5.66**	.154	4.14 _{a,b}	1.69	4.72 _a	1.49	3.61 _b	1.62
<i>Back-in-time</i>	(2, 62)	6.26**	.168	4.44 _a	1.81	5.59 _b	1.37	4.50 _a	1.68
<i>Remember/Know</i>	(2, 62)	4.35*	.123	5.28 _{a,b}	1.75	5.50 _a	1.60	4.47 _b	1.74
<i>Real/Imagine</i>	(2, 62)	8.76***	.220	5.66 _{a,b}	1.14	6.17 _a	0.97	5.25 _b	1.30
<u>Vividness</u>	(2, 62)	3.29*	.096	4.65 _{a,b}	1.35	5.17 _a	1.35	4.38 _b	1.35
<u>Component Processes</u>									
<i>See</i>	(2, 62)	4.24*	.120	5.15 _{a,b}	1.25	5.67 _a	1.29	4.83 _b	1.56
<i>Hear</i>	(2, 62)	1.96	.149	2.68	1.59	3.41	2.19	2.86	1.84
<i>Emotions</i>	(2, 62)	5.08**	.141	3.94 _{a,b}	1.58	4.66 _a	1.62	3.70 _b	1.74
<i>Talk</i>	(2, 62)	1.06	.033	2.79	2.01	3.42	2.00	3.08	2.16
<i>Setting</i>	(2, 62)	0.39	.012	5.70	1.48	5.88	1.40	5.58	1.49
<i>Spatial Layout</i>	(2, 62)	0.18	.006	4.96	1.77	4.80	1.71	4.73	1.93
<i>Story</i>	(1.55, 48.16)	2.96 ⁺	.087	3.69	1.72	4.17	1.83	3.33	1.61

Notes. Means with unshared subscripts are significantly different from each other, $p < .05$

⁺ $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$

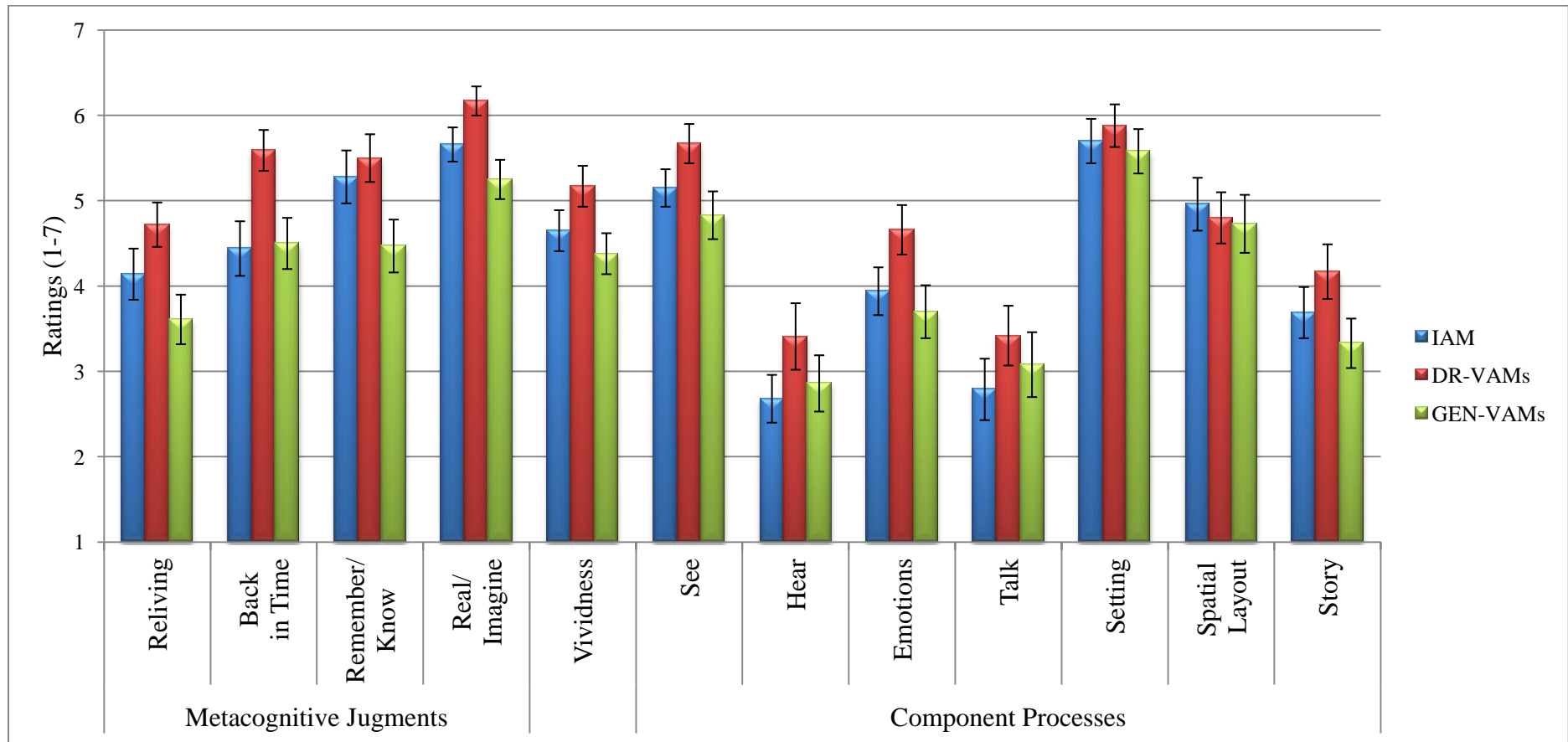


Figure 8. Phenomenological ratings of IAMs, DR-VAMs, and GEN-VAMs

Findings indicated that memory type had an effect on ratings of *reliving*, $F(2, 62) = 5.66$, $MSE = 1.74$, $p < .01$, $\eta_p^2 = 0.15$. DR-VAMs ($M = 4.72$, $SD = 1.49$) were rated significantly higher than GEN-VAMs ($M = 3.61$, $SD = 1.62$), $p = .001$; however, ratings of IAMs ($M = 4.14$, $SD = 1.69$) were in between and were not different from both ($ps > .05$).

There was also an effect of memory type on *back-in-time* measure, $F(2, 62) = 6.26$, $MSE = 2.15$, $p < .01$, $\eta_p^2 = 0.17$. Similarly, DR-VAMs ($M = 5.59$, $SD = 1.37$) were given higher ratings of back-in-time, compared to GEN-VAMs ($M = 4.50$, $SD = 1.68$), $p < .05$. In addition, participants experienced travelling back in time in their DR-VAMs significantly more than in their IAMs ($M = 4.44$, $SD = 1.81$), $p < .05$. However, IAMs were not different from GEN-VAMs ($p > .05$).

Similarly, *remember/know* ratings were also significantly affected by memory type, $F(2, 62) = 4.35$, $MSE = 2.16$, $p < .05$, $\eta_p^2 = 0.12$. Pairwise comparisons suggested that DR-VAMs ($M = 5.50$, $SD = 1.60$) were rated higher in terms of remember/know compared to GEN-VAMs ($M = 4.47$, $SD = 1.74$) ($p < .05$). The difference between GEN-VAMs and IAMs ($M = 5.58$, $SD = 1.75$) was also marginally significant ($p = .085$). However, ratings of IAMs and DR-VAMs were not different from each other ($p > .05$).

Again, memory type was found to have an effect on *real/imagine* ratings, $F(2, 62) = 8.76$, $MSE = .78$, $p < .001$, $\eta_p^2 = 0.22$. DR-VAMs ($M = 6.17$, $SD = 0.97$) were more likely believed to be real than being imagined, compared to GEN-VAMs ($M = 5.25$, $SD = 1.29$), $p < .001$. In addition, the difference between IAMs ($M = 5.66$, $SD = 1.14$) and DR-VAMs was also marginally significant, $p = .082$. Ratings of IAMs and GEN-VAMs were not different from each other, $p > .05$.

Vividness

As expected, there was an effect of memory type on vividness ratings, $F(2, 62) = 3.29$, $MSE = 1.59$, $p < .05$, $\eta_p^2 = .10$. DR-VAMs ($M = 5.17$, $SD = 1.35$) were rated high than GEN-VAMs ($M = 4.38$, $SD = 1.35$) in terms of vividness ($p = .05$). IAMs ($M = 4.65$, $SD = 1.35$) were not different from both DR-VAMs and GEN-VAMs ($ps > .05$). Thus, findings indicated that directly retrieved VAMs were remembered more vividly than generated VAMs; vividness of IAMs was not different from either.

Component Processes

Again, separate repeated measures ANOVAs were conducted to find out whether there were effects of memory type on ratings of *see*, *hear*, *emotions*, *talk*, *setting*, *spatial layout* and *story* items.

Only *see* and *emotions* items were found to be significantly affected by memory type, $F(2, 62) = 4.24$, $MSE = 1.37$, $p < .05$, $\eta_p^2 = 0.12$, $F(2, 62) = 5.08$, $p < .01$, $MSE = 1.55$, $\eta_p^2 = 0.14$, respectively. Participants' ratings of *see* item were higher for DR-VAMs ($M = 5.67$, $SD = 1.29$), compared to GEN-VAMs ($M = 4.83$, $SD = 1.56$), $p < .05$. However, their ratings of IAMs ($M = 5.15$, $SD = 1.25$) were in between and did not differ from both DR-VAMs and GEN-VAMs. Similarly, participants gave higher ratings to *emotions* item significantly more for their DR-VAMs ($M = 4.66$, $SD = 1.62$) than their GEN-VAMs ($M = 3.70$, $SD = 1.74$), $p < .05$. Ratings of IAMs ($M = 3.94$, $SD = 1.58$) were not different from both types of voluntary remembering ($ps > .05$).

Perspective

Three types of memories (IAMs, DR-VAMs, and GEN-VAMs) were compared in terms of perspective (field, observer, or both) of the rememberer. Again, only those

VAMs that were given in response to new cues were included to the analysis. The results indicated that IAMs were equally likely to be remembered in field perspective (41%) or both perspectives (42%), while DR-VAMs and GEN-VAMs were more likely remembered in field perspective (62% and 47%, respectively). However, remembering the events from observer perspective were mostly common in GEN-VAMs, compared to the other two types of retrieval, $\chi^2(4, N = 271) = 9.26, p = .055$ (see Figure 9).

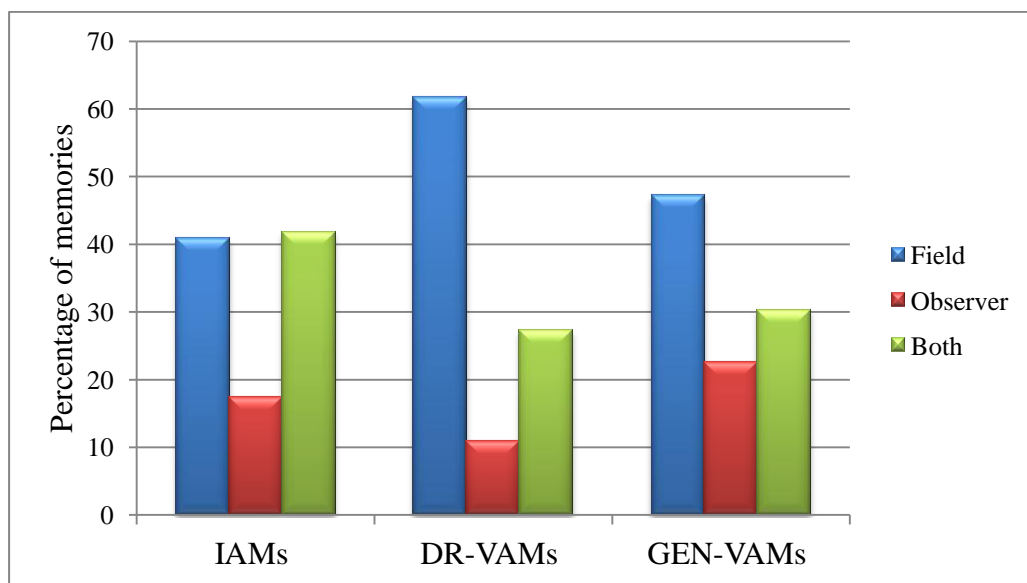


Figure 9. Percentages of memories remembered in different perspectives

Centrality of Events

Separate repeated measures ANOVAs were conducted in order to investigate whether ratings of centrality of event (CES) measures, namely *importance*, *life story*, *other experiences*, *effects on future*, and *turning point*, were affected by memory types.

The findings showed that memory types did not affect any of the CES measures (all $ps > .05$). In other words, participants' ratings to these items were similar for IAMs, DR-VAMs, and GEN-VAMs. Mean ratings and statistical results can be seen in Table 4.

Table 4. Analyses of Variances and Descriptive Statistics for Centrality of Events in Different Memory Types

	ANOVA			Descriptives					
	Type of Memories (IAMs, DR-VAMs, GEN-VAMs)			IAMs		DR- VAMs		GEN- VAMs	
	<i>df</i>	<i>F</i>	η_p^2	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
<u>Centrality of Event Measures</u>									
<i>Importance</i>	(2, 62)	1.84	.056	3.42	1.72	3.28	1.84	2.58	1.85
<i>Life Story</i>	(2, 60)	0.29	.009	2.34	1.36	2.35	1.33	2.11	1.44
<i>Other Experience</i>	(2, 60)	1.29	.041	3.17	1.42	3.15	1.52	2.63	1.85
<i>Effects on Future</i>	(2, 60)	0.57	.019	2.53	1.83	2.42	1.50	2.08	1.59
<i>Turning Point</i>	(2, 60)	0.41	.014	2.20	1.28	2.31	1.35	2.00	1.44

Note. One participant did not fill the second page of the questionnaires, thus analyses for last four items depended on 31 participant's data.

A 3 (memory type: IAM, DR-VAM, GEN-VAM) x 3 (memory valence: negative, neutral, positive) between subjects ANOVA was also conducted to see whether types of memories with different valence affect CES measures differently¹². A main effect of memory valence were found for all CES measures, namely *importance*, $F(2, 261) = 9.93$, $MSE = 3.50$, $p < .001$, $\eta_p^2 = .071$, relation to *life story*, $F(2, 257) = 5.00$, $MSE = 2.56$, $p < .01$, $\eta_p^2 = .037$, effects on *other experiences*, $F(2, 257) = 14.82$, $MSE = 3.06$, $p < .001$, $\eta_p^2 = .103$, effects on *future*, $F(2, 257) = 4.74$, $MSE = 2.88$, $p = .01$, $\eta_p^2 = .036$, and *turning point*, $F(2, 257) = 6.38$, $MSE = 2.57$, $p < .01$, $\eta_p^2 = .047$. Post-hoc tests with Tukey's HSD revealed that negative memories were rated higher in all these measures, compared to positive and neutral memories (all $ps < .05$). Main effect of memory type or the interaction effects were not significant (all $ps > .05$).

¹² Since the valence of memories was also part of the analyses, memories were treated as independent rather than multiple observations of same individuals.

Specificity

Firstly, IAMs were contrasted with all VAMs of the 62 participant regardless of whether or not they were classified as the instances of direct or generative retrieval. Thus, a total of 300 narratives which were classified as specific or summarized events by independent coders were analyzed¹³. As expected, IAMs were more likely specific events (88%), when compared to VAMs (79%), $\chi^2 (1, N = 300) = 4.00, p = .05$.

In order to investigate whether or not the specific and summarized events distributed in a similar way across IAMs, DR-VAMs, and GEN-VAMs, the same analyses were conducted by including only those VAMs given in response to new cues and those which could be categorized either as direct or generative retrieval instances. As expected, proportion of specific events were higher in IAMs (88%) and DR-VAMs (86%) than GEN-VAMs (74%), $\chi^2 (2, N = 270) = 7.47, p < .01$.

Experiences at Retrieval

Physical Reaction

Participants often reported that they smiled, they had their eyes with tears, they laughed, or they had a deep sigh just after they remembered memories. When analyzed all IAMs and VAMs in response to new cues reported by 62 participants, as expected, a relationship was found between the memory type (IAM or VAM) and physical reaction (present or non-present), $\chi^2 (1, N = 302) = 4.17, p < .05$. Participants gave a physical reaction 44% of the times after they remembered an IAM, while they gave a physical reaction only 33% of the times they remembered a VAM.

¹³ Participants' self-reports of specificity were also analyzed. Almost 70% of the memories of all types were specific; thus, there was not a significant relationship between type of memories and the self-reports of specificity, $\chi^2 (2, N = 266) = .32, p > .05$. However, it should be noted that participants were not familiar with the concepts of specific or summarized events. It was observed that many participants falsely tagged episodic events as "specific" only if they occurred once in their lives (e.g., vacation).

In addition, when DR-VAMs and GEN-VAMs were separately investigated, the relationship between memory type (IAM, DR-VAM, or GEN-VAM) and physical reaction (present or non-present) was again found, $\chi^2(2, N = 271) = 6.94, p < .05$. Participants gave a physical reaction 44% of the times after they remembered an IAM and 42% of the times after they remembered a DR-VAM; however they only gave a physical reaction 27% of the times after they remembered a GEN-VAM (see Figure 10).

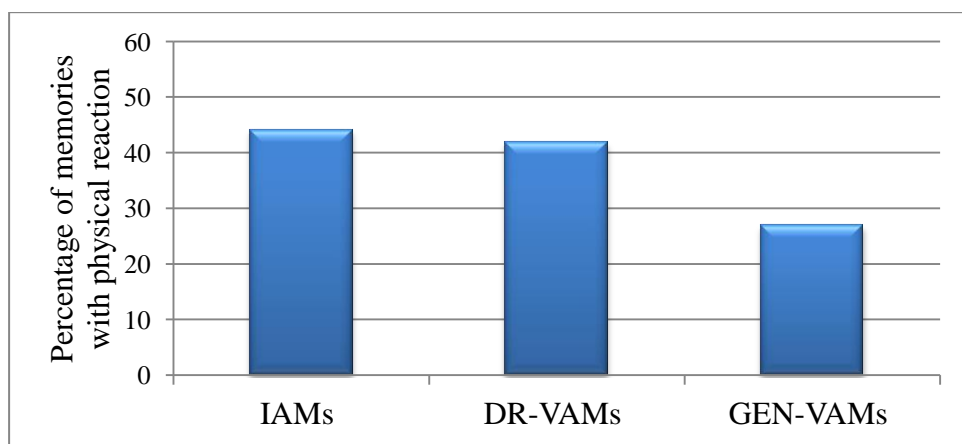


Figure 10. Percentages of memories followed by a physical reaction

Mood Change

There was a significant relationship between the direction of the mood change (positive mood change, no mood change, negative mood change) and the memory type. While IAMs (69%) and DR-VAMs (75%) affect one's mood more likely than GEN-VAMs (54%); IAMs' effects on mood were mostly in a negative direction (35%) but DR-VAMs' effects were usually in positive direction (46%). Figure 11 shows the distribution of mood change direction across memory types.

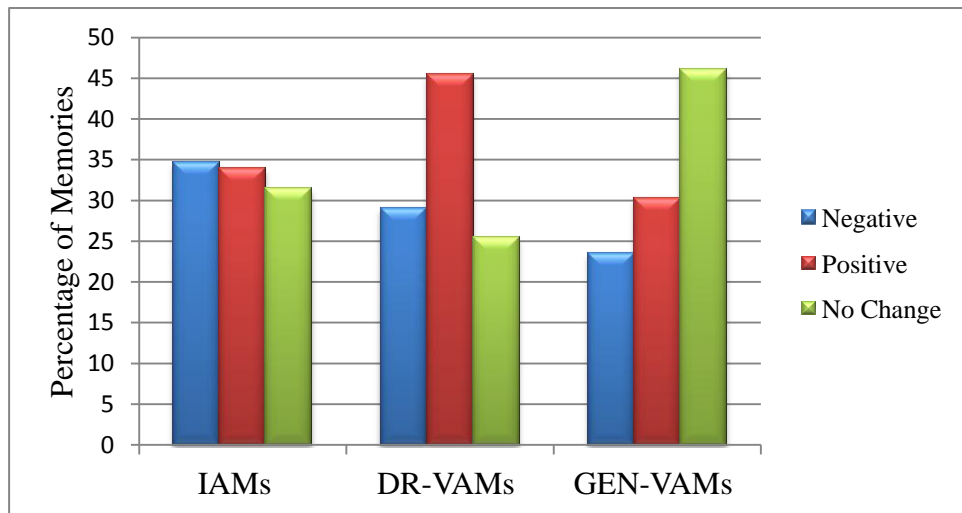


Figure 11. Percentages of memories which brings positive, negative, or no mood change

Mood change ratings were also analyzed independent of the direction of change.

The ratings were converted into absolute values (ranging 0 to 3) in order to see

whether a particular memory type had more intense mood change effects on

participants. The effect of memory type on absolute mood change scores was

significant, $F(2, 268) = 6.42$, $MSE = .77$, $p < .01$, $\eta_p^2 = .046$. Post-hoc tests using

Tukey's HSD showed that mood change absolute values of IAMs ($M = 1.06$, $SD =$

0.90) and DR-VAMs ($M = 1.24$, $SD = 0.96$) were both significantly higher than those

of GEN-VAMs ($M = 0.73$, $SD = 0.78$), $p < .05$, $p < .01$, respectively. The scores of

IAMs and DR-VAMs were not different from each other, $p > .05$ (see Figure 12).

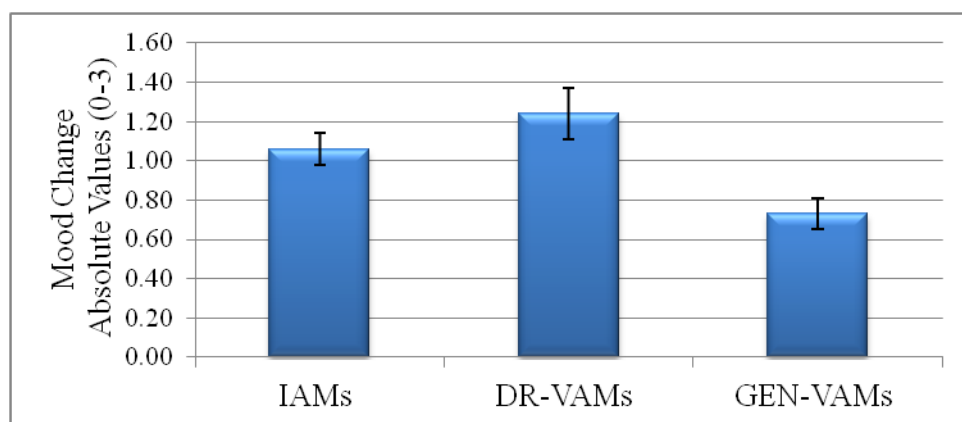


Figure 12. Mean absolute values of mood change for IAMs, DR-VAMs, and GEN-VAMs

Surprise

One way repeated measures ANOVA was conducted in order to see whether memory type had an effect on participants' ratings of surprise about remembering those events. The findings indicated that surprise ratings of participants were not affected by memory type, $F(1, 31) < 1$.

Results Pertaining Cue Variation: Same and Own Cues

Both same cues and own cues generally triggered the same memories (70% and 64%, respectively). It should be noted here that many of the participants' own cues were words with abstract meanings (i.e, friendship, honesty etc.) rather than representing a distinctive of events. Many reported that it was hard to describe their memories by using one word only.

Table 5 summarizes the distribution of reported DR-VAMs and GEN-VAMs across the cue categories, and the number of VAMs which were memories of the same events as IAMs.

Table 5. Percentages of DR-VAMs and GEN-VAMs in Response to Same and Own Cues

Same Cues (49 memories)				Own Cues (46 memories)			
Same Event		Different Event		Same Event		Different Event	
DR	GEN	DR	GEN	DR	GEN	DR	GEN
69.39	4.08	10.20	16.33	56.52	10.87	23.91	8.69

As can be seen from Table 5, 80% of the VAMs in response to same cues or own cues were retrieved directly. These direct retrieval instances were especially high if the participants remembered the same events. As expected, 90% of the same events were retrieved directly; however, if any other event was remembered in response to the

same or own cue, the participant engaged in direct retrieval and generative retrieval almost equally (57% and 43%, respectively), $\chi^2(1, N = 95) = 12.96, p < .001$.

Different Events Remembered in Response to the Same Cue

Seventeen VAMs of different events given in response to the same cue words were analyzed in terms of specificity and centrality of events.

Specificity of Different Memories Triggered by the Same Cue-Words

VAMs of different events triggered by the same cue were contrasted with their IAM counterparts in terms of specificity. If IAMs and VAMs given in response to the same cue were both specific or both summarized events, the pairs were coded as “same in specificity”. However, if one of them was a specific event while the other was a summarized event, the pairs coded as “different in specificity”. The results indicated that only one of the IAM-VAM pairs were different in specificity, and thus the pairs were not distributed equally, $\chi^2(1, N = 17) = 13.24, p < .001$. Therefore, clearly there was not a relationship between the type of remembering (involuntary vs. voluntary) and the specificity for memories (specific vs. summarized) when both memories were triggered by the same cue. In fact, all VAMs given to these same cues were specific, meaning that it was not the deliberate retrieval which makes VAMs less specific than IAMs; rather, it was the cue itself which helps individuals to reach a specific memory.

Centrality of Different Events Triggered by the Same Cue-Words

Separate *t*-tests were conducted in order to see whether IAMs and VAMs of the different events triggered by the same cues differ in centrality of events measures, namely *importance*, *life story*, *other experiences*, *effects on future*, and *turning point*.

The only significant difference between IAMs and VAMs was found for *importance*

measure. Contrary to expectations, IAMs ($M = 3.47$, $SD = 2.27$) were rated as more important events than VAMs ($M = 2.29$, $SD = 1.61$), $t(16) = 2.11$, $p = .05$.

If working self was earlier included to the search process while engaging in generative retrieval, events of GEN-VAMs should be higher in centrality, compared to IAMs given in response to the same cues. However, this hypothesis could not be tested since there were only eight GEN-VAMs to be compared with IAM counterparts.

Same Events Remembered Involuntarily and Voluntarily

A total of 77 VAMs in response to same-cues (39) and own-cues (38) were coded to be the same events as the participants' IAMs. In other words, these VAMs were deliberate recollections of the same events retrieved as IAMs.

Phenomenology of Remembering Same Event Involuntarily and Voluntarily

In order to test whether deliberate recall lead to different phenomenological experience in memories of the same events, separate paired samples t -test were conducted.

Participants gave higher ratings for VAMs in metacognitive judgments of *reliving*, $t(76) = 2.15$, $p < .05$, and *back-in-time*, $t(76) = 2.43$, $p < .05$ than they gave for IAMs.

In addition, VAMs of the same events were more *vivid*, $t(76) = 2.38$, $p < .05$ compared to IAMs. Furthermore, *hear*, *spatial layout*, and *story* items of component processes measures were also rated as higher for VAMs than IAMs, $t(76) = 2.44$, $p < .05$, $t(76) = 2.03$, $p < .05$, $t(76) = 2.03$, $p < .05$, $t(76) = 3.40$, $p = .001$, respectively (see Table 6).

Table 6. Descriptives for Phenomenology of the Same Events Retrieved as IAMs and VAMs

	All Memories (77)				Recent Memories (45)			
	IAMs		VAMs		IAMs		VAMs	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
<u>Metacognitive Judgments</u>								
<i>Reliving</i>	4.09	1.82	4.62*	1.68	4.31	1.77	4.93	1.67
<i>Back-in-time</i>	4.22	2.12	4.82*	1.53	4.67	2.02	5.24	1.32
<i>Remember/Know</i>	5.32	1.67	5.38	1.53	5.42	1.80	5.53	1.62
<i>Real/Imagine</i>	5.70	1.58	5.77	1.28	6.00	1.24	6.24	0.88
<u>Vividness</u>	4.86	1.54	5.31*	1.46	5.13	1.39	5.38	1.51
<u>Component Processes</u>								
<i>See</i>	5.42	1.50	5.51	1.38	5.40	1.66	5.56	1.47
<i>Hear</i>	3.53	2.07	4.12*	2.06	3.53	2.10	4.28*	2.08
<i>Emotions</i>	4.38	1.57	4.30	1.81	4.62	1.41	4.40	1.81
<i>Talk</i>	3.51	2.17	3.66	2.15	3.58	2.11	3.91	2.21
<i>Setting</i>	5.84	1.58	6.00	1.32	5.73	1.64	5.87	1.62
<i>Spatial Layout</i>	4.87	1.87	5.26*	1.62	4.75	1.86	5.29	1.69
<i>Story</i>	3.83	1.92	4.60*	1.75	4.16	1.89	4.84*	1.65

*Significantly higher ratings compared to IAM counterparts, $p < .05$.

It is important to note that IAM session always preceded VAM session; thus, rehearsing an old event in near future might have led the memory to be remembered more vivid, or helped participants gave higher ratings for phenomenology. To check this possibility, we repeated the same analyses by including only recent events of which occurred at most a year ago. As can be seen in Table 6, the results indicated that higher ratings of phenomenology for VAMs were disappeared for all items except *hear*, $t(44) = 2.42$, $p < .05$, and *story*, $t(44) = 2.29$, $p < .05$; meaning that generally IAMs and VAMs of the same recent events were not different in phenomenology.

Retrieval Times of Involuntary and Voluntary Remembering of the Same Events

A 2 (cue type: same cue vs. own cue) x 2 (retrieval type: direct vs. generative) x 2 (remembering type: involuntary vs. voluntary) mixed ANOVA with repeated measures

on the last factor was conducted to compare retrieval times of same memories. In addition to the significant main effect of remembering type, $F(1, 54) = 19.99$, $MSE = 4841.54$, $p < .001$, $\eta_p^2 = .27$, and the significant main effect of retrieval type, $F(1, 54) = 21.64$, $MSE = 6054.12$, $p < .001$, $\eta_p^2 = .28$, there was a significant interaction between remembering and retrieval types, $F(1, 54) = 21.05$, $MSE = 4841.54$, $p < .001$, $\eta_p^2 = .28$. As can be seen in Figure 13, if the VAMs of the same events were directly retrieved, retrieval times of IAMs ($M = 5.11$, $SD = 6.31$) and VAMs ($M = 4.66$, $SD = 5.34$) were not different ($p > .05$); however, if the VAMs of the same events were accessed through generative retrieval, then the retrieval time of IAMs ($M = 7.26$, $SD = 8.70$) were shorter than retrieval time of VAMs ($M = 28.14$, $SD = 20.93$) ($p < .001$). Thus, it can be concluded that the significant difference between involuntary and voluntary recollections of the same events were due to higher retrieval times of the GEN-VAMs.

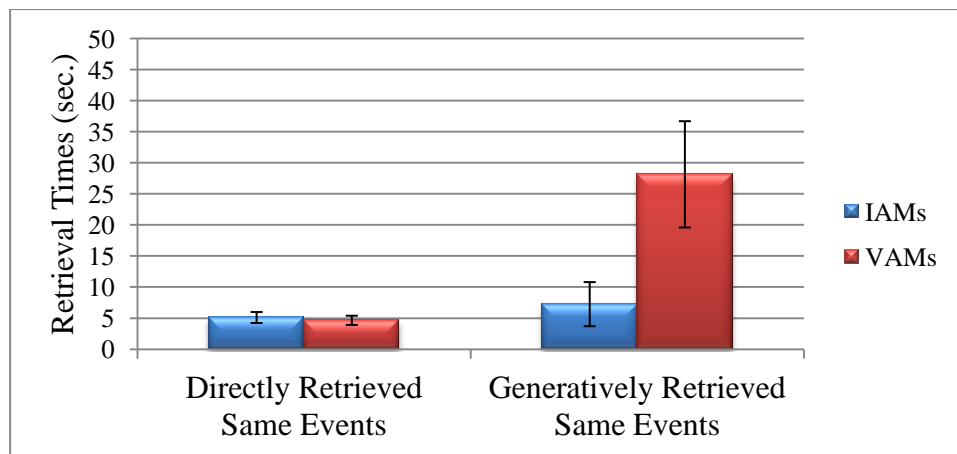


Figure 13. Retrieval times of the IAMs and VAMs of the same events

Exploratory Analyses

Although specific hypothesis were not generated regarding the following issues, exploratory analyses were carried out in some other properties of memories since this was the first study demonstrates differences between IAMs, DR-VAMs, and GEN-

VAMs. In addition, results of these exploratory analyses might provide corroborative evidences for abovementioned findings.

Valence of IAMs and VAMs

Valence of IAMs and VAMs given in response to the new cues were compared. Even if it was not significant, there was a trend indicating different types of memories were usually given different valence ratings. As can be seen in Figure 14, IAMs were more likely negative events (46%), DR-VAMs were more likely positive events (56%), while negative and positive events were equally likely to be remembered as GEN-VAMs (36% and 43% respectively), $\chi^2(4, N = 270) = 7.91, p = .095$.

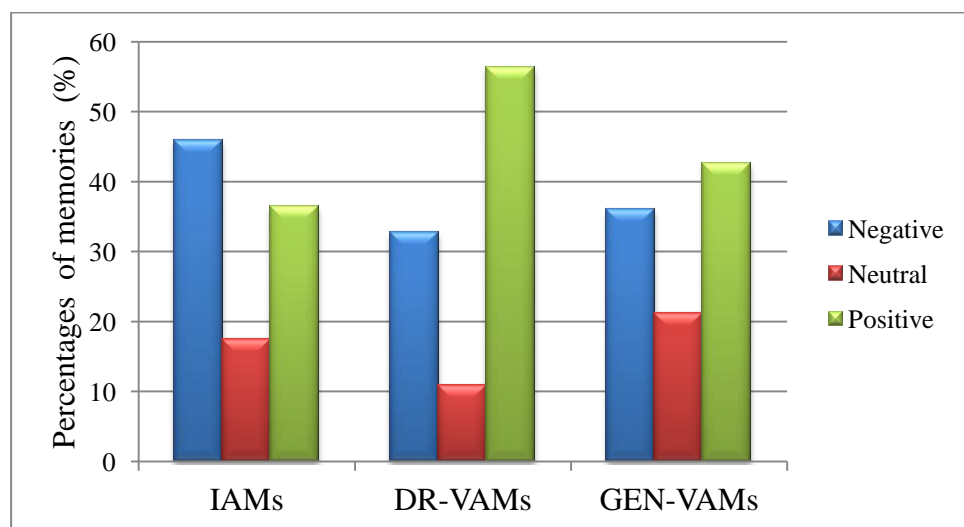


Figure 14. Proportion of negative, neutral, and positive memories of different types

Age of Memories

One way repeated measures ANOVA was conducted to compare the age of memories of IAMs, DR-VAMs, and GEN-VAMs. The findings suggested that there was no effect of memory type on the age of memories $F(2, 40) = .46, MSE = 8.97, p > .05$. However, when the memories were coded as recent (at most one year old) and remote (more than a year old), the analysis showed that events in IAMs were more likely

recent events (54%), while events in DR-VAMs and GEN-VAMs were more likely remote events (65% and 66%, respectively), $\chi^2(2, N = 266) = 10.85, p < .01$ (See Figure 15).

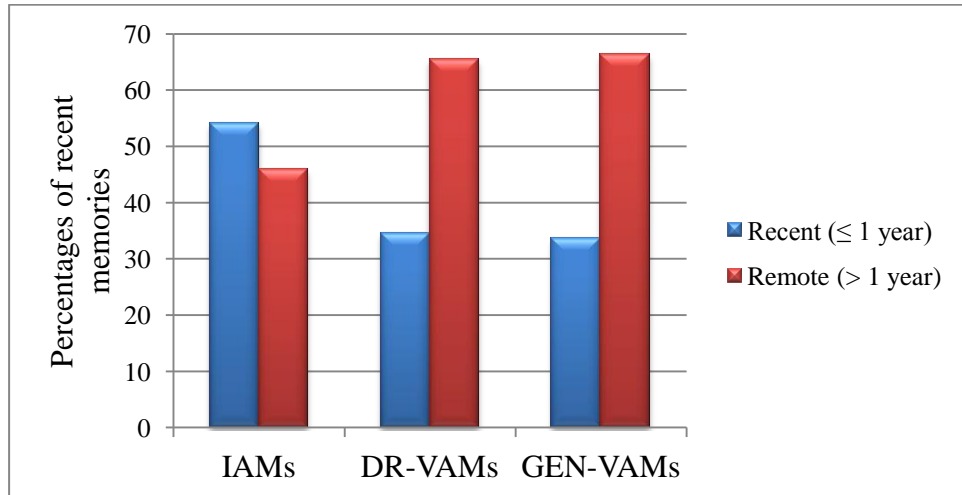


Figure 15. Percentages of recent and remote events within each memory type

Other Characteristics

Participants less often reported that chaining occurred while they remember IAMs (25%) and DR-VAMs (18%), compared to GEN-VAMs (50%), $\chi^2(4, N = 270) = 22.25, p < .001$, indicating that GEN-VAMs were more likely to be the first or the last part of a memory chain which triggers one another.

IAMs, DR-VAMs, and GEN-VAMs did not differ in terms of *expectedness* of events, $F(2, 62) < 1$. There was also no difference between the memory types in terms of *frequency of remembering*, $F(2, 62) < 1$, and *goal relatedness* ratings, $F(2, 60) < 1$.

Participants' ratings of how frequently they *thought about* the events were affected by memory type, $F(2, 62) = 3.44, MSE = 3.07, p < .05, \eta_p^2 = .10$. IAMs ($M = 3.97, SD = 1.84$) and DR-VAMs ($M = 3.72, SD = 1.68$) were rated significantly higher than GEN-VAMs ($M = 2.88, SD = 1.62$). However, ratings of how frequently they *talk about* the event did not lead such a difference, $F(2, 62) = 0.56, MSE = 2.78, p > .05$.

CHAPTER IV

DISCUSSION AND CONCLUSIONS

The main objective of the present study was to compare IAMs, DR-VAMs, and GEN-VAMs in terms of memory properties, phenomenology, and experiences at retrieval. Additional purposes were to explore (a) the IAMs and VAMs triggered by the same cue, and (b) phenomenology of IAMs and VAMs of the same events. To my knowledge, the present study was the first to compare IAMs and VAMs by examining VAMs accessed through different retrieval mechanisms separately. By using this strategy, it was aimed to rule out the possibility of DR-VAMs hindering the differences between IAMs and VAMs due to their similarity to IAMs in terms of retrieval mechanism. In addition, by using the same words for cuing the memories, the present study was the first to investigate the pure effect of “intention” on remembering.

The Frequency of Direct and Generative Retrieval in Voluntary Memories

According to Conway’s SMS framework (Conway, 2001a; Conway, 2005), a memory could be reached by using one of the two retrieval mechanisms. When the cues are capable of directly activating event specific knowledge, a link between the cue and the memory is formed by utilizing direct retrieval. Generative retrieval, on the other hand, occurs when the individual engages in a top-down search process from life time periods to event specific knowledge, with the help of the his/her working self. In the present study, VAMs were categorized as DR-VAMs and GEN-VAMs by using Uzer and her colleagues’ (2012) methodology. However, the present study could not replicate their findings regarding higher frequency of DR-VAMs over GEN-VAMs (Uzer et al., 2012). On the contrary, it was found that almost 60% of the classified

VAMs were instances of generative retrieval. However, the frequency of DR-VAMs were still five times more than what Haque and Conway (2001) reported; thus, it cannot be concluded that the basic retrieval strategy for individuals is generative retrieval. Overall, since generative retrieval is not the basic strategy, investigating DR-VAMs and GEN-VAMs separately was an important attempt to see the differences between IAMs and VAMs clearly.

Differences Originating From Retrieval Mechanisms

Retrieval Times

Supporting the hypothesis, DR-VAMs were accessed equally fast as IAMs, and access to GEN-VAMs were slower compared to both. Similar results were consistently obtained in the analyses of all memories, first memories, as well as the memories of same events. Although no study compared these three types of memories before, these results were in line with previous findings showing that IAMs are faster recollections than VAMs (Berntsen et al., 2013; Jones & Steel, 2012; Schlagman, & Kvavilashvili, 2008) as well as with the findings indicating that DR-VAMs were accessed faster than GEN-VAMs (Uzer et al., 2012). Thus, it can be argued that the present findings can be considered as the first empirical support for IAMs being instances of direct retrieval (Conway, 2001a; Conway, 2005; Conway, & Pleydell-Pearce, 2000).

Uzer et al. (2012) interpreted the retrieval time differences between DR-VAMs and GEN-VAMs in the light of what they called “dual strategies approach”. According to this approach, retrieval time of the VAMs depends on the proportions of direct and generative retrieval among all memories. They also argued that retrieval times reported by previous studies were unrealistic, since they represent a combination of direct and generative retrieval due to neglecting this retrieval strategy distinction. The

results of the present study provide support for dual strategies approach by extending its implications through comparative studies of IAMs and VAMs. Specifically, the proportion of DR-VAMs and GEN-VAMs among all VAMs predict retrieval time differences between IAMs and VAMs; because the present study showed that if all VAMs were accessed through direct retrieval, the retrieval time differences would not be obtained.

Specificity

IAMs were more likely to be specific than summarized events, compared to VAMs. This is in line with what previous studies consistently indicated (e.g., Berntsen, 1998; Johannessen & Berntsen, 2010; Mace et al., 2011; Schlagman & Kvavilashvili, 2008). IAMs were believed to be more specific events because a distinctive cue directly activates a memory without requiring elaboration of it during the search processes (Berntsen, 2009). On the other hand, in order to deliberately retrieve a memory, one should engage in a top-down search by elaborating the cue until the search process ends with a direct retrieval (Conway, 2001a; Conway, 2005; Conway & Pleydell-Pearce, 2000). However, since these search and elaboration processes are only evident in GEN-VAMs, in the present study, it was hypothesized that IAMs will be more specific than GEN-VAMs only. As expected, IAMs and DR-VAMs did not differ in terms of specificity, while GEN-VAMs were found to be less specific than both.

It can be argued that this is consistent with the results regarding chaining. Participants indicated that half of their GEN-VAMs were the first or the last memory of a memory chain. Such high prevalence of chaining in GEN-VAMs may be due to cue elaboration processes. Elaborations of a cue may lead the participants to reach sequential events that constitute a story (episodic) or a summary of equivalent events

that occur repeatedly (generic), instead of retrieving one specific event (See Singer & Blagov, 2002; for classification).

As a second issue, the present study looked at the specificity of IAMs and VAMs by controlling the personal relevance of the cues. When the same cue triggered IAMs and VAMs, no difference was found between memories of different events in terms of specificity. In fact, all VAMs, either directly or generatively retrieved, were specific events. This may indicate that what makes a VAM less specific compared to an IAM is not the intention of retrieval. Instead, it can be argued that those VAMs which have strong associations with the cues were underrepresented in autobiographical memory knowledge base, and this prevents participants to reach specific memories. However, when the individual is provided with such strong or personally relevant cues, as it was shown in the present study, one could retrieve as specific VAMs as IAMs. This argument is in line with why Rubin and colleagues (2008) found VAMs as more specific than IAMs. In their study, participants were instructed to remember a VAM in the same period of each reported IAM. Thus, when they were cued by very distinctive and personally relevant events –their own IAMs, in this case–, they could reach even more specific VAMs.

Physical Reaction and Mood Change

IAMs and DR-VAMs both led participants to give a physical reaction more than GEN-VAMs did, and both were also more effective in changing one's mood compared to GEN-VAMs. Importantly, although deliberately remembered, DR-VAMs were not different from IAMs in terms of physical reaction and mood change.

Consistent with the literature (e.g., Berntsen, & Hall, 2004; Johannessen, & Berntsen, 2010), it was not surprising that remembering an IAM was more often followed by a physical reaction compared to remembering a VAM. According to

Bertnsen (2009), there are two accounts which are capable of explaining higher emotional impact of IAMs over VAMs: Associative activation of emotion account and emotion regulation hypothesis. The former argued that while a cue associatively brings a past event into our minds, it can also bring the emotion we experienced in the past (Power & Dalgleish, 1999). Berntsen (2009) claimed that such associative associations were more prevalent in IAMs “because of their inherently associative retrieval”. On the other hand, according to emotion regulation explanation (Gross, 2001), due to the “sudden and spontaneous nature” of the involuntary retrieval, individuals could not engage in emotion regulation strategies. Thus the IAMs affect their moods more than VAMs do, as well as individuals could not prevent themselves from giving a physical reaction that normally they could regulate (Bertnsen, 2009). The present findings are important due to differentiating these two accounts, while supporting one and providing evidence against the other. Both of these accounts explain higher emotional impact of IAMs over VAMs; however the latter could not explain the similarity between DR-VAMs and IAMs. If the differences between IAMs and VAMs are due to the “spontaneous nature of IAMs”, we should not expect DR-VAMs to be as impactful as IAMs. However, associative activation of memory account should expect higher emotional impact of IAMs and DR-VAMs over GEN-VAMs because both memories utilized from associative nature of direct retrieval. Overall, the present results regarding emotional impact could be considered as a support for associative activation of memory account.

Rehearsal

Unlike some previous studies (Berntsen, 1998; Rubin et al., 2008), two separate measures were used for frequency of rehearsal: *thinking* and *talking* about the event. It was found that how frequently an event had been thought about, but not talked about,

was different across memory types. Specifically, individuals reported that they thought more about the events in their IAMs and DR-VAMs, compared to the events in their GEN-VAMs.

In the literature, there are studies which found IAMs to be more rehearsed events (Schlagman & Kvavilashvili, 2008; Study 2), to be less rehearsed events (Berntsen, 1998; Johannessen, & Berntsen, 2010; Rubin et al, 2008), or not to be different from VAMs in terms of rehearsal (Berntsen & Hall, 2004; Bertnsen & Jacobsen, 2008; Watson et al., 2012). One might speculate that the proportion of direct and generative retrieval across all VAMs in these studies might have predicted the direction of the results. Investigating the retrieval strategies separately allowed us to see that individuals thought more about the events in their IAMs and DR-VAMs than the events in their GEN-VAMs. These results are in line with what reminding literature (e.g., Hintzman, 2011) suggests. Since retrieving the information facilitates its later retrieval (Bjork, 2011), reminding makes memories more persistent and more accessible because new bonds between cues and memory could be formed (MacLeod, 2013; Hintzman, 2011). Thus, consistent with Berntsen's (2009) claims, an event gets more accessible as it is rehearsed and the probability of the event popping into our mind involuntarily increases. Similarly, as much as we think on some memories, by increasing its accessibility and association with the cue, the probability of retrieving it as a DR-VAM also increases when we engage in a deliberate retrieval.

Differences Originating From Retrieval Intention

Abovementioned findings were specifically related to the retrieval mechanisms that were used while remembering. However, the present research showed that some of the existed differences between IAMs and VAMs occurred irrespective of retrieval

mechanisms. Rather, they appeared to be related to individuals' "intention" on remembering. These are events' recency and valence.

Consistent with most of the findings in the literature (Berntsen & Hall, 2004; Bertnsen & Jacobsen, 2008; Mace et al., 2011; Schlagman & Kvavilashvili, 2008), IAMs, DR-VAMs, and GEN-VAMs were not found to be different in terms of recency. However, it was evident that half of the events in IAMs came from the last year of participants' lives, while most of the events in both their DR-VAMs and GEN-VAMs were older than one year. This indicates that remembering a recent memory is not related to the retrieval strategy; rather, relatively recent events are more likely to pop up in our minds compared to a deliberate retrieval.

When it comes to the valence of memories, there was a tendency of IAMs being negative events, while positive events were more prominent among VAMs, especially in DR-VAMs. Previous findings which indicate IAMs were more likely to be triggered by negative cues (Schlagman & Kvavilashvili, 2008) could be considered as in line with the pattern found in this study. However, since the present results regarding valence were not statistically significant, further replications are needed to argue for a relationship between valence and the memory type.

Similarities between IAMs and VAMs: Phenomenology and Centrality of Events

Phenomenological Properties

Current findings regarding phenomenology can be summarized as following: DR-VAMs were more *vivid* recollections than GEN-VAMs. DR-VAMs were rated higher in *see* and *emotions* items of component processes measures compared to GEN-VAMs. Ratings of DR-VAMs were also higher in measures of all metacognitive judgments, namely *reliving*, *back-in-time*, *remember/know*, *real/imagine*, compared to

GEN-VAMs. When it comes to IAMs, consistent with the hypotheses, phenomenological ratings of IAMs were not different from those of DR-VAMs. However, unexpectedly, they were also not different from those of GEN-VAMs. The lack of significant difference between IAMs and GEN-VAMs demonstrated that IAMs did not mimic DR-VAMs in terms of phenomenological experience.

Higher ratings of phenomenology in DR-VAMs compared to GEN-VAMs were in line with what St Jacques and colleagues (2011) found for memories triggered by Sense-Cam pictures compared to those triggered by phrases. Present results were also consistent with previous finding regarding the similarity of IAMs and VAMs in terms of vividness (Berntsen & Hall, 2004; Johannessen & Berntsen, 2010; Mace et al., 2011; Schlagman & Kvavilashvili, 2008), metacognitive judgments of remember/know (Berntsen & Hall, 2004), as well as measures of some component processes (Rubin et al., 2008).

There are two possible explanations of why IAMs were not different from both types of VAMs. First, as the present findings suggest, remembering autobiographical memories voluntarily or involuntarily simply may not affect phenomenological experience of the individuals. However, it is not clear why IAMs were similar to GEN-VAMs while DR-VAMs were different. Future research should investigate what makes a difference in phenomenological experience within VAMs if it is not retrieval mechanism. Perhaps a stronger phenomenology is experienced when the cue is capable enough to directly activate the memory, and a deliberate recollection of that memory has an extra effect on phenomenological experience.

Second possibility is that the present study might not reveal the differences originating from retrieval mechanisms, due to the methodological issues. Many of the participants had only one memory of each type. These memories might not represent

the characteristics of retrieval types; rather they might be bounded to the properties of the events. In fact, in a between-subjects pilot study, we found that phenomenological ratings of both IAMs and DR-VAMs were higher than GEN-VAMs, while ratings of the two were not different from each other (Ersoy & Tekcan, 2014). Unlike the present work, we collected VAMs in response to nine cue words in the pilot study; thus the design enabled us to use average ratings of almost two or three memories accessed by each retrieval strategy. However, since the number of participants in IAM condition was low, the results of this pilot work should also be interpreted with caution.

As a novel issue regarding phenomenological experience, involuntary and voluntary recollections of the same events were compared. These memories were either cued by the same words that triggered IAMs before or the words that the participants themselves wrote to describe their IAMs. It was expected that if retrieval intention does not affect phenomenology, then the phenomenological ratings between IAMs and VAMs of the same events should not differ. Contrary to the expectations, the results showed that VAMs were more vivid, and they were rated higher in travelling *back-in-time* and *reliving* measures, compared to IAMs. VAMs were also rated higher in *hear*, *spatial layout*, and *story* items. Thus, based on these results, retrieval intention seems to affect how we remember the same event.

However, one should take into consideration that IAM session always preceded VAM session due to the nature of the task. Thus, it is a possibility that earlier rehearsal might have led higher phenomenology in VAMs. Lack of the differences between IAMs and VAMs for the same events which occurred at most one year ago indicates the plausibility of this explanation. Future studies should replicate this finding by developing another method to elicit the same events as IAMs and VAMs in a counterbalanced order.

Centrality of Events

Contrary to the hypothesis, no difference was found between IAMs, DR-VAMs, and GEN-VAMs in terms of events' centrality to self. The results did not support previous findings indicating that IAMs were less related to one's life story and identity as well as they used less often as reference points for future, compared to VAMs (Johannessen & Berntsen, 2010; Rubin et al., 2008).

It is important to note that previous studies indicating differences between IAMs and VAMs were both diary studies. In diary studies it was never known if the participants reported the first events that come to mind. However, in the present study, participants had to report a memory as soon as they retrieve it. Thus, they did not have an opportunity to wait for choosing an event which is more related to their life story or identity. Overall, it can be concluded that the first VAMs that come to one's mind in response to a cue-word were not different from IAMs in terms of events' centrality to self.

Strengths, Limitations and Future Directions

The present study had valuable attempts to prevent voluntary remembering during IAM session. Due to the nature of IAMs being *involuntary*, using a methodology to elicit IAMs without directing participants to remember an event is not easy. All methods except CWAT, including diary studies and other laboratory studies, require asking participants to report an IAM whenever it occurs; thus, it was never known if the participants question their minds for a memory and therefore the memories turn out to be *voluntary* memories. In fact, Barzykowski (2013) instructed participants to pause the vigilance task when they have a memory (suggestion group) or to pause the vigilance task when they have any thought (no-suggestion group). He found that those

in suggestion group rated their voluntariness of remembering higher than those in no-suggestion group. By using a non-suggestive task, the present study had a valuable attempt to reduce the probability of deliberately remembering an event. In addition, discarding the memories which were rated high in voluntariness of remembering measure was a good strategy in order to have only memories which came to mind *involuntarily*. Barzykowski (2013) also showed that participants in suggestion group reported more IAMs than those in no-suggestion group. In line with this finding, the low number of reported IAMs in the present study (less than two IAMs per participant; maximum five IAMs) was not surprising, compared to the relatively high number of memories (seven IAMs per participant; maximum 21 IAMs) reported by the participants in Schlagman and Kvavilashvili (2008) study.

More similar to the current methodology, studies using Continuous Word Association Task (Ball, 2007; Jones & Steel, 2012) also do not lead participants to remember an event; but the task requires them to report memories retrospectively. However, in the present study, participants identified the IAMs as soon as they occurred. In addition, they answered the questions related to the retrieval moment and phenomenological experience immediately after they remembered IAMs. Thus, the present study also attempted to prevent the second *voluntary* remembering of the event, while filling out the questionnaire.

Despite using a non-suggestive procedure, the present findings showed that IAMs outnumbered the current thoughts or future thoughts, consistent with an earlier work (Plimpton, Pattel, & Kvavilashvili, 2013). Thus, it can be argued that without directing the participants, it is possible to collect *involuntary* memories since they are more likely to pop up in one's mind compared to other types of TUTs.

Although the present study provides novel findings and offers a comprehensive way to examine IAMs and VAMs, there are also some limitations regarding the methodology and design of the study.

Firstly, as mentioned above, the number of IAMs reported by the participants was not as high as the numbers in previous IAM studies (e.g., Schlagman & Kvavilashvili, 2008). This led IAM ratings to be based only on one or two memories. This might be problematic because if a participant reported only one IAM, the ratings of that memory might be bounded to the characteristics of that specific event, rather than representing any involuntary recollection of one's personal past. Why participants did not report many IAMs was actually clear: They were allowed to report all TUTs in a limited time. More speculatively, participants might have experienced difficulties in reporting their all IAMs because of being everyday issues or being perceived as "silly". As Hintzman (2011) argued, involuntary memory studies required three steps for participants to report an IAM, namely recollective experience, identification of recollection, and decision to report. Hintzman (2011) called the second step as a "formidable bottleneck" which requires participant to stop his/her ongoing activity to realize the recollective experience. In addition, as the third step, one should decide whether the memory is worth reporting (Hintzman, 2011). Simply, the participants in the present study might have experienced difficulties in these second and third steps. As an evidence, almost one third of the participants reported that they had a memory during the task but they did not pause the task to indicate it. The same problem probably occurs in almost all IAM studies; taking this issue into account should be a good practice for future research. Using clear instructions which explicitly mentions that memories are not expected to be "extraordinary" events may be a good strategy.

Secondly, the participants in the present study were highly motivated on their so-called attention task which required them to concentrate on lines. Many reported that they did not even read the words to prevent the possibility of missing the target pattern of lines. In fact, the percentage of reading words predicted the number of IAMs reported. Thus, future research should develop a new version of the task in which the target and non-target screens were specified according to the perceptual properties of the words. For instance, rarely presented target screens may be composed of words written in uppercase or written in blue, while the words in non-target screens are written in lowercase or written in red, respectively (See McVay and Kane, 2009, for a similar methodology used in a mind wandering study). By this way, participants can be made to report more IAMs, still without directing them to retrieve a memory.

Lastly, one of the main aims of the present study was to investigate the recollections of the same events retrieved involuntarily and voluntarily. However, due to the nature of the design, IAMs were always collected before VAMs. Even if the participants were tested in different rooms and by different experimenters, there were still some participants who retrieved *memories of retrieving the same memory* in the VAM session, rather than retrieving the same events that they had reported. Those memories were not coded as the same event; thus, this procedure lowered the number of same memories given as VAMs. Future research should replicate the present findings by increasing the time between two sessions in order to prevent such issues.

As a last point, since the literature suggests that there are some differences in the neural mechanisms underlying IAMs and VAMs (Hall, Gjedde, & Kupers, 2008; Hall, Miles, Davis, Bertnsen, Cabeza, & Rubin, 2013), as well as in DR-VAMs and GEN-VAMs (Addis et al., 2012), future imaging studies that compare IAMs and VAMs by

separately looking at different retrieval mechanisms may provide support of neural evidence to the behavioral findings reported here.

Conclusion

Overall, the present study is the first to show that some properties of involuntary memories were not different from voluntary counterparts if both used the same retrieval mechanism, namely direct retrieval. In addition to provide empirical support for IAMs as instances of direct retrieval, this study also differentiated the origins of the differences between IAMs and VAMs. Specifically, differences in retrieval times, emotional impact, rehearsal, and specificity have their sources from retrieval mechanisms (direct vs. generative retrieval); while differences in recency and valence have their sources from retrieval intention (spontaneous vs. deliberate retrieval). The present results also showed that the most common characteristic of IAMs, which is the higher specificity compared to VAMs, is related to personal relevance or distinctiveness of the cues. This is evidenced by the disappearance of the difference while same cues were used to trigger involuntary and voluntary memories.

To sum up, this study contributes to the literature by offering a theoretically more appropriate way to look at the similarities and differences between IAMs and VAMs. Utilizing direct and generative retrieval distinction, the present work may lead further studies to better explain the properties of spontaneous and deliberate remembering of autobiographical memories.

Appendices

APPENDIX A

Informed Consent Form in Session-I

Katılımcı Bilgi ve Olur Formu

Deney 2 – Odaklanma

Araştırma Konusu ve Onay:

Kişiler, belirli bir görev yürütürken dikkat dağınıklığı yaşayabilir, görevden uzak düşüncelere dalabilirler. Bu araştırma, kişilerin odaklanma süreçlerini, bu süreçler sekteye uğradığında meydana gelen değişimleri izlemektedir. Araştırma sırasında sizden dikkat ölçen bir görevi yürütmeniz istenecek; bu görev içerisinde kimi uyarıcılara tepki verirken kimi uyarıcılara sessiz kalmanız beklenecektir. Bu çalışma yaklaşık olarak 50 dakika sürecektir. Görev esnasında birtakım form ve anketler doldurmanız istenecektir.

Çalışmaya katılmak tamamıyla isteğe bağlıdır. Katılımınız karşılığında size PSY 101 ya da PSY 242 dersinden 1 kredi verilecektir. Çalışmanın katılımcılar üzerinde herhangi bir rahatsızlık uyandırması beklenmemektedir; ancak siz deneyin herhangi bir aşamasında istenecek olan bilgilerin sizde rahatsızlık yaratacağını öngörüyorsanız çalışmaya katılmamakta özgürsünüz. Formu imzalarsanız dahi kendinizi rahat hissetmediğiniz an çalışmayı bırakabilirsiniz. Bu durumda kredi kaybetmeyeceksiniz.

Çalışmanın hiçbir aşamasında isimler kullanılmayacaktır. Size ait olan veriler bir numarayla eşleştirilip isimsiz olarak saklanacaktır. Tek isimli belge, üzerinde isminiz ve imzanız bulunan bu form olacaktır, ve size ait olan diğer tüm verilerden ayrı saklanacaktır.

Çalışma ile ilgili sorularınızı pinar.kurdoglu@boun.edu.tr adresinden ya da 0212 359 6757 numaralı telefondan sorabilir, bu çalışmanın katılımcısı olarak haklarınızla alakalı bilgi almak için üniversitenin etik kurullarına başvurabilirsiniz.

Bu çalışmaya katılmak için, lütfen aşağıdaki “İzin Formu”nu doldurup imzalayınız. Eğer 18 yaşından küçük iseniz, lütfen bu formu velinize imzalatıp araştırmacıya teslim ediniz.

Çalışma hakkındaki bilgilendirmeyi okudum ve anladım. Formun bir örneğini aldım.

Çalışmaya katılmak istiyorum / istemiyorum

Kredi almak istediğim ders: PSY 101 PSY 242

Katılımcı Adı-Soyadı:.....

İmzası:

Tarih (gün/ay/yıl):/...../.....

Velisi veya vasinin adı, soyadı ve imzası:

(18 yaşından küçük katılımcılar için)

APPENDIX B

Demographic Form Used in Session-I

DEMOGRAFİK BİLGİ VE DENEYLE İLGİLİ ANKET

1. Cinsiyetiniz: Kadın / Erkek / Diğer / Belirtmek İstemiyorum

2. Bölümünüz: _____

3. Doğum Tarihiniz (gün, ay, yıl olarak): _____

4. Anadiliniz: Türkçe Diğer Lütfen belirtiniz _____

5. (Anadiliniz Türkçe değil ise) Kendinizi Türkçe'ye ne kadar hakim hissediyorsunuz?

1 2 3 4 5
Hiç hakim değilim Oldukça hakimim

6. Denei süresince çizgilere odaklanmakta zorlandınız mı?

1 2 3 4 5
Hiç zorlanmadım Oldukça zorlandım

7. Tüm deneyi düşündüğünüzde, sizce kelimelerin yüzde kaçını okumuşsunuzdur?
% _____

8. Denei sırasında aklınızdan geçtiğini fark ettiğiniz, ancak BOŞLUK tuşuna basmadığınız düşünceleriniz (hayal / anı / plan vs.) oldu mu? Evet / Hayır

9. ("Evet" ise) Bunlar ne tür düşüncelerdi? (Birden fazla işaretleyebilirsiniz)

Anılar Hayaller Planlar Anlık durum Kişisel kaygı vs.

10. Şu sıralar aklınızı fazlasıyla meşgul eden (sınav, proje, mezuniyet, ilişki, sağlık sorunları vb.) bir konu var mı? Varsa belirtiniz: _____

11. Daha önce buna benzer bir deneye katıldınız mı? Evet / Hayır

12. (Katıldıysanız) İki deneyin benzer yönleri nelerdi?
_____.

13. Araştırma sırasında size tuhaf gelen bir durum oluştu mu? Evet / Hayır

Yanıtınız "Evet" ise lütfen açıklayınız:

14. Araştırma ile ilgili eklemek istediğiniz bir şey varsa lütfen yazınız:

APPENDIX C

List of Words Used in Vigilance Task

WORDS	Valence	Img.	Conc.
BİTKİ*	()	6.50	6.81
BULGUR*	()	6.58	6.84
DUA*	()	4.00	2.84
FİYAT*	()	4.64	5.00
HESAP*	()	5.16	4.86
KALKMAK*	()	5.47	5.06
NAYLON*	()	6.29	6.50
RADYUM*	()	6.47	6.75
ŞEKİL*	()	4.75	5.40
SESTEŞ*	()	2.89	3.33
TELEVİZYON*	()	4.91	4.23
TİLKİ*	()	6.21	6.79
TÜR*	()	2.73	4.19
YATSI*	()	3.60	4.39
ZAMAN*	()	3.35	2.79
ABLA	()	5.67	5.33
AÇI	()	5.56	4.48
AÇIK	()	4.09	4.26
AÇIKLAMAK	()	3.60	3.45
AÇMAK	()	4.58	4.29
AD	()	4.49	3.35
ADAM	()	5.67	5.98
ADAY	()	4.21	5.12
AĞIRLIK	()	5.02	5.04
AĞIZ	()	6.79	6.67
AHŞAP	()	5.48	6.42
AJAN	()	4.48	5.60
ALET	()	4.61	6.63
ALINTI	()	3.70	4.45
ALIŞKIN	()	2.33	2.34
ALKOL	()	5.87	6.46
ALTGEÇİT	()	6.66	6.88
AMAÇ	()	2.95	2.14
AMCA	()	6.15	6.35
ANAHTAR	()	6.87	6.67
ANTEN	()	6.36	6.87
ANTRENMAN	()	5.65	4.79
APARTMAN	()	6.70	6.74
ARA	()	3.48	4.02
ARAÇ	()	5.76	6.12

WORDS	Valence	Img.	Conc.
ARAMAK	()	3.96	4.23
ARKA	()	3.94	4.83
ARSA	()	5.74	6.69
ASKER	()	6.77	6.69
ASKILIK	()	6.28	6.80
ASLAN	()	6.64	6.64
ASLINDA	()	1.92	2.48
ATASÖZÜ	()	3.95	3.38
ATMAK	()	4.42	4.45
ATOM	()	3.16	4.73
AVARE	()	3.37	3.07
AVUÇ	()	6.20	6.63
AYAKKABI	()	6.44	6.88
AYKIRI	()	2.74	2.15
AYNA	()	6.74	6.83
AYRICA	()	2.04	2.66
BACAK	()	6.50	6.86
BAGAJ	()	6.09	6.84
BAKANLIK	()	5.06	5.10
BAKIŞ	()	4.65	3.86
BANKA	()	6.38	6.40
BARDAK	()	6.74	6.72
BARINAK	()	5.47	6.43
BARMEN	()	6.38	6.60
BAŞIBOŞ	()	2.97	2.82
BASINÇ	()	3.25	4.85
BAŞKAN	()	5.24	5.57
BAŞVURMAK	()	4.44	3.93
BATI	()	4.82	4.00
BAYİ	()	4.85	6.26
BELDE	()	3.71	5.35
BELEDİYE	()	5.21	5.65
BELGE	()	5.03	6.50
BELKİ	()	2.10	2.00
BEY	()	4.69	4.45
BEYİN	()	6.36	6.07
BİBER	()	6.81	6.94
BİÇİM	()	3.16	3.77
BILDİRCİN	()	5.57	6.80
BİLEK	()	6.06	6.82

WORDS	Valence	Img.	Conc.
BİLET	()	6.58	6.88
BİNA	()	6.68	6.76
BIRAKMAK	()	3.91	3.93
BİRİ	()	3.20	4.38
BLOK	()	4.15	5.55
BOĞA	()	6.18	6.84
BÖLGE	()	4.32	4.79
BÖLÜM	()	3.87	4.45
BORA	()	6.32	6.89
BOYA	()	5.35	6.43
BÖYLECE	()	1.89	2.41
BOZA	()	6.33	6.64
BRÜT	()	2.39	2.99
BUGÜN	()	3.74	3.29
BULUT	()	6.45	6.29
BÜRO	()	5.43	6.37
BURUN	()	6.66	6.86
BÜYÜK	()	4.98	3.81
BUZ	()	6.42	6.74
BUZDOLABI	()	6.77	6.70
ÇABUK	()	2.98	2.40
CADDE	()	6.11	6.52
ÇADIR	()	6.62	6.90
ÇAĞRI	()	3.23	3.90
CAMİ	()	6.52	6.59
ÇEHRE	()	4.88	6.02
CEKET	()	6.39	7.00
ÇEKİRDEK	()	6.30	6.62
ÇEKMEK	()	4.11	4.08
CENİN	()	4.36	5.72
ÇEŞİTLİ	()	3.26	3.40
CEVAP	()	3.99	4.35
ÇEVRE	()	4.72	5.00
ÇİĞNEMEK	()	6.02	5.78
CİHAZ	()	4.76	6.43
ÇIKMAK	()	3.85	4.06
CİSİM	()	3.64	5.84
ÇİZGİ	()	6.34	5.90
ÇÖMLEK	()	5.18	6.85
ÇUBUK	()	5.13	6.47
DAKİKA	()	4.14	3.51
DAMLA	()	5.87	6.64
DANSÖZ	()	6.50	6.45

WORDS	Valence	Img.	Conc.
DEDE	()	6.39	6.48
DEMEK	()	2.74	3.44
DEMİR	()	5.50	6.77
DEPO	()	5.58	6.67
DERECE	()	4.44	3.83
DERİ	()	5.55	6.74
DERNEK	()	4.55	5.26
DEVLET	()	4.09	3.48
DEYİM	()	3.11	2.84
DİKİŞ	()	5.52	6.33
DİKKAT	()	3.45	2.67
DİL	()	5.91	5.68
DİN	()	3.38	2.22
DİNLEMEK	()	4.71	4.40
DİZGİN	()	3.42	5.31
DÖNEM	()	3.27	3.17
DÖNMEK	()	4.81	4.02
DUDAK	()	6.46	6.80
DÜDÜK	()	6.47	6.86
DÜĞÜM	()	6.14	5.52
DÜKKAN	()	6.06	6.79
DÜNYA	()	6.14	5.84
DURMAK	()	4.79	4.47
DUVAR	()	6.66	6.62
DUYMAK	()	4.53	4.71
DUYU	()	3.28	3.89
EFENDİM	()	2.87	2.90
EĞER	()	2.16	2.25
EKLEMEK	()	3.40	4.13
EKMEK	()	6.73	6.67
EKONOMİ	()	3.21	3.47
EKRAN	()	6.27	6.74
EKŞİ	()	4.94	5.19
ELÇİLİK	()	5.14	5.19
ELEKTRİK	()	4.45	5.49
ELEMAN	()	5.02	6.00
ELEŞTİRMEN	()	3.80	5.34
ELMA	()	6.73	6.95
EMEKLİ	()	4.90	4.26
EŞEK	()	6.40	6.80
ESNEK	()	4.92	4.40
EŞYA	()	5.49	6.56
ET	()	6.43	6.76

WORDS	Valence	Img.	Conc.
ETEK	()	6.38	6.55
ETKEN	()	2.57	2.98
FAKAT	()	2.02	2.57
FAKS	()	5.94	6.59
FANİ	()	2.49	2.45
FARKLI	()	3.31	2.86
FAZLALIK	()	3.12	3.99
FERİBOT	()	6.94	6.94
FERMUAR	()	6.58	6.91
FİKİR	()	3.88	2.52
FİNCAN	()	6.47	6.94
FIRÇA	()	6.11	6.73
FIRIN	()	6.52	6.52
FİRMA	()	4.64	5.58
FISTIK	()	6.33	6.40
FORMÜL	()	4.08	4.58
FUAR	()	5.29	5.89
FUTBOLCU	()	6.40	6.50
GARSON	()	6.24	6.61
GAZETECİ	()	5.87	6.31
GELECEK	()	3.55	2.40
GELENEK	()	3.53	2.66
GELMEK	()	4.07	4.33
GENİŞ	()	4.17	4.28
GEREKLİ	()	2.65	2.92
GETİRMEK	()	4.02	4.30
GICIRTI	()	4.03	5.29
GİRİFT	()	1.52	2.92
GİRMEK	()	4.21	4.17
GİTMEK	()	4.26	4.12
GİYSİ	()	6.08	6.54
GÖLGE	()	5.05	5.55
GÖREV	()	3.02	3.55
GÖRÜNMEK	()	3.11	4.09
GÖSTERMEK	()	4.06	4.40
GÖTÜRMEK	()	4.07	4.53
GÖZLÜK	()	6.63	6.87
GRAVÜR	()	2.68	5.63
GRUP	()	4.75	4.76
GÜN	()	3.22	3.81
HABER	()	4.91	4.24
HACİM	()	3.50	4.94
HAFİF	()	4.29	3.74

WORDS	Valence	Img.	Conc.
HAFTA	()	3.91	3.35
HAKKINDA	()	1.89	3.00
HALK	()	5.24	5.12
HANGİ	()	2.15	2.82
HAREKET	()	4.75	5.14
HARF	()	5.56	6.02
HARİTA	()	6.26	6.70
HATTA	()	2.02	2.23
HAYIR	()	2.98	2.31
HAYRET	()	2.95	1.90
HAYVAN	()	6.02	6.50
HAZIRLAMAK	()	3.94	3.92
HEMEN	()	3.42	2.14
HERKES	()	3.96	4.05
HEYKEL	()	6.26	6.78
HIZLI	()	4.50	4.55
HOCA	()	6.09	6.07
HORMON	()	3.02	5.36
HUKUK	()	3.32	3.79
İÇERİ	()	3.87	4.28
İFADE	()	3.36	2.86
İĞDE	()	5.22	6.37
İKİNCİ	()	3.51	3.47
İKLİM	()	3.86	4.59
İKRAM	()	5.36	5.38
İMAJ	()	2.94	2.69
İNCE	()	4.85	4.59
İNCİR	()	6.31	6.88
İP	()	6.25	6.84
İŞARET	()	3.77	5.18
İSİM	()	3.66	3.92
İSKELE	()	5.93	6.71
İSKELET	()	6.03	6.72
İSLAK	()	5.25	5.91
İŞLEM	()	4.11	4.12
İŞLEMCİ	()	3.15	5.76
İSLİK	()	4.81	5.49
İSRAR	()	2.84	2.04
İSTASYON	()	6.37	6.49
İZLEMEK	()	5.32	4.57
İZLENİM	()	2.23	2.46
KABİN	()	5.59	6.70
KABLO	()	6.07	6.87

WORDS	Valence	Img.	Conc.
KAÇMAK	()	4.31	4.36
KAFA	()	6.09	6.43
KAFİYE	()	4.27	3.93
KAĞIT	()	6.81	6.77
KALABALIK	()	5.89	5.10
KALAN	()	3.06	3.65
KALDIRIM	()	6.26	6.70
KALECİ	()	6.32	6.62
KAMERA	()	6.58	4.76
KAMUOYU	()	3.45	3.46
KAMYON	()	6.75	6.96
KANCA	()	5.39	6.72
KAPAK	()	5.63	6.69
KAPI	()	6.60	6.64
KAPÜŞON	()	4.42	6.28
KARAR	()	2.74	2.64
KARGO	()	5.91	6.38
KARINCA	()	6.44	6.88
KARTON	()	5.46	6.77
KAS	()	5.49	6.51
KASA	()	6.33	6.48
KASAP	()	6.42	6.65
KAŞIK	()	6.71	6.86
KASNAK	()	4.02	6.36
KAT	()	4.45	5.60
KAVANOZ	()	6.57	6.62
KAVURMAK	()	5.02	5.12
KAYGAN	()	4.74	4.96
KEDİ	()	6.87	6.94
KEMİK	()	6.21	6.82
KENDİ	()	2.90	3.76
KEPENK	()	5.91	6.76
KESİK	()	5.00	5.40
KİMSE	()	2.35	3.04
KİMYA	()	3.58	4.49
KİMYON	()	5.11	6.69
KİRA	()	4.67	4.95
KIRMIZI	()	6.42	4.32
KIŞ	()	5.83	5.15
KISA	()	4.79	4.69
KİŞİ	()	3.96	5.92
KISIM	()	2.98	4.29
KLİP	()	5.81	6.04

WORDS	Valence	Img.	Conc.
KOÇ	()	6.13	6.71
KOL	()	6.58	6.76
KOLTUK	()	6.53	6.87
KOMŞU	()	5.41	5.76
KONTÖR	()	5.67	4.56
KONU	()	3.26	3.02
KONUK	()	5.31	5.90
KONUŞMAK	()	5.71	4.96
KÖPÜK	()	5.78	6.49
KORİDOR	()	6.20	6.17
KÖŞE	()	5.83	5.98
KOŞMAK	()	6.19	5.56
KÖY	()	6.13	6.06
KOYMAK	()	3.55	4.19
KOYU	()	4.01	3.91
KREM	()	5.79	6.61
KÜÇÜK	()	4.87	4.17
KULAK	()	6.51	6.79
KULAKLIK	()	6.68	6.91
KÜLHAN	()	2.45	3.49
KULLANMAK	()	3.76	4.33
KÜLOT	()	6.36	6.89
KÜLÜSTÜR	()	5.44	4.50
KÜPE	()	6.45	6.67
KURAL	()	3.67	2.90
KURMAK	()	3.56	4.04
KÜRSÜ	()	6.23	6.49
KUTU	()	6.27	6.84
KUZEN	()	5.55	5.14
KUZGUN	()	3.37	5.65
KUZU	()	6.72	6.98
LAMBA	()	6.43	6.87
LASTİK	()	6.50	6.81
LAVABO	()	6.64	6.68
LEHÇE	()	3.27	3.91
LENS	()	6.62	6.64
LİMON	()	6.57	6.93
MADDE	()	4.16	6.10
MAĞARA	()	6.09	6.71
MAĞAZA	()	6.50	6.69
MAHALLE	()	5.57	6.06
MAL	()	4.98	6.23
MALZEME	()	4.63	6.35

WORDS	Valence	Img.	Conc.
MANKEN	()	6.30	6.28
MARKA	()	4.27	4.66
MASA	()	6.42	6.90
MAYIS	()	3.86	3.36
MEMUR	()	5.85	5.84
MERAKLI	()	3.75	2.36
MERDİVEN	()	6.74	6.74
MESAFE	()	3.98	4.75
MESAJ	()	5.52	5.02
METAL	()	5.32	6.51
METRE	()	5.51	5.64
METRO	()	6.37	6.74
MEYDAN	()	6.04	6.00
MİLYON	()	4.24	4.14
MİNDER	()	6.31	6.86
MISIR	()	6.66	6.92
MISRA	()	4.75	5.31
MOBİLYA	()	6.14	6.76
MODEL	()	5.14	4.98
MÖNÜ	()	6.09	6.33
MUAF	()	3.20	2.27
MUAYENE	()	5.72	5.40
MÜFTÜLÜK	()	3.64	3.96
MÜLAKAT	()	5.33	4.44
MUSLUK	()	6.76	6.92
MUSON	()	3.08	4.70
NAMAZ	()	5.51	3.94
NEDEN	()	2.60	2.00
NESİL	()	2.71	3.32
NİNE	()	6.49	6.20
NİSPETEN	()	2.13	2.52
NİTEKİM	()	1.87	2.25
NÖBETÇİ	()	5.63	5.88
NOKSAN	()	2.99	3.00
NOKTA	()	6.17	5.43
NOT	()	4.98	5.77
NUMARA	()	5.81	4.29
ODA	()	6.36	6.45
ÖĞLEN	()	4.23	4.23
OMUZ	()	6.32	6.86
ÖNCELİKLE	()	2.40	2.76
ÖNEMLİ	()	2.94	1.92
ONLAR	()	2.84	4.33

WORDS	Valence	Img.	Conc.
ORAN	()	3.79	3.52
ORDU	()	6.38	6.43
ÖRNEĞİN	()	2.27	2.77
ÖRTÜ	()	6.04	6.75
ORUÇ	()	4.87	3.03
ÖRÜMCEK	()	6.49	6.83
OTOBÜS	()	6.85	6.96
OTURMAK	()	5.70	5.14
ÖZELLİK	()	2.57	3.15
ÖZET	()	3.92	4.73
PAMUK	()	6.24	6.77
PARAŞÜT	()	6.43	6.64
PARÇA	()	4.30	5.61
PARKE	()	5.73	6.91
PARMAK	()	6.64	6.94
PASLI	()	4.79	5.91
PASPAS	()	6.51	6.79
PATEN	()	6.06	6.77
PATİK	()	5.75	6.66
PAVYON	()	6.02	6.45
PAY	()	3.43	4.03
PEÇETE	()	6.66	6.83
PEKİ	()	2.28	2.40
PENCERE	()	6.70	6.92
PENSE	()	5.79	6.94
PERDE	()	6.65	6.62
PETROL	()	5.57	6.56
PEYGAMBER	()	3.98	3.76
PEYNİR	()	6.43	6.88
PİDE	()	6.28	6.88
PİLOT	()	6.08	6.35
PİRİNÇ	()	6.50	6.69
PİZZA	()	6.58	6.88
PLAN	()	4.40	3.59
PROTEİN	()	3.29	5.17
PUNTO	()	3.32	4.92
RAKAM	()	5.89	4.14
RAKİP	()	4.42	4.52
RASTLAMAK	()	3.87	3.64
REJİSÖR	()	3.58	6.10
RESİM	()	6.06	6.70
RİSK	()	3.11	2.37
ROBOT	()	6.44	6.90

WORDS	Valence	Img.	Conc.
RÖFLE	()	3.81	5.94
SAAT	()	6.71	5.90
SADAKA	()	4.80	5.21
SADECE	()	2.23	2.09
SAKAL	()	6.62	6.48
SAKIZ	()	6.64	6.52
SAKLAMAK	()	3.98	4.02
SAKSI	()	6.53	6.83
SALON	()	6.15	6.50
ŞALTER	()	5.09	6.73
SANDALYE	()	6.70	6.94
SANDIK	()	6.47	6.86
SANDVIÇ	()	6.55	6.64
SANMAK	()	2.40	2.36
ŞAPKA	()	6.56	6.93
SARI	()	6.42	5.33
SARIŞIN	()	6.19	6.00
SARP	()	3.82	4.44
ŞAŞIRMAK	()	4.78	3.02
SATIŞ	()	4.31	3.98
SAYFA	()	6.27	6.40
SAZLIK	()	4.93	6.52
SEBZE	()	6.19	6.71
SEÇMEK	()	3.64	3.29
ŞEFFAF	()	4.35	4.37
ŞEFTALİ	()	6.79	6.94
ŞEKER	()	6.18	6.63
SEKTÖR	()	2.98	4.07
SEMER	()	5.72	6.54
SEN	()	4.38	5.27
SERİN	()	3.92	5.03
SERT	()	4.64	4.88
SERVİS	()	4.83	5.17
SESSİZ	()	4.10	4.00
SEZON	()	2.76	3.59
SICAKLIK	()	4.19	5.19
SİCİL	()	2.85	3.79
ŞİDDETLİ	()	3.48	2.43
SİFON	()	6.33	6.56
SİĞLİK	()	2.88	3.71
SIKI	()	2.91	3.89
ŞİMDİ	()	3.12	2.53
SINIF	()	6.12	5.56

WORDS	Valence	Img.	Conc.
SİPARİŞ	()	4.72	4.53
ŞİRKET	()	5.27	5.60
SİSLİ	()	6.00	5.67
SİYAH	()	6.60	5.62
SİZ	()	4.04	4.69
SLOGAN	()	3.97	4.57
SOKAK	()	6.40	6.60
SOLCULUK	()	4.17	2.39
SOLO	()	3.38	4.33
SON	()	3.62	3.14
SONDAJ	()	3.69	5.77
SONRA	()	2.35	2.16
SORU	()	4.49	3.91
SÖYLEMEK	()	4.18	4.33
STANDART	()	2.75	3.31
SÜNNET	()	5.93	5.23
SÜRESİZ	()	1.72	2.15
SUSKUNLUK	()	4.00	3.52
TABAKA	()	4.83	5.40
TABLO	()	6.44	6.48
TABURE	()	5.88	6.70
TAHTA	()	6.24	6.94
TAKIM	()	5.67	5.40
TAKOZ	()	4.80	6.46
TAKSİ	()	6.38	6.79
TAKSİT	()	3.92	4.58
TAMAM	()	2.85	2.79
TANE	()	3.76	4.76
TANITIM	()	3.45	3.72
TAŞ	()	6.60	6.86
TAVUK	()	6.79	6.96
TEKNİK	()	3.60	4.12
TENİS	()	5.91	6.05
TEPSİ	()	6.13	6.75
TER	()	6.02	6.55
TERAZİ	()	6.30	6.58
TERZİ	()	6.36	6.62
TEZGAH	()	5.91	6.74
TİCARET	()	4.10	3.73
TIKNAZ	()	3.92	4.48
TIRNAK	()	6.62	6.90
TIRTİK	()	3.41	5.32
TOP	()	6.69	6.52

WORDS	Valence	Img.	Conc.
TOPLAMAK	()	4.75	5.28
TOPLANTI	()	5.79	5.07
TOPLUM	()	4.19	3.35
TOPRAK	()	6.38	6.92
TORBA	()	6.03	6.87
TORTUL	()	3.14	5.52
TOZ	()	5.26	6.09
TUHAF	()	3.16	1.88
TÜKETİM	()	3.42	3.73
TURİZM	()	3.67	3.28
TURNUVA	()	5.14	4.77
TUTMAK	()	4.26	5.00
TÜTÜN	()	6.07	6.82
TÜY	()	5.51	6.68
TUZLU	()	4.71	5.62
UÇUŞ	()	4.30	4.72
UĞRAMAK	()	3.42	3.77
ÜNLÜ	()	4.66	4.30
ÜTÜ	()	6.71	6.94
UYANDIRMAK	()	5.40	4.31
UYARI	()	3.01	3.28
UYGUN	()	3.14	2.45
UZAY	()	4.89	4.64
UZUN	()	4.65	4.68
VALİ	()	5.09	6.11
VERMEK	()	4.21	4.19
VİCDAN	()	2.32	1.39
VİSKİ	()	6.05	6.83
VİTRİN	()	5.99	6.56
YABANCI	()	4.78	4.55
YAĞ	()	6.32	6.73
YAKIN	()	4.47	3.80
YAKIT	()	4.98	6.48
YAKLAŞMAK	()	3.81	4.15
YAMA	()	5.41	6.45
YANI	()	1.94	2.23
YANKI	()	4.52	4.62
YAPI	()	5.26	6.23
YAPMAK	()	3.31	3.86
YAPRAK	()	6.77	6.84
YARIM	()	5.13	4.26
YAŞ	()	4.09	3.98
YAVAŞ	()	3.72	3.70

WORDS	Valence	Img.	Conc.
YAVRU	()	4.85	5.52
YAYA	()	6.12	6.16
YAYIN	()	3.79	5.57
YAZMAK	()	6.00	5.23
YENİDEN	()	2.26	2.77
YER	()	4.77	5.68
YIL	()	4.02	3.31
YOL	()	6.60	6.17
YÖN	()	4.38	4.21
YÖNETİM	()	3.79	3.68
YORUM	()	2.76	2.37
YÜRÜYÜŞ	()	6.00	5.43
YÜZ	()	5.33	6.00
YÜZYIL	()	3.10	3.19
ZATEN	()	1.87	2.44
ZAYIFLAMAK	()	4.14	5.02
ZIPLAMAK	()	6.39	5.38
ACI	(-)	4.19	3.15
AÇLIK	(-)	4.24	3.68
ALKOLİK	(-)	5.51	4.86
AMELİYAT	(-)	5.94	5.96
ANTİBİYOTİK	(-)	5.79	6.02
AYRILMAK	(-)	3.77	3.13
BAĞIMLILIK	(-)	4.11	2.75
BAĞNAZ	(-)	2.82	2.49
BAŞARISIZLIK	(-)	3.06	2.40
BELA	(-)	2.70	1.93
BENCİL	(-)	3.06	2.06
BOĞULMAK	(-)	5.07	5.02
BOMBA	(-)	6.13	6.50
BOŞANMAK	(-)	4.38	3.95
BOZUKLUK	(-)	3.95	4.69
BUNALTI	(-)	3.40	2.87
CANSIZ	(-)	4.19	5.29
CENAZE	(-)	6.53	5.79
CEZA	(-)	3.98	3.59
ÇİĞLİK	(-)	4.60	5.20
CİNAYET	(-)	4.50	4.71
ÇİRKİN	(-)	4.08	2.61
DAYAK	(-)	4.67	4.85
DEHŞET	(-)	3.81	1.72
DEPREM	(-)	5.60	6.00
DERT	(-)	3.44	2.16

WORDS	Valence	Img.	Conc.
DİYABET	(-)	3.45	4.83
DRAM	(-)	2.82	2.84
DÜŞMANLIK	(-)	3.82	2.60
ELEM	(-)	2.32	1.78
EMRETMEK	(-)	3.66	3.66
EROZYON	(-)	4.26	6.01
ESİR	(-)	4.64	5.06
FELAKET	(-)	3.86	3.40
FELÇ	(-)	5.33	5.19
FOBİ	(-)	3.28	2.15
FÜZE	(-)	5.99	6.70
GADDAR	(-)	3.05	2.59
GÖZALTI	(-)	5.07	4.56
GÖZYAŞI	(-)	6.53	6.64
HAKSIZ	(-)	2.67	2.30
HAPİSHANE	(-)	6.30	6.30
HARAÇ	(-)	3.52	5.02
HASAR	(-)	3.94	4.47
HASTALIK	(-)	5.18	4.90
HASTANE	(-)	6.72	6.62
HAYDUT	(-)	4.95	5.87
HIRÇINLIK	(-)	3.21	2.10
HIRSIZ	(-)	6.11	6.31
İHMAL	(-)	2.36	2.24
İNAT	(-)	3.98	2.36
İNTİHAR	(-)	5.02	4.76
İSHAL	(-)	4.67	5.72
İŞSİZLİK	(-)	4.24	3.65
KATİL	(-)	4.42	5.82
KAVGA	(-)	5.34	4.89
KAYBETMEK	(-)	3.58	3.29
KAZA	(-)	5.51	5.58
KİRLİLİK	(-)	5.56	4.77
KIRMAK	(-)	5.27	4.75
KISKANÇLIK	(-)	3.63	1.67
KORKU	(-)	3.92	2.33
KÖTÜ	(-)	3.52	2.00
KOVULMAK	(-)	4.33	3.76
KULLANILMAK	(-)	2.79	2.98
KUSMAK	(-)	6.09	5.49
MAHKUM	(-)	5.84	6.10
MAYIN	(-)	5.40	6.70
MEZARLIK	(-)	6.51	6.57

WORDS	Valence	Img.	Conc.
MUTSUZLUK	(-)	4.14	2.60
NEFRET	(-)	3.78	2.12
NEZLE	(-)	5.18	5.20
ÖFKE	(-)	4.84	2.38
ÖLDÜRMEK	(-)	5.08	5.27
ÖLÜM	(-)	5.56	4.50
ONURSUZ	(-)	2.71	1.98
ÖZLEM	(-)	3.81	1.54
PANİK	(-)	3.98	2.75
PIHTI	(-)	4.40	6.33
PİŞMANLIK	(-)	3.47	1.79
POLİS	(-)	6.57	6.26
PUSU	(-)	3.39	4.39
REZALET	(-)	2.60	2.69
SADİST	(-)	3.55	3.81
SAHTEKARLIK	(-)	3.11	2.64
SALDIRI	(-)	4.86	4.40
SARSICI	(-)	2.68	2.68
SAVAŞ	(-)	5.66	4.96
SIKINTI	(-)	3.88	2.48
SİLAH	(-)	6.51	6.71
ŞOK	(-)	3.23	2.51
SORUN	(-)	3.11	2.92
SOYKIRIM	(-)	4.75	4.07
STRES	(-)	4.12	2.51
SUÇ	(-)	3.36	3.11
TABANCA	(-)	6.44	6.93
TECAVÜZ	(-)	5.49	5.21
TEHLİKE	(-)	3.19	2.57
TERÖR	(-)	4.76	3.88
TERSLİK	(-)	2.91	2.26
TÜMÖR	(-)	4.43	6.02
ÜLSER	(-)	3.44	5.10
UYUŞTURUCU	(-)	5.42	6.09
ÜZÜLMEK	(-)	4.74	2.55
VİRÜS	(-)	3.13	5.13
YAĞCILIK	(-)	3.07	2.39
YALAN	(-)	2.68	2.35
YALNIZLIK	(-)	4.45	2.38
YANGIN	(-)	5.74	6.07
YANMAK	(-)	5.55	5.04
YASAKLANMAK	(-)	3.53	2.92
YAŞLI	(-)	6.21	5.36

WORDS	Valence	Img.	Conc.
YOLSUZLUK	(-)	3.35	3.12
YORGUNLUK	(-)	4.75	3.72
ZARAR	(-)	3.17	2.41
ADALET	(+)	3.08	1.82
AİLE	(+)	6.45	4.64
AKIL	(+)	3.20	2.62
ANNE	(+)	6.65	6.14
ARKADAŞ	(+)	5.71	5.12
AŞK	(+)	4.78	1.90
BAĞLILIK	(+)	3.66	2.06
BAHAR	(+)	5.46	4.94
BAKLAVA	(+)	6.72	6.90
BALAYI	(+)	5.15	4.25
BARIŞ	(+)	3.28	2.17
BAŞARI	(+)	3.56	2.52
BAŞARILI	(+)	4.00	2.62
BEDAVA	(+)	3.55	3.51
BİLGİ	(+)	3.37	2.85
BİLİMDAMI	(+)	5.53	6.10
CENNET	(+)	3.72	1.76
CESARET	(+)	4.36	2.38
ÇİKOLATA	(+)	6.49	6.91
DANS	(+)	4.96	5.10
DENİZ	(+)	6.87	6.77
DOĞUMGÜNÜ	(+)	5.25	3.94
DONDURMA	(+)	6.81	6.94
DOST	(+)	4.91	4.09
DOSTLUK	(+)	4.56	1.96
DUYGU	(+)	3.21	1.56
EĞİTİM	(+)	4.72	3.33
EĞLENCE	(+)	5.08	2.98
ENERJİK	(+)	3.65	2.69
EŞ	(+)	4.77	5.47
ESPİRİ	(+)	3.61	2.76
EŞSİZ	(+)	2.16	2.35
EVLENMEK	(+)	5.96	4.16
FESTİVAL	(+)	5.04	5.07
GELİNLİK	(+)	6.35	6.69
GEZİ	(+)	4.60	4.98
GÜLMEK	(+)	6.38	5.22
GÜLÜMSEMEK	(+)	6.44	4.86
GÜLÜŞ	(+)	5.32	4.66
GÜNAYDIN	(+)	3.64	3.02

WORDS	Valence	Img.	Conc.
GÜZELLİK	(+)	4.95	2.98
HAKLI	(+)	3.11	2.81
HARİKA	(+)	2.87	1.44
HAYAT	(+)	3.00	2.92
HAZ	(+)	2.93	1.59
HİSSETMEK	(+)	4.02	2.54
HOŞ	(+)	3.91	1.93
HOŞLANMAK	(+)	4.15	2.33
HOŞNUT	(+)	3.42	2.19
İLHAM	(+)	2.95	1.95
İNDİRİM	(+)	4.64	4.24
İNSANLIK	(+)	3.13	1.95
IŞIK	(+)	6.30	6.06
İYİ	(+)	3.25	1.74
İYİLİK	(+)	2.79	1.46
KARDEŞ	(+)	5.87	5.92
KAZANÇ	(+)	3.54	4.10
KEYİF	(+)	4.04	2.02
KİBARLIK	(+)	4.05	2.81
KİTAP	(+)	6.79	6.78
KOKTEYL	(+)	6.24	6.21
KOMİK	(+)	3.91	2.59
KONFOR	(+)	3.82	2.94
KONSER	(+)	6.44	6.06
KUTLAMAK	(+)	4.53	3.79
LEZZET	(+)	4.37	4.04
MANZARA	(+)	6.02	5.45
MUCİZE	(+)	2.72	2.05
MUHABBET	(+)	4.88	3.77
MUTLULUK	(+)	3.72	1.85
MÜZİK	(+)	4.64	5.60
ÖPMEK	(+)	6.32	5.78
ÖVGÜ	(+)	2.81	1.77
OYUN	(+)	5.38	4.57
ÖZGÜR	(+)	3.61	2.08
ÖZGÜRLÜK	(+)	3.85	2.30
PARFÜM	(+)	6.47	6.38
PARTİ	(+)	6.09	5.45
RENK	(+)	5.79	5.27
ROMANTİK	(+)	4.29	3.02
SADIK	(+)	2.88	2.07
SAĞLAM	(+)	3.58	3.66
SAĞLIK	(+)	4.34	3.98

<i>WORDS</i>	<i>Valence</i>	<i>Img.</i>	<i>Conc.</i>
SAĞLIKLI	(+)	4.06	3.85
ŞAHANE	(+)	3.23	2.02
SAHİL	(+)	6.68	6.77
ŞAMPİYON	(+)	5.00	4.57
SANAT	(+)	4.66	3.56
ŞANS	(+)	3.06	1.79
SEVAP	(+)	2.61	1.64
SEVGİ	(+)	4.84	2.29
SEVGİLİ	(+)	5.62	5.38
SEVİNÇ	(+)	4.95	1.67
SEVMEK	(+)	4.66	2.00
ŞİİR	(+)	5.52	5.10
SÜRPRİZ	(+)	4.92	3.26
SÜSLENMEK	(+)	5.71	4.29
TAKDİR	(+)	3.40	2.49
TATİL	(+)	6.06	4.19
TEKNE	(+)	6.32	6.89
TEMİZ	(+)	4.33	3.89
TEŞEKKÜR	(+)	4.49	3.35

<i>WORDS</i>	<i>Valence</i>	<i>Img.</i>	<i>Conc.</i>
TİYATRO	(+)	6.28	5.82
TURİST	(+)	6.00	6.04
TUTKU	(+)	4.02	1.79
ÜMİTLİ	(+)	2.80	2.10
ÜRETMEK	(+)	4.31	4.29
UYUM	(+)	3.16	2.29
UYUMLU	(+)	2.89	2.10
YARDIM	(+)	3.96	3.57
YAŞAM	(+)	3.40	3.21
YAŞAMAK	(+)	4.25	3.76
YAZ	(+)	6.04	4.74
YENİ	(+)	3.49	2.62
YILDÖNÜMÜ	(+)	4.76	3.00

* Words that were presented in target trials

11. Bazı anılarımızı hatırladığımızda olayı doğrudan kendi gözümüzden görürken, bazı anılarımızı kendimizi de dışarıdan görebilecek şekilde gözlemci perspektifinden görürüz. Bu olaya dair anınızı hangi perspektiften gördünüz?

1	2	3
Kendi gözümüzden	Hem kendi gözümüzden hem gözlemci gibi	Gözlemci gibi

12. Olayı yalnızca bir durum, gözlem ya da sahne olarak değil, kelimeler veya resimler halinde akan bütün bir hikaye şeklinde hatırlıyorum.

1	2	3	4	5	6	7
Hiç						Tamamen

13. Bu olayın gerçekten hatırladığım şekilde gerçekleştiğine ve olmamış herhangi bir şeyi hayal etmediğime ya da kurmadığıma inanıyorum.

1	2	3	4	5	6	7
%100 hayal ürünü						%100 gerçek

14. Bu anıyı hatırlamak sizi ne derece şaşırttı?

1	2	3	4	5	6	7
Hiç						Tamamen

15. Şu an olayı hatırladığımızda fiziksel olarak tepki verdiniz mi? (Gülümsemek, gözleri dolmak, mırıldanmak gibi.) Lütfen belirtiniz: _____.

16. Bu anıyı hatırlamak duygu durumunuzda nasıl bir değişiklik yarattı?

-3	-2	-1	0	+1	+2	+3
Çok olumsuz			Değiştirmedim			Çok olumlu

17. Bu anıyı şu an hatırlamanıza sebep olduğunu düşündüğünüz herhangi bir tetikleyici ipucu/unsur var mıydı? Lütfen belirtiniz. _____.

18. Tek bir tetikleyici unsur size doğrudan bu anıyı mı anımsattı; yoksa hatırladığınız anı birbirini tetikleyen anılar zincirinin bir halkası mıydı?

1	2	3
Tek bir tetikleyiciyle doğrudan bu anıyı hatırladım.	Bu anım, birbirini anımsatan birçok anıdan sonuncusuydu.	Bu anım, birbirini anımsatan birçok anıdan ilkiydi.

19. Anıyı hatırladığımız sırada dikkatiniz yürütmekte olduğunuz göreve ne derece odaklanmıştı?

1	2	3	4	5	6	7
Hiç						Tamamen

20. Dikkat görevini yürütürken bu anıyı hatırlamanız ne derece sizin isteminiz doğrultusunda oldu?

1	2	3	4	5	6	7
Tamamen kendiliğinden aklıma geldi (İstemsiz)			Ne istemsiz Ne istemli			Tamamen kendim katırlamak istedim (İstemli)

21. Bu anıya, tek bir kelimedden oluşan, ancak size hep bu anınızı hatırlatacağını düşündüğünüz kapsamlı bir başlık vermek isterseniz, bu kelime ne olurdu?

Lütfen 1 kelime yazınız: _____

APPENDIX F

Current Thoughts Questionnaire Used in Session-I (At the time of occurrence)

ANLIK DÜŞÜNCELER

1. Bu düşünce sizin için ne ölçüde olumlu / olumsuz duygular içeriyor?
- | | | | | | | |
|-------------|----|----|------|----|----|------------|
| -3 | -2 | -1 | 0 | +1 | +2 | +3 |
| Çok olumsuz | | | Nötr | | | Çok olumlu |
2. Bu düşünce imgesel olarak gözünüzde canlandı mı?
- | | | | | | | |
|-----|---|---|---|---|---|---------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Hiç | | | | | | Tamamen |
3. (İmgesel olarak canlandıysa) Bu imge, ne derece canlı bir imgeydi?
- | | | | | | | |
|-----------|---|---|---|---|---|-----------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Çok silik | | | | | | Çok canlı |
4. Deneyi yürütürken bu düşünceye dalmanız ne derece sizin isteminiz doğrultusunda oldu?
- | | | | | | | |
|---|---|---|---------------------------|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Tamamen kendiliğinden aklıma geldi (İstemsiz) | | | Ne istemsiz
Ne istemli | | | Tamamen kendim düşünmek istedim (İstemli) |
5. Bu düşüncenize tek bir kelimedenden oluşan, ancak size hep aynı düşünceyi hatırlatacağına inandığınız kapsamlı bir başlık vermek isterseniz, bu kelime ne olurdu?
Lütfen 1 kelime yazınız: _____

APPENDIX G

Informed Consent in Session-II

Bilgilendirilmiş Olur Formu Deney 3 – Otobiyografik Anıların Araştırılması

Araştırma Konusu ve Onay:

Otobiyografik anılar, yakın ya da uzak geçmişte kendi başımızdan geçmiş olan, başı ve sonu belirli olan tek bir olay ya da bir zaman diliminde olmuş olaylar genelinden oluşan anılarımızdır. Bu çalışmada, farklı ipucu kelimeleri ile hatırlanan otobiyografik anıların özelliklerinin incelenmesi ve hatırlama süreçlerinin değerlendirilmesi amaçlanmaktadır. Çalışma sırasında, size birtakım kelimeler verilecek, ve bu kelimeler ile anılar hatırlamanız istenecektir. Kelimenin aklınıza getirdiği ilk anıyı ve sesli düşünme yöntemiyle bu anıya ulaşana dek zihninizden geçenleri kaydetmeniz ve anının özellikleri ile ilgili birtakım sorular içeren anketler doldurmanız beklenecektir. Deney, yaklaşık olarak yarım saat sürecektir.

Çalışmaya katılmak tamamıyla isteğe bağlıdır. Katılımınız karşılığında size (eğer PSY 101 ya da PSY 241/242 dersi öğrencisi iseniz) PSY 101 ya da PSY 241/242 dersinden 1 kredi verilecektir. Çalışmanın katılımcılar üzerinde hiçbir rahatsızlık uyandırması beklenmemektedir; ancak siz deneyin herhangi bir aşamasında istenecek olan bilgilerin sizde rahatsızlık yaratacağını öngörüyorsanız çalışmaya katılmamakta özgürsünüz. Formu imzalasanız dahi kendinizi rahat hissetmediğiniz an çalışmayı bırakabilirsiniz. Bu durumda kredi alma hakkınızı kaybetmeyeceksiniz.

Çalışmanın hiçbir aşamasında isimler kullanılmayacaktır. Size ait olan veriler bir numarayla eşleştirilip isimsiz olarak saklanacaktır. Tek isimli belge, üzerinde isminiz ve imzanız bulunan bu form olacaktır, ve size ait olan diğer tüm verilerden ayrı saklanacaktır. Ses kayıt cihazındaki kayıtlar, yazı ortamına geçirildikten sonra derhal silinecek, hiçbir katılımcının ses kayıtları saklanmayacaktır.

Çalışma ile ilgili sorularınızı psy.deney3@gmail.com adresinden ya da 0212 359 6757 numaralı telefonda Pınar Ersoy'a sorabilir, bu çalışmanın katılımcısı olarak haklarınızla alakalı bilgi almak için üniversitenin etik kurullarına başvurabilirsiniz.

Bu çalışmaya katılmak için, lütfen aşağıdaki "İzin Formu"nu doldurup imzalayınız. Eğer 18 yaşından küçük iseniz, lütfen bu formu velinize imzalatıp araştırmacıya teslim ediniz.

Çalışma hakkındaki bilgilendirmeyi okudum ve anladım. Formun bir örneğini aldım.

Çalışmaya katılmak istiyorum / istemiyorum

Kredi almak istediğim ders: PSY 101 PSY 241/242

Katılımcı Adı-Soyadı:.....

İmzası:

Tarih (gün/ay/yıl):...../...../.....

Velisi veya vasiinin adı, soyadı ve imzası:

(18 yaşından küçük katılımcılar için)

APPENDIX H

Demographic Form Used in Session-II

DENEY BİLGİ FORMU

1. Cinsiyetiniz: Kadın Erkek
2. Bölümünüz: _____
3. Doğum Tarihiniz: _____
4. Verilen kelimelerden anı hatırlamakta zorlandınız mı? Evet / Biraz / Hayır
5. Anı hatırlamakta özellikle zorlandığınız bir kelime varsa, lütfen yazınız:
_____.
6. Daha önce buna benzer bir deneye katıldınız mı? Evet / Hayır
7. (Katıldıysanız), iki deneyin benzer yönleri nelerdi?

8. Araştırma sırasında size tuhaf gelen bir durum oluştu mu? Evet / Hayır
“Evet” ise açıklayınız: _____

9. Eklemek istediğiniz bir şey varsa lütfen yazınız:

APPENDIX I

Word-Sets Used in Session-II

	Valence	Imageability	Concreteness
WORD-SET 1			
<i>TRAFİK</i>	(-)	6.30	5.53
<i>DEĞİŞMEK</i>	()	3.45	3.16
<i>TATLI</i>	(+)	6.32	5.35
WORD-SET 2			
<i>AMBULANS</i>	(-)	6.64	6.87
<i>MİSAFİR</i>	()	5.36	6.07
<i>AZİM</i>	(+)	2.45	1.88
WORD-SET 3			
<i>BUNALIM</i>	(-)	3.17	1.94
<i>YOĞURT</i>	()	6.51	6.79
<i>HEDİYE</i>	(+)	6.29	5.62
SUPPLEMENTARY WORD-SET			
<i>VURMAK</i>	(-)	4.96	5.26
<i>BEYAZ</i>	()	6.00	5.04
<i>SEYAHAT</i>	(+)	5.58	4.55

Note. Imageability and concreteness were rated on a scale ranging from 1 to 7.

APPENDIX J

Memory Questionnaire Used in Session-II Questionnaire.1 (At the time of retrieval)

OTOBİYOGRAFİK ANI ANKETİ

Geçmiş hayatınıza dair bir anı hatırladınız. Lütfen bu anınız ile ilgili aşağıdaki soruları yanıtlayınız.

Soruları, bu anınızı normalde nasıl hatırladığınızı düşünerek değil, anının zihninizde şu an belirlediği haliyle cevaplamanız gerekmektedir.

1. Aşağıdakilerden hangisi bu anıyı hatırlama sürecinizi daha iyi tanımlıyor:

1	2	3
Anı aklıma bir anda geldi.	Bir anı hatırlamak için aktif bir şekilde zihnimi taradım.	Karar veremiyorum.

2. Aşağıdakilerden hangisi bu anıyı hatırlama sürecinizi daha iyi tanımlıyor:

1	2
Bu anı, ekrandaki sözcük tarafından doğrudan tetiklendi; anıyı hatırlamama yardımcı olması için kendi hayatımla ilgili bilgiler kullanmam gerekmedi.	Bu anı, ekrandaki sözcük tarafından doğrudan tetiklenmedi; anıyı hatırlamama yardımcı olması için kendi hayatıma dair bilgiler kullanmam gerekti.

3. Anıyı ne kadar canlı hatırladınız?

1	2	3	4	5	6	7
Son derece silik						Şu an yaşıyormuş gibi canlı

4. Anıyı hatırladığımda, yeniden yaşıyormuş gibi hissettim.

1	2	3	4	5	6	7
Hiç						Şu anda yaşıyormuş gibi

5. Anıyı hatırladığımda zihnimde görüntüler canlandı.

1	2	3	4	5	6	7
Hiç						Şu anda yaşıyormuş gibi

6. Anıyı hatırladığımda zihnimde sesler canlandı.

1	2	3	4	5	6	7
Hiç						Şu anda yaşıyormuş gibi

7. Anıyı hatırladığımda o zaman hissettiğim duyguları hissedebildim.

1	2	3	4	5	6	7
Hiç						Şu anda yaşıyormuş gibi

8. Anıyı hatırladığımda zihnimde ben veya başka insanlar konuşuyordu.

1	2	3	4	5	6	7
Hiç						Şu anda yaşıyormuş gibi

9. Anıyı hatırladığımda olayın geçtiği mekanın neresi olduğunu hatırlayabildim.

1	2	3	4	5	6	7
Hiç						Şu anda yaşıyormuş gibi

10. Anıyı hatırladığımda olayın geçtiği mekanda kimin/neyin nerede durduğunu hatırlayabildim.

1	2	3	4	5	6	7
Hiç						Şu anda yaşıyormuş gibi

11. İnsanlar bazen bir olayın bütün ayrıntılarını hatırlamasalar da başlarından geçtiğini bilirler. Bu anıyı hatırlarken olayın başımdan geçtiğini bilmekten öte onu gerçekten hatırladım.

1 2 3 4 5 6 7
Hiç Tamamen

12. Olayı hatırladığımda, olayın olduğu ana geri döndüğümü ve olayı dışarıdan seyreden biri değil, olaya yeniden doğrudan katılan biri olduğumu hissettim.

1 2 3 4 5 6 7
Hiç Tamamen

13. Bazı anılarımızı hatırladığımızda olayı doğrudan kendi gözümüzden görürken, bazı anılarımızı kendimizi de dışarıdan görebilecek şekilde gözlemci perspektifinden görürüz. Bu olaya dair anınızı hangi perspektiften gördünüz?

1 2 3
Kendi gözümden Hem kendi gözümden Gözlemci gibi
hem gözlemci gibi

14. Olayı yalnızca bir durum, gözlem ya da sahne olarak değil, kelimeler veya resimler halinde akan bütün bir hikaye şeklinde hatırlıyorum.

1 2 3 4 5 6 7
Hiç Tamamen

15. Bu olayın gerçekten hatırladığım şekilde gerçekleştiğine inanıyorum.

1 2 3 4 5 6 7
Hiç Tamamen

16. Bu anıyı hatırlamak sizi ne derece şaşırttı?

1 2 3 4 5 6 7
Hiç Tamamen

17. Şu an olayı hatırladığınızda fiziksel olarak tepki verdiniz mi? (Gülümsemek, gözleri dolmak, mırıldanmak gibi.)

Lütfen belirtiniz: _____.

18. Bu anıyı hatırlamak duygu durumunuzda nasıl bir değişiklik yarattı?

-3 -2 -1 0 +1 +2 +3
Çok olumsuz Nötr Çok olumlu

19. Ekranda gördüğünüz kelime size doğrudan bu anıyı mı anımsattı; yoksa hatırladığınız anı birbirini tetikleyen anılar zincirinin bir halkası mıydı?

1 2 3
Kelimeyi görünce Bu anım, birbirini anımsatan Bu anım, birbirini anımsatan
doğrudan bu anıyı hatırladım. birçok anıdan sonuncusuydu. birçok anıdan ilkiydi.

20. Bu anıya, tek bir kelimededen oluşan, ancak size hep bu anınızı hatırlatacağını düşündüğünüz kapsamlı bir başlık vermek isteseyiz, bu kelime ne olurdu?

Lütfen 1 kelime yazınız: _____

8. Bu olay diğer deneyimlerimle ilgili duygu ve düşüncelerimi etkiledi.

1 Kesinlikle Katılmıyorum 2 3 4 5 6 7 Kesinlikle Katılıyorum

9. Sık sık bu olayın geleceğim üzerindeki etkileri hakkında düşünürüm.

1 Kesinlikle Katılmıyorum 2 3 4 5 6 7 Kesinlikle Katılıyorum

10. Bu olay hayatımda bir dönüm noktası oldu.

1 Kesinlikle Katılmıyorum 2 3 4 5 6 7 Kesinlikle Katılıyorum

11. Hatırladığımız anı belli bir yer ve zamanda bir kez gerçekleşmiş bir olaya mı, birçok defa yaşanmış benzer olayların bir özeti veya birleşmiş haline mi, yoksa bir günden fazla bir süreye yayılmış, aralarında bir süreklilik bulunan olaylara mı aittir?

1 Bir kez yaşanan olay 2 Birçok defa yaşanan olayların özeti / birleşimi 3 Aralarında süreklilik bulunan bir günden fazla süren olaylar

12. Anıdaki olay gerçekleştiğinde kaç yaşındaydınız? (Lütfen hatırlamıyorsanız dahi ortalama bir yaş veriniz) _____

13. Bu anının, hayatınızda başarmak istediğiniz bir hedef/amaç ile ne kadar ilgili olduğunu düşünüyorsunuz?

1 Hiç 2 3 4 5 6 7 Tamamen

REFERENCES

- Addis, D. R., Knapp, K., Roberts, R. P., & Schacter, D. L. (2012). Routes to the past: neural substrates of direct and generative autobiographical memory retrieval. *Neuroimage*, *59*, 2908-2922.
- Ball, C. T. (2007). Can we elicit involuntary autobiographical memories in the laboratory? In J. H. Mace (Ed.), *Involuntary memory* (pp. 127-152). Malden, MA: Blackwell Publishing.
- Ball, C. T., & Little, J. C. (2006). A comparison of involuntary autobiographical memory retrievals. *Applied cognitive psychology*, *20*(9), 1167-1179.
- Barzykowski, K. (2013, June). *The effect of suggestive instruction on involuntary autobiographical memory research*. Poster presented at Social Perspectives on Autobiographical Memory Conference - Memory and Imagination, Aarhus, Denmark.
- Batool, I., & Mazzoni, G. (2011, August). *Eliciting involuntary memories in the lab: Does imagination play a role?* Poster presented at the 5th International Conference on Memory, York, UK.
- Berntsen, D. (1996). Involuntary autobiographical memories. *Applied Cognitive Psychology*, *10*, 435-454.
- Berntsen, D. (1998). Voluntary and involuntary access to autobiographical memory. *Memory*, *6*(2), 113-141.
- Berntsen, D. (2009). *Involuntary autobiographical memories: An introduction to the unbidden past*. Cambridge University Press.
- Berntsen, D. (2001). Involuntary memories of emotional events: Do memories of traumas and extremely happy events differ?. *Applied Cognitive Psychology*, *15*(7), 135-158.
- Berntsen, D. (2010). The unbidden past: Involuntary autobiographical memories as a basic mode of remembering. *Current Directions in Psychological Science*, *19*(3), 138-142.
- Berntsen, D., & Hall, N. M. (2004). The episodic nature of involuntary autobiographical memories. *Memory & Cognition*, *32*(5), 789-803.
- Berntsen, D., & Jacobsen, A. S. (2008). Involuntary (spontaneous) mental time travel into the past and future. *Consciousness and Cognition*, *17*(4), 1093-1104.
- Berntsen, D., & Rubin, D. C. (2002). Emotionally charged autobiographical memories across the life span: The recall of happy, sad, traumatic and involuntary memories. *Psychology and Aging*, *17*(4), 636-652.

- Berntsen, D., & Rubin, D. C. (2006). The centrality of event scale: A measure of integrating a trauma into one's identity and its relation to post-traumatic stress disorder symptoms. *Behaviour Research and Therapy*, *44*(2), 219-231.
- Berntsen, D., Staugaard, S. R., & Sørensen, L. M. T. (2013). Why am I remembering this now? Predicting the occurrence of involuntary (spontaneous) episodic memories. *Journal of Experimental Psychology: General*, *142*(2), 426-444.
- Bjork, R. A. (2011). On the symbiosis of remembering, forgetting, and learning. In A. S. Benjamin (Ed.), *Successful remembering and successful forgetting* (pp. 1-22). New York: Psychology Press.
- Brewin, C. R., & Soni, M. (2011). Gender, personality, and involuntary autobiographical memory. *Memory*, *19*(6), 559-565.
- Ceylan, S., Batool, I., & Mazzoni, G. (2013, June). *Social cues and involuntary autobiographical memories*. Poster presented at the 10th Conference of the Society for Applied Research in Memory and Cognition (SARMAC X), Rotterdam, The Netherlands.
- Conway, M. A. (2001a). Phenomenological Records and Self-Memory-System. In C. Hoerl & T. McCormack (Eds.), *Time and Memory: Issues in Philosophy and Psychology* (pp. 235-256). New York, NY: Oxford University Press Inc.
- Conway, M. A. (2001b). Sensory-perceptual episodic memory and its context: Autobiographical memory. *Philosophical Transactions of the Royal Society of London. Series B: Biological Sciences*, *356*, 1375-1384.
- Conway, M. A. (2005). Memory and the self. *Journal of memory and language*, *53*, 594-628.
- Conway, M. A., & Bekerian, D. A. (1987). Organization in autobiographical memory. *Memory & Cognition*, *15*(2), 119-132.
- Conway, M. A., & Pleydell-Pearce, C. W. (2000). The construction of autobiographical memories in the self-memory system. *Psychological review*, *107*(2), 261-288.
- Ebbinghaus, H. (1913). *Memory: A contribution to experimental psychology*. Retrieved October 15, 2013 from <http://psychclassics.yorku.ca/Ebbinghaus/wozniak.htm>
- Ersoy, P., & Tekcan, A. İ. (2014, June). *The Direct, The Generative, and The Involuntary: A look at phenomenological differences*. Poster presented at CONAMORE Conference: Comparative Perspectives on Autobiographical Memory, What Human and Non-human Animals Remember About Their Past, Aarhus, Denmark.

- Finnbogadóttir, H., & Berntsen, D. (2013). Involuntary future projections are as frequent as involuntary memories, but more positive. *Consciousness and cognition*, 22, 272-280.
- Giambra, L. M. (1989). Task-unrelated thought frequency as a function of age: A laboratory study. *Psychology and aging*, 4(2), 136-143.
- Gross, J. J. (2001). Emotion regulation in adulthood: Timing is everything. *Current directions in psychological science*, 10(6), 214-219.
- Göz, İ. (2003). *Yazılı Türkçenin kelime sıklığı sözlüğü* [Word frequency dictionary of written Turkish]. Ankara, Turkey: Turk Dil Kurumu.
- Haque, S., & Conway, M. A. (2001). Sampling the process of autobiographical memory construction. *European Journal of Cognitive Psychology*, 13(4), 529-547.
- Hall, S., Miles, A., Davis, S., Bertnsen, D., Cabeza, R., & Rubin, D. (2013, April). *An fMRI Investigation of the Neural Basis of Involuntary Memory: How Do They Differ From Established*. Poster Presented at 20th Annual Meeting of Cognitive Neuroscience Society, San Fransisco, CA, US.
- Hall, N. M., Gjedde, A., & Kupers, R. (2008). Neural mechanisms of voluntary and involuntary recall: A PET study. *Behavioural brain research*, 186(2), 261-272.
- Hauer, B. J., Wessel, I., Geraerts, E., Merckelbach, H., & Dalgleish, T. (2008). Autobiographical memory specificity after manipulating retrieval cues in adults reporting childhood sexual abuse. *Journal of abnormal psychology*, 117(2), 444-453.
- Hintzman, D. L. (2011). Research strategy in the study of memory: Fads, fallacies, and the search for the “coordinates of truth”. *Perspectives on Psychological Science*, 6, 253-271.
- Johannessen, K. B., & Berntsen, D. (2010). Current concerns in involuntary and voluntary autobiographical memories. *Consciousness and cognition*, 19(4), 847-860.
- Jones, V., & Steel, C. (2012). Schizotypal personality and vulnerability to involuntary autobiographical memories. *Journal of behavior therapy and experimental psychiatry*, 43(3), 871-876.
- Kvavilashvili, L., & Schlagman, S. (2011). Involuntary autobiographical memories in dysphoric mood: A laboratory study. *Memory*, 19(4), 331-345.
- Mace, J. H. (2004). Involuntary autobiographical memories are highly dependent on abstract cuing: The Proustian view is incorrect. *Applied Cognitive Psychology*, 18(7), 893-899.

- Mace, J. (2005). Priming involuntary autobiographical memories. *Memory, 13*(8), 874-884.
- Mace, J. H. (2006). Episodic remembering creates access to involuntary conscious memory: Demonstrating involuntary recall on a voluntary recall task. *Memory, 14*(8), 917-924.
- Mace, J. H., Atkinson, E., Moeckel, C. H., & Torres, V. (2011). Accuracy and perspective in involuntary autobiographical memory. *Applied Cognitive Psychology, 25*, 20-28.
- MacLeod, C. M. (2013). The 6 R's of remembering. *Canadian Psychology, 54*, 38-49.
- McVay, J. C., & Kane, M. J. (2009). Conducting the train of thought: working memory capacity, goal neglect, and mind wandering in an executive-control task. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 35*(1), 196.
- Moscovitch, M., & Melo, B. (1997). Strategic retrieval and the frontal lobes: Evidence from confabulation and amnesia. *Neuropsychologia, 35*(7), 1017-1034.
- Norman, D. A., & Bobrow, D. G. (1979). Descriptions: An intermediate stage in memory retrieval. *Cognitive Psychology, 11*, 107-123.
- Plimpton, B., Pattel, P., Kvavilashvili, L. (2013, June). *The nature and temporal focus of mind wandering in dysphoria: A laboratory study*. Poster presented at the 10th Biennial Meeting of the Society for Applied Research in Memory and Cognition (SARMAC X), Rotterdam, The Netherlands.
- Proust, M. (1928/1998). *Swann's way: In search of lost time*. New York: Modern Library.
- Power, M. J., & Dalgleish, T. (1999). Two routes to emotion: Some implications of multi-level theories of emotion for therapeutic practice. *Behavioural and Cognitive Psychotherapy, 27*(02), 129-141.
- Rasmussen, A. S., & Berntsen, D. (2011). The unpredictable past: Spontaneous autobiographical memories outnumber autobiographical memories retrieved strategically. *Consciousness and cognition, 20*(4), 1842-1846.
- Rubin, D. C., & Berntsen, D. (2009). The frequency of voluntary and involuntary autobiographical memories across the life span. *Memory & cognition, 37*(5), 679-688.
- Rubin, D. C., Boals, A., & Berntsen, D. (2008). Memory in posttraumatic stress disorder: properties of voluntary and involuntary, traumatic and nontraumatic autobiographical memories in people with and without PTSD symptoms. *Journal of Experimental Psychology: General, 137*(4), 591-614.

- Rubin, D. C., Schrauf, R. W., & Greenberg, D. L. (2003). Belief and recollection of autobiographical memories. *Memory & Cognition*, 31(6), 887-901.
- Schlagman, S., & Kvavilashvili, L. (2008). Involuntary autobiographical memories in and outside the laboratory: How different are they from voluntary autobiographical memories?. *Memory & Cognition*, 36(5), 920-932.
- Schlagman, S., Kliegel, M., Schulz, J., & Kvavilashvili, L. (2009). Differential effects of age on involuntary and voluntary autobiographical memory. *Psychology and aging*, 24(2), 397-411.
- Singer, J. A. & Blagov, P. S. (2002). *Classification system and scoring manual for self-defining autobiographical memories*. Unpublished manuscript, Department of Psychology, Connecticut College, New London, CT, USA.
- St. Jacques, P. L., Conway, M. A., & Cabeza, R. (2011). Gender differences in autobiographical memory for everyday events: Retrieval elicited by SenseCam images versus verbal cues. *Memory*, 19(7), 723-732.
- Tekcan, A. İ., & Göz, İ. (2005). *Türkçe kelime normları* [Turkish word norms]. Istanbul: Boğaziçi Üniversitesi Yayınevi.
- Uzer, T., Lee, P. J., & Brown, N. R. (2012). On the prevalence of directly retrieved autobiographical memories. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 38(5), 1296-1308.
- Watson, L. A., Berntsen, D., Kuyken, W., & Watkins, E. R. (2012). The characteristics of involuntary and voluntary autobiographical memories in depressed and never depressed individuals. *Consciousness and cognition*, 21, 1382-1392.
- Watson, L. A., Berntsen, D., Kuyken, W., & Watkins, E. R. (2013). Involuntary and voluntary autobiographical memory specificity as a function of depression. *Journal of behavior therapy and experimental psychiatry*, 44, 7-13.