AN INVESTIGATION OF THE CONTEXT ACCOUNT OF RETRIEVAL-INDUCED FORGETTING: CULTURE AS CONTEXT

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ÖZET

Geri getirme yollu unutma paradigmasında katılımcılar çalışma aşamasında kategori-çrnek çiftlerini öğrenirler. İkinci aşamada bu kategori-örnek çiftlerinden bazılarını geri getirme çalışması yapmaları istenir. Test aşamasında ise bütün kategori-kelime çiftlerini yeniden hatırlamaları istenir. Test aşamasında pratik edilen kategorideki pratik edilmeyen örneklerin, pratik edilmeyen kategorideki örneklere göre daha az hatırlandığı bulunmuştur. Bu etkiler geri getirme yollu unutma etkisi denir. Bu etkiye sebep olduğu düşünülen en yaygın görüş ketvurmadır ancak konteks değişimi de yeni bir açıklama olarak sunulmuştur. Bu araştırmanın amacı, konteks değişimi açıklamasını kültürel videokliplerle değişimleyerek test etmektir. On iki Türk kültürüne ve altı başka kültüre ait videoklip seçilmiştir. İlk aşamada kategori-örnek çiftleri Türk kültürüne ait videokliplerle birlikte sunulmuştur. İkinci aşamayı katılımcıların bir kısmı Türk kültürüne ait videokliplerle bir kısmı ise başka kültüre ait videokliplerle tamamlamıştır. Kontrol grubundaki katılımcılar standard geri getirme yollu unutma paradigmasını tamamlamışlardır. Sonuçlara göre, konteks açıklamasının aksine geri getirme yollu unutma bulgusu bütün gruplarda bulunmuştur.

Anahtar sözcükler: geri getirme yollu unutma, konteks, ket vurma, kültrel konteks

ABSTRACT

Retrieval-induced forgetting (RIF) is tested by a paradigm in which participants are provided with items for a category at study phase, and receive retrieval practice on some of the items for that category. Non-practiced items from a practiced category are less likely to be retrieved than non-practiced items from a non-practiced category on a follow-up memory test for all items. Although inhibition account was the most accredited explanation of RIF effect, context account was recently presented as a new explanation. The primary concern of the present study was to test the assumptions of the context account by manipulating culture externally. Twelve own-culture and six other-culture videoclips were selected. Category-item pairs were presented with the own-culture videoclips at the study phase. Half of the participants received retrieval-practice phase with own-culture videoclips (no-context-shift condition) and half of the participants received retrieval practice phase with other-culture videoclips (context-shift condition). Control condition was the standard RIF paradigm without videoclips. The result showed that RIF effect was observed all conditions in contrast with the context account's prediction.

Keywords: retrieval-induced forgetting, context account, inhibition account, cultural context, internal context

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

1.INTRODUCTION

1.1. Rertieval-Induced Forgetting

The retrieval process can change the availability of the information in memory (Murayama, Miyatsu, Buchli, Storm, 2014). Retrieval may have both positive and negative consequences on memory. One negative consequence of retrieval is referred to as retrieval-induced forgetting. Anderson and his colleagues initially defined retrieval induced forgetting by stating that "the very act of remembering may cause forgetting" (Anderson, Bjork, & Bjork, 1994, p. 1063). They claimed that repeated retrieval of items may cause failure to retrieve other related items. Retrieval-induced forgetting is tested in a paradigm in which participants are provided with items for a category (e.g. fruit-orange, fruit-banana, etc.) at study phase, and receive retrieval practice on some of the items for that category (e.g., fruit-orange; RP+ items). Non-practiced items from a practiced category (e.g., fruit-banana; RP- items) are less likely to be retrieved than non-practiced items from a non-practiced category (e.g., furniture-chair; NRP items) on a follow-up memory test for all items. This counterintuitive phenomenon is referred to as Retrieval-Induced Forgetting (RIF). The paradigm also reveals a standard practice effect, with RP+ items being better recalled than NRP and RP- items.

1.2. Underlying Mechanisms of RIF

As Storm and Levy (2012) reported in their review, there is considerable controversy about the possible reasons of RIF. Currently, there is a hot debate about the nature and the type of items that are forgotten in the RIF paradigm, and the underlying mechanism for the RIF effect. Theoretical explanations of RIF effect can be classified into two general categories: inhibitory-based explanations and competition-based explanations (Murayama et al., 2014). While the inhibitory account

is the most accredited explanation for the effect (Anderson, 2003), recently, the potential effect of context has been taken into consideration by Jonker, Seli, and Macleod (2013) under the general category of competition-based theories (Murayama et al., 2014).

2. INHIBITORY ACCOUNT

Inhibition is the mechanism that causes some of the items in our mind to become less recallable. There are four properties that empirically support the inhibitory account of RIF which was stated by Anderson (2003) to support the role of inhibition on the RIF effect. These are cue independence, retrieval specificity, interference dependence, and strength dependence. These properties of inhibitory account will be explained and exemplified in the next section (for an extensive review, see also Storm & Levy, 2012; Raaijmakers & Jakab, 2013).

2.1. Properties of the inhibitory account

2.1.1. Cue independence

When you cannot remember and retrieve a name of a very well-known actor, you probably search his name in your memory with cues like facial features. You should use an appropriate cue in order to be able to retrieve the correct information from your memory. You probably remember his name after a period of time passes and the cue helps you to remember his name. Traditional perspective on this issue is explained by the fact that retrieval failure like this happens because of the use of an inappropriate cue (for review Verde, 2012). Interference-based accounts of RIF effect assume that forgetting of RP- items is due to a weakened association between the cue and that item. For example, practicing the pair “fruit-orange” causes the item “banana” from the fruit category to become likely to be retrieved, because of the shared cue.

However, the prediction of inhibition account is that the occurrence of the RIF effect is independent from the practiced cue (Anderson, 2003), meaning that RP- items are less likely to be retrieved in a test phase but it is not because cue-item associations became weakened. To test this prediction, Anderson and Spellman (1995) modified the RIF paradigm by using items that either belong to a single category or that can belong to more than one category. For example, while "blood" only belongs to the category "red thing", and "apple" only belongs to the "food" category, "radish" belongs to both the "food" and the "red thing" (similar items). The prediction is that if RIF effect is cue-dependent, practicing the pair "red thing-blood" would not result in forgetting of the pair "food-radish". Anderson and Spellman (1995) found that similar items were impaired regardless of the cue that was tested indicating that impaired recall of RP- items is independent from cue-item associations, providing disconfirming evidence to the predictions of the interference-based accounts. Cue independence of RIF effect has been replicated many times with different manipulations (e.g., Anderson & Bell, 2001; Anderson & Green, 2001; Shivde & Anderson, 2001).

2.1.2. Retrieval specificity

If RIF effect occurs because of the relative strength of the practiced and unpracticed items, extra exposure of the RP+ rather than active retrieval practice task should not change the standard findings of RIF effect and in both conditions RIF effect should occur. This assumption is called retrieval specificity which is another property of the inhibitory account. Anderson, Bjork, and Bjork (2000) tested this assumption by modifying the RIF paradigm. In the standard condition, which they call the competitive condition, both the category and the stem are provided at the retrieval practice phase. In a non-competitive condition, the participants are asked to recall the

category name and they are re-exposed to the target items (fr___-orange). By doing this, first, the task of the retrieval practice phase is held constant across the two conditions, such that one group retrieves items belonging to the categories while the other group retrieves the category name. Second, competition which is because of the retrieval practice task, among RP+ and RP- items is eliminated. Their hypothesis is that if the process of inhibition is sufficient to explain the RIF effect, it should only occur in the standard condition (competitive condition). Otherwise, non-competitive condition should also result in the RIF effect. The results confirm their hypothesis. This property is also supported by many studies (e.g., Anderson & Bell, 2001; Bauml, 2002; Shivde & Anderson, 2001).

2.1.3. Interference dependence

Non-inhibitory accounts predict that taxonomic frequency does not affect the strength of the RIF effect which means that weaker items show as much RIF effect as stronger items do (Jakab & Raaijmakers, 2009). According to the inhibition account, however, RP- items should interfere with RP+ items and that interference results in inhibitory control. Therefore, the amount of RIF effect is determined by the amount of interference between those of target (RP+) and non-target (RP-) items (Anderson, 2003). Anderson and his colleagues (Anderson, Bjork & Bjork, 1994) support this by manipulating the items' frequency. They tested high versus low taxonomic frequency exemplars with standard RIF paradigm and they found that when the unpracticed items are less frequent exemplars from the category (i.e., fruit_guava), recall performance of the RP- items are less likely to be impacted at test. Therefore, observed RIF effect decreases.

In addition to the above-mentioned experiment, Anderson and his colleagues (2000) provides another evidence for the interference dependence of RIF. They

blocked the interference between RP+ and RP- items in order to eliminate the RIF effect by manipulating retrieval practice phase of the paradigm. In the non-competitive practice condition in which the category name was practiced and practiced items acted as a retrieval cue, related but unpracticed exemplars did not interfere with the practiced exemplars because practiced exemplars served as a retrieval cue. They found inhibitory control in the competitive condition but not in the non-competitive condition even though both conditions were procedurally similar.

Another evidence for interference dependence (Shivde & Anderson, 2001) was studied with homograph words with dominant and subordinate meanings. For example, dominant meaning of an arm is a shoulder while a missile is the subordinate meaning. In experiment 3, they changed the RIF paradigm in which words with dominant meaning are practiced during retrieval practice phase. They hypothesized that RP- items were less impaired because words with subordinate meaning did not interfere with the RP+ items since RP+ items had the dominant meaning. Hypothesis was confirmed as a result of the experiment.

2.1.4. Strength independence

Strength independence property of inhibitory-based theories is closely related to retrieval specificity assumption of the theory (Murayama et al., 2014). In other words, the design to test strenght independence is same as the design to test retrieval specificity which means evidence from retrieval specificity studies can be considered as evidence for strength independence (see Anderson, Bjork & Bjork, 2000).

The proponents of strength-based interference assert that RIF effect occurs because RP+ items are strengthened during retrieval practice phase (Mensink & Raaijmakers, 1988). In other words, recall performance on RP- items at test is

negatively correlated with the strength of RP+ items. If the strength of the RP+ items affect the amount of RIF effect, an extra study phase that provides stronger RP+ items should cause more powerful RIF effect (Storm & Levy, 2012). However, studies show that RIF effect does not have direct relation with the strength of RP+ items (i.e., Cranni & Shimamura, 1999; Saunders, Fernandes, and Kosnes, 2009).

Second way of testing strength independence property of the RIF effect is an impossible retrieval practice paradigm (Storm, Bjork, Bjork, & Nestojko, 2006). In this paradigm, participants are divided into two groups at the retrieval practice phase. In the possible retrieval practice condition, participants are provided with category-plus-stem cues (fruit-o___) at the retrieval practice phase. However, in the impossible retrieval practice condition, participants are provided with category plus the first stem of the impossible word which does not correspond to any of the items presented in the study phase. The logic of this paradigm is that retrieval success during retrieval practice phase is not required for RIF effect to occur according to the inhibition account. They claim to find that RIF effect should be observed not only in the possible retrieval practice condition but also in the impossible retrieval practice condition.

2.1.5. Controlling Output Interference

Retrieval order of the items at the test phase are thought to be crucial for detecting underlying mechanism of the RIF effect (Murayama et al., 2014; for review Storm & Levy, 2012). If the output order of the items at the test phase is not controlled, meaning that RP+ items are always recalled first due to being strenghtened during retrieval practice phase, forgetting of RP- items cannot be claimed to result from inhibitory-based or competition-based accounts, but it results from output interference (Roediger, 1974). Murayama and his colleagues (2014) claimed that

output interference and RIF are closely associated with each other and output interference is a type RIF. For this reason, it should be differentiated from RIF to better understand the underlying mechanism of RIF. Otherwise, underlying mechanism of the effect cannot be specified as either inhibition-based or competition-based (Bauml, 1998). If participants are provided with a free recall test at the test phase, they tend to recall RP+ items first and this causes RP- items are exposed to more output interference. Therefore, output interference should be controlled at the final test phase. To control output interference, participants should be forced to recall RP- items in the first place. There are two methods that are extensively used. First one is testing RP- items first before the RP+ items and the second one is randomizing the testing position of all items. In the current study, the first method is used.

3. CONTEXT ACCOUNT

Context changes result in forgetting according to context-dependent memory literature and both internal context (Eich, 1980; Goodwin, Powell, Bremer, Hoine, and Stern, 1969) and external context changes, like physical environment or background setting, result in the impairment of memory, while context match enhances it (Godden and Baddeley, 1975; Smith, 1979). A recent article by Jonker and her collegues (2013) proposed that context shift can be an explanation for the RIF effect.

According to a recent metaanalysis by Murayama and his colleagues (2014), context account can be classified as one of the competition-based theories of RIF effect. Competition-based theories basically state that inhibition is not necessary to obtain the RIF effect (e.g. Perfect et al., 2004; Verde, 2012; Raaijmakers & Jakab, 2013).

Jonker et al. (2013) built their context account on the basis of recent research which demonstrates that people shift their mental context during retrieval (Jang & Huber, 2008; Sahakyan & Hendricks, 2012). Based on this, they (Jonker et al., 2013) propose that there are two internal contexts in RIF, a study and a retrieval practice context. RIF effect occurs because at test, retrieval practice context is activated for the RP items which results in a disadvantage for the RP- items, because they have been studied in the study context, which creates a context mismatch for these items. On the other hand, the study context is activated for Nrp items, helping these items to benefit from context match.

Proponents of context account assert that there should be two contexts, as study and retrieval practice context (first assumption) and retrieval practice context should be reinstated for practiced categories at test phase (second assumption) in order for RIF effect to occur. The context account requires that these two assumptions should be met, in order for the RIF effect to occur. With regards to the first assumption which states that there should be two different contexts for the study phase and the retrieval practice phase, the prediction is that if there is an extra study phase in the RIF paradigm for some of the items instead of a retrieval practice phase, this would provide the same context for all items, instead of two distinct contexts, leading to the elimination of the RIF effect.

With regards to the second assumption which states that the retrieval practice context should be reinstated at test phase in order to observe the RIF effect, it is claimed that this assumption is always met automatically when there are two different contexts for study and retrieval practice.

When these two assumptions are met, RIF should occur because for RP+ items, when the category cue is presented at test, the retrieval practice context is activated, which provides a retrieval benefit for these items. For RP- items which have the same category cue as RP+ items, similarly the retrieval practice context is activated, however, the encoding of these items was in a different context, i.e., the study context. This provides a retrieval disadvantage for these items due to context mismatch. They are less privileged at retrieval compared to Nrp items because the cue for the Nrp items activate the study context in which these items have been studied, which provides a match between the study and test contexts.

In studies that provide support for this account, RIF disappears when the study context is externally activated at test by means of an experimental manipulation, since at that point both RP+ and RP- items benefit from context. To test the first assumption of the context account; Jonker and her collegues (2013) conducted two experiments. In experiment 2a, they provided a context shift between study and retrieval practice phase (extra study phase) by an imagination task. In the imagination task, in which they aimed to produce context shift between study and extra study phases, participants were required to imagine their parents' house and asked to draw the layout of it. This procedure was borrowed from Sahakyan and Kelley (2002). Surprisingly, they found RIF-like effect (they called RIF-like effect because extra-study variant does not have retrieval practice phase, I prefer to use RIF effect from this point on) with extra-study variant of RIF paradigm. Unlike the standard RIF paradigm, the paradigm they used did not have a retrieval practice phase, however they still obtained RIF effect despite this change in procedure.

In the experiment 2b, they were able to eliminate this effect by adding a study context reinstatement manipulation just before the test phase. The study context

reinstatement was provided by the question about the beginning of the experiment (about the experiment room etc.). By doing this, they aimed to reinstate study context which was changed during retrieval practice phase by the imagination task. They found that, this time, recall performance between RP- and Nrp items did not differ significantly. In other words, RIF effect did not occur when the study context was reinstated in the test phase.

In the last experiment, they manipulated context reinstatement by short videoclips by using a standard RIF paradigm. In the study phase, category-exemplar pairs were superimposed on a set of videoclips. In the retrieval practice phase, half of the items from half of the categories were presented with new set of videos which have a different context (for example, while videos, in the study phase, depicted different places in the world, retrieval practice videos were animal videos etc.). In the final recall test, half of the participants were tested with study context videoclips and the other half were tested with retrieval practice context videoclips. The group that was tested with the study phase videoclips was the study context reinstatement group and the other group that was tested with the retrieval practice phase videoclips was the retrieval practice context reinstatement group. Their hypothesis was that RIF effect would be eliminated for study context reinstatement condition and would remain for retrieval practice reinstatement condition based the second assumption of the context account. The results provided confirming evidence for the hypothesis.

4. CULTURE

While reductionism attributes cognitive processes to the functions of the brain, anthropology explains these processes by socially shared experiences, that is to say culture (Blount, 2011). Culture is a capacity of people to acquire knowledge, belief, language, moral values and any other habits (Tylor, 1871). Capacity, in this

definition, refers to cognition because the capacity of acquiring knowledge requires cognitive capacity.

4.1. Culture and cognition

Cole and Gay (1972) ask the question whether people from different cultures think differently. Although cognitive antropology was traditionally seen as a subfield of a cultural antropology, its main interest was actually identified as psychology (Blount, 2011). Distinction between psychologists' way of thinking about what people think and how they think is a very basic definition of cognitive anthropology. The aim of cognitive antropology is to discover people's way of organization and use of different cultures (Tyler, 1969). The main interest of cognitive antropology is what people think rather than how they think. Cole and Gay (1972) made this distinction between content of cognitive activity versus cognitive process rather than what and how people think. Members of different societies may think differently because they have different environments and different necessities. This cultural difference is the potential reason for differences in cognitive activities. For example, people from different cultures may have thoughts about family and they may have common experiences about their families. However, these thoughts probably diverge from each other because they probably have different beliefs and values about the concept of family. This is a very basic example for cultural influence on cognitive activity. Thus far, as they (1972) reviewed in their article, the factors that have an impact on different memory functions were failed to be identified.

Cole and Gay (1972) conducted an experiment which tested the effect of cultural difference on memory performance. Two different cultural groups of participants were required to learn a list of words and then they were asked to recall freely. African-tribal adults remembered less than American college students. However, they were not interested in this particular finding in terms of a capacity

difference between the two groups (Mistry and Rogoff, 1994) because the difference between the groups may result from educational differences or one group may not be interested in the task at all. They thought that culture has at least a partial impact on this difference and they were rather interested in the cultural factors that contributed to this difference. The most important cultural difference, according to them, was learning strategies that the cultural groups used. African-tribal adults had the habit of using rote learning. In rote learning, participants repeat the presented stimulus in the order that it was presented. In other words, they had a cultural habit for memorizing presented stimulus in a given order. Testing the participants with free recall may be a potential reason for the difference between these cultural groups related to their cultural background. Cole and Gay (1972) also argued that the performance of African-tribal group might be better and comparable with some changes in the design of the experiment.

Rogoff and Mistry (1985) conducted another experiment to investigate the effect of culture on remembering. They conducted a study on recall of a story and they used stories that were culturally appropriate for both western and non-western participants. Environment of the experiment was also controlled and both groups were tested by the experimenter who is from their own culture. Although they controlled all possible factors, non-western participants recalled less about the story than western participants. Since the experimenter in their study was older than participants, they claimed that non-western participants have a cultural value in which it is inappropriate to talk freely in the face of older adult. This might be a potential reason for their worse performance against western participants because testing environment was not comfortable for the non-western participants. Mistry and Rogoff (1994) argued that remembering is an activity that is totally embedded in a culture.

Culture is stored in memory and affects cognition. How culture organizes and affects cognition is explained by two different mechanisms. First one is automatic cognition which relies on culturally available schemata. Automatic cognition is thought to be implicit and rapid (D'Andrade, 1995). Schemata is seen as the basic unit of culture and it is important to understand how culture works (DiMaggio, 1997). DiMaggio (1997) reviewed the mechanisms through which schemata shapes thought and cognition. The first mechanism is differences in perception. People tend to perceive information that is related to their existing schemata. Von Hippel, Jonides, Hilton, and Narayan (1993) found that people perceive information more correctly when the information is related to their existing schemata compared to those that are not related to their schemata. Another mechanism is speed of recall. If the information is schematically related, people are assumed to recall more quickly (DiMaggio, 1997). For example, Sedikies and Skowronski (1991) found that people can remember longer list of words and retrieve more information about a learned story more quickly if they are related to their preexisting intellectual formation. Thus, schemata consistency makes the given information more understandable. Furthermore, people can remember information more accurately if the information is consistent with preexisting schemata. Schemata consistency makes the accuracy higher than schemata inconsistency (Neisser, 1981). Freeman, Romney, and Freeman (1987) also support similar findings based on their study. They (1987) asked about the members of a workshop to the members. They found that people can list the regular attenders more accurately compared to irregularly attending members.

Second mechanism that explains how culture organizes the cognition is deliberative cognition which is described as explicit and slow (D'Andrade, 1995). According to D'Andrade (1995), people are rarely deliberate in their thoughts and he

proposed three conditions as attention, motivation and schemata failure based on studies parallel with the sociology of culture literature. Attention is the first important condition for people to move their mode of thought from automatic to deliberate. When tasks can attract people's attention or people have an attraction to solve the problem, they can move their mode of thought more easily to deliberative mode of thought. For example, Loftus, Donders, Hoffman, and Schooler (1989) presented inaccurate stimuli (like videotapes or written stories) which were distracting the participants, and they found that people recollected falsely those visual stimuli in a follow-up test. Supportively, Johnson, Hastroudi, and Lindsay (1993) eliminated such effect by asking participants to think carefully about the given information. Motivation is another condition for people to have deliberate cognition. If people are sufficiently motivated for a given task, they can more easily move their mode of thought from automatic to deliberate (D'Andrade, 1995). For instance, Devine (1989) claimed that even though white Americans have existing racist schema toward black people, they can effortfully overcome that schema thanks to deliberate thinking. In schemata failure, people think more deliberately if the existing schema does not have reference for the given information.

4.2. Internalization of culture

From the beginning of the 1990s, culture has been tried to be integrated into psychology (Valsiner, 1995). Major debate under psychology and culture was the question of whether culture can be conceptualized as an internalized and personal construct or whether it should be considered as an external societal construct (Zittoun and Gillespie, 2015). Internalization was supported by Vygotsky (1978) from the developmental perspective and he described three transformations to internalization process: First one is the transformation of the operations which were conceptualized as higher-order mental activities such as abstract thought and continuity of matter.

They are the first external activites for a baby but with the development of memory, voluntary attention and practical intelligence, children move to internal processes. The second transformation, according to Vygotsky (1978), is from interpersonal relations to intrapersonal relations. Development of children's cultural development begins at the social level and continues to the individual level. Cultural forms of behavior are internalized as the psychological activities and are reconstructed based on development of children's operations which are described above. According to the present account, culture is internalized from the beginning of the development of children. However, how these primarily external operations are internalized remains debatable.(Zittoun and Gillespie, 2015). Bruner (2008) argued that Vygotsky's contribution to the field was emphasizing the mind and culture and their interaction. The most crucial question that he posed is how culture is to be internalized by the mind. Although his contribution is still up to date and the most influencial followers are American cultural psychologists Micheal Cole and James Wertsch, internalization process still is not well understood.

Debate on the internalization of culture is claimed to be firstly based on a spatial metaphor (Wertsch, 1993). By the spatial metaphor, he emphasizes the definition of what is extarnal and what is internal, and what people understand by saying internal and external (Lakoff and Johnson, 1980). This process of internalization causes psychologists to think of the separation of the mind from the outside world, which is an ancient debate of philosophy on the issue of the mind and the body (Zittoun and Gillespie, 2015). To solve and become distant from this mind-body issue of the internalization process, Rogoff (2008) used the term participatory appropriation instead of internalization. According to Rogoff (2008), children transfrom their understanding of the environment by participation and become a

proficient cultural actor thanks to their social context. Based on this account, internalizing culture is not necessary to discuss but participatory appropriation explains the process of internalization (Zittoun and Gillespie, 2015). In short, to move away from what is internal and external, Rogoff (2008) tried to explain the process of children's cultural acquirements by focusing only on external part of the process. However, Rogoff's (2008) explanation is problematic because it ignores existence of the mind or at least it states that mind is not relevant to this process.

Solution of the problems of Rogoff's (2008) argument is taken into account by Valsiner and Lawrence (1997). They proposed a semiotic understanding of internalization. According to them, internalization is a psychological process and it is bidirectional which means internalization is from the outer world to inner mind but also the reverse process is from the mind to the outer world. However, the mechanism through which culture is internalized cannot only be explained by Valsiner and Lawrence's (1997) bidirectional model. Toomela (1996) proposed that internalization is not only a bidirectional process but it is also constructional and integrational. He (1996) defined properties of internalization: First, it involves structural change. From the developmental perspective, babies build a unified structure of culture by internalization. Second, in order to build this unified structure, babies should have an innate capability and they should have a social environment. At the end, in addition to innate capability and social environment that babies have, internalization process requires to be processed by two distinct mechanisms, which are non-verbal thought and symbolic operations (i.e. language). Additionaly, this construction and integration of internalization process is in interaction.

Ultimately, Zittoun and Gillespie (2015) proposed that people do not internalize the culture itself but they internalize experiences which are actually

culture-specific throughout the lifespan. This process is also creative and always connected with previous experiences. These experiences can be a book or a movie but also cultural ceremonies which are unique for each culture, such as wedding or engagement and teenager ceremonies, dinner habits, and family habits can be experiences that are internalized by people.

Based on the idea of internalization of culture and cultural experiences as an internal context in the mind, the current experiment manipulated cultural context by videoclips. Jonker and her collegues (2013) assumed that since the study task which is a passive learning task, and the retrieval practice task which requires active retrieval of the items are different from each other. This difference results in internal context change between study and retrieval practice. To test this assumption, they used extra-study task instead of retrieval practice task. The rationale of the current experiment is that since culture is an internal context in people's mind and this internalization process of culture is a bidirectional process from outer to inner and inner to outer (Zittoun and Gillespie, 2015) world, internal context shift from study phase to retrieval practice phase in the standard RIF paradigm is assumed to be at least temporarily blocked by an external cultural context manipulation (i.e. other culture videoclips). Shifting an internal context by an external manipulation was also used by Jonker an her collegues (2013) and Buchli, Storm and Bjork (2015), with an imagination procedure which was developed by Sahakyan and Kelley (2002). Rupprect and Bauml (2017) also used both internal context shift and external context shift between study and extra-study phases of the paradigm. Therefore, one can assume that there should be a significant difference between context-shift and no-context shift condition in terms of the magnitude of the RIF effect depending on the internalization process of culture. The difference between experimental conditions

might be an evidence for not only the context account of RIF but also for the internalization of culture. If context shift between study and retrieval practice task is successfully blocked by the other culture videoclips, it might be claimed that culture is an external phenomenon that has a continuous but changeable representation in the mind.

5. THE PRESENT STUDY

Next step for testing the context account should be testing the first assumption in the context account, that is, by preventing the context shift between study and retrieval practice phase. If context account is sufficient to explain RIF effect, the RIF effect should disappear or at least be lowered in this condition compared to the other conditions. To test the hypothesis, two experimental conditions, one involving a context shift from study to retrieval practice phase (Context Shift Condition), and another one involving the same contexts across these phases (No Context Shift Condition) will be administered in a between-participants design. Context shift condition is a condition which the context of study phase is different from the context of retrieval practice phase (e.g. own-culture videoclip versus other-culture videoclip) while no-context-shift condition is a condition which the context of study phase and the context of retrieval practice phase is same (e.g. own-culture videoclip versus own-culture videoclip). A control group will additionally be tested, in which the standard RIF paradigm will be used, without any context manipulation. Thus, the present study will test the first assumption of the context account of RIF. It is hypothesized that RIF effect will be observed in the context shift condition and control condition and it will be reduced in the no-context-shift condition compared to context shift condition and control condition if the results support the context account. On the other hand, RIF

effect will not differ between conditions because all of them contain retrieval practice if the results support the inhibitory account.

In addition to testing the first assumption of the context account, the present study also manipulates context by using culture specific vs. non-specific videoclips. If RIF effect is reduced in no-context-shift condition compared to context shift condition, it means that external manipulation of cultural videoclips shifts mental context of culture and culture is an internal and not only anexternal property of the mind. It is internalized and that internalization process is bidirectional as Zittoun and Gillespie (2015) claimed.

6. METHOD

6.1. Pretest

The aim of the pretest was to replicate the RIF effect with a subset of the Turkish item pool (Anderson, Bjork, & Bjork, 1994). In the Peynircioğlu (1988) item pool, there are a total of 6 categories with 8 examplars for each category. In the literature, there is only a single empirical study using the Turkish RIF materials (Eraltan & Mungan, in press). They selected ten categories and six items for each category based on their hypothesis. However, six categories and eight items for each category were selected for this study, in order to make the procedure similar to the procedure used by Jonker and her colleagues (2013).

6.2.Pretest Method

6.2.1.Participants

Twenty two University students, selected by convenience sampling, voluntarily participated in the study. Age distribution was between 18-30 and all of the participants were undergraduate students or have bachelor degree. Mean and standard error for age and correct recall of each item were displayed in Table1.

Table 1
Descriptive statistics for the pretest subjects (n =22)

	Min	Max	Mean	SE
Age (years)	18	28	23.46	0.57
Education	13	18	15.23	0.43
Correct recall RP+ (12)	6	12	9.73	0.45
Correct recall RP- (12)	1	11	5.59	0.54
Correct recall NRP (24)	6	21	14.09	0.92

6.2.2.Procedure

Informed consent (Appendix A) was obtained from the participants before the experiment. In the study phase, fourty-eight category-exemplar pairs (Appendix B) were shown on the computer screen. Category names were always uppercase and exemplars were always lowercase. Category and exemplar pairs were divided with a dash (e.g. FRUIT - orange). Background of the screen was black and category-exemplar pairs were white. Each pair was presented for ten seconds in a continuous sequence with no interstimulus interval. Presentation order was random except that the exemplars from the same category were not shown consecutively. In the retrieval practice phase, participants were required to retrieve four exemplars from the three categories, three times. Practice task was category -first stem cued recall test (i.e. fruit-o___ for the pair of fruit-orange). Items from the same category were practiced consecutively. In other words, items from the other categories were not practiced before all items from the current category were completed. Practiced categories and exemplars were presented randomly. After retrieval practice phase, a 5 minute distractor test (Appendix C) in which participants solved simple mathematical equations (_5 + 15 = 30) was presented. In the test phase, participants were asked to recall all category-exemplar pairs. Presentation order for the categories were random,

but items within categories were blocked such that all items from the same category were presented consecutively. All participants were debriefed.

6.2.3.Results

Means and standard deviations of the exemplars were displayed in Table 2. Repeated measures analysis of variance (ANOVA) was conducted to compare recall percentages of item types (RP+, RP-, NRP). Sphericity assumption of repeated measures ANOVA was met ($p > .05$). Result showed that there was a significant effect of item type, $F(2,20) = 30.33, p < .001$ multivariate partial *eta squared* = $.752$. Three within subject t-test were conducted to compare differences between recall percentages of RP+, RP- and NRP exemplars at test phase distinctively as a post hoc comparisons. RP+ were recalled better than RP-, $t(21) = 7.06, p < .001$ and NRP items, $t(21) = 6.08, p = .001$, revealing a practice effect. Critically, there was also statistically significant RIF effect, with better recall for NRP items than RP- items, $t(21) = -2.47, p < .05$ (see Figure 1).

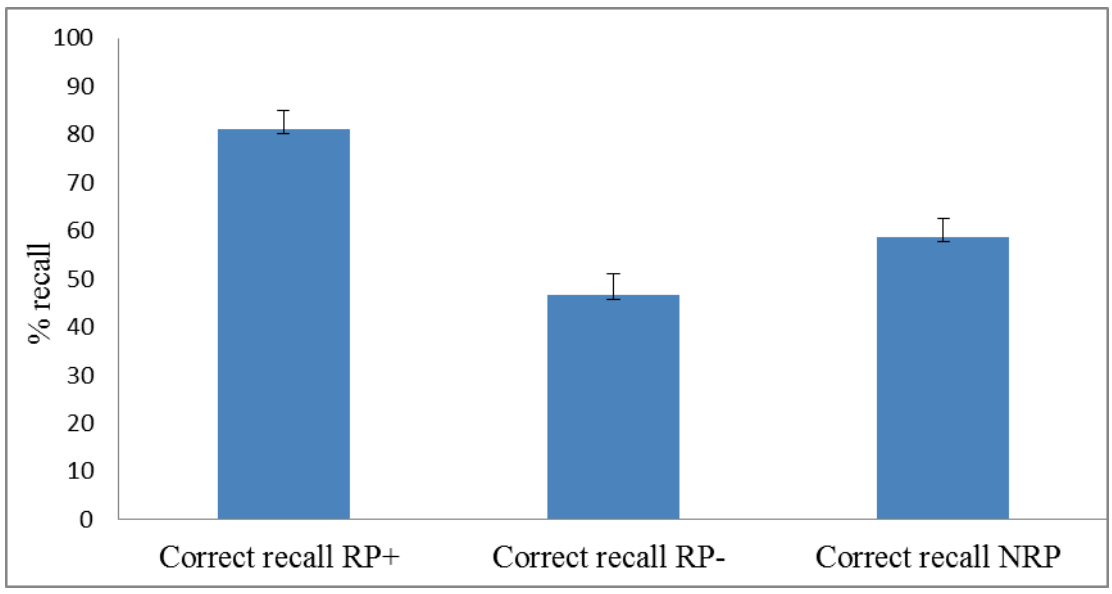

Figure 1. Mean percentages of correct recall for each item type in pretest

These results indicated that selected items from the Turkish RIF materials replicated the results of the RIF paradigm using English materials. In other words, selected materials were appropriate for studying RIF paradigm in Turkish.

Table 2
Descriptive statistics for the item types(percent) (N = 22)

	Min	Max	Mean	SE
Correct recall RP+	50	100	81.06	3.77
Correct recall RP-	8.3	91.3	46.59	4.51
Correct recall NRP	25	87.5	58.71	3.84

6.3.The Current Study

6.3.1.Participants

Ninety University students, selected by convenience sampling, voluntarily participated in the study. Age distribution was between 18-30 and all of the participants were undergraduate students or have bachelor degree. Mean age and correct recall of each item for each condition were displayed in Table 3. The participants were randomly assigned to the three experimental conditions such that there were equal number of participants in each condition. %60 of the participants were female and their mean age was 23.93 (*SD* = 2.39 for no-context-shift condition; *SD* = 2.97 for context shift condition) in the no-context-shift condition and context shift condition while %66.7 of the participants were female and their mean age was 21.67 (*SD* = 1.58) in the control condition.

6.3.2.Materials

6.3.2.1. Category-item pairs

Six categories and 8 items (Appendix B) for each category were selected from the Turkish-category norms (Peynircioglu, 1988), based on the results of the pretest (for the complete list see Appendix A). Items and categories are selected such that

each item from the same category has a different initial letter, similar to other studies (Anderson, Bjork, & Bjork, 1994).

6.3.2.2. Videoclips

6.3.2.2.1. Own-culture Videoclips

A total of 12 own culture videoclips were selected in which 6 of them were shown in the study phase and the other 6 of them were shown in the retrieval practice phase for the no-context-shift condition. Own-culture videoclips included wedding ceremonies, engagement ceremonies, dinner habits, teenager ceremonies, traditional dance and family habits. There were two videoclips for each content. Duration of the each videoclip was 5 seconds. For the no-context-shift condition, participants were provided with 6 videoclips for 6 categories in which all of them had distinct content as described above at the study phase and three of the remaining 6 videoclips were provided in the retrieval practice phase such that the content of the videoclip provided for the category name in the retrieval practice phase matched with the content of the videoclip in the study phase. For example, if the fruit category was matched with the engagement ceremony videoclip and the fruit category was randomly choosen as the retrieval practice category, RP+ items from the fruit category were shown with the engagement ceremony videoclips.

6.3.2.2.2.Other-culture videoclips

Six other culture videoclips are selected such that they matched with the own-culture videoclips in terms of their content. Other-culture videoclips included Hindu wedding ceremony, Christian engagement ceremony, Chinese family habits, Jewish boy teenage ceremony, African tribe dance, and Christian family habits. Duration of the videoclips is the same as the own-culture videoclips. For the context-shift condition, the own-culture videoclips are provided in the study phase and the other-

culture videoclips are provided in the retrieval practice phase. Content of the videoclips matched in the study phase and the retrieval practice phase as explained above.

6.3.2.3. Distractor Task

After the retrieval practice phase and immediately before the test phase, a 5 minute quantitative test is used (Appendix C). In the test, participants are asked to complete simple mathematical operations (_5 + 15 = 30). There are 60 items in the test and participants need to complete the test in 5 minutes. If they cannot complete the whole test in given time, experimenter said that it is enough for the study and presented the final test phase of the paradigm. If they can complete the whole test before given time, they were not provided with extra equations and the final test phase was presented. All of the participants in the current study completed the test in 5 minutes.

6.3.2.4. Vocabulary Test

After the test phase of the experiment, vocabulary subset of WAIS-R (Appendix D) (Weschler, 1981) is used in order to understand the participants' vocabulary capacity. Revised version of WAIS (WAIS-R; Weschler, 1981) was adapted by Savaşır and Şahin (1984) to Turkish. After series of studies, standardization of WAIS-R was completed. There are 35 items in the vocabulary test and items' difficulty level is increasing from the beginning to the end (e.g. first item of the test is bread while the last item is animosity). Participants are required to describe each item and the experimenter gives an appropriate score in terms of the content of the answer. Maximum score for each item is 2 and minimum score is 0. If there is no answer or if the answer is irrelevant, score is 0. Correct definition, correct example, correct

synonym, and correct metaphor about the item results in 2 point. One point is given for less appropriate but correct answers. Maximum possible points on this test are 70.

6.3.2.5.Demographic Form

A short demographic form (Appendix E) is provided to collect information related to gender, age, education status, health status etc., about the participants.

6.3.3.Procedure

Informed consent (Appendix F) was obtained from the participants before the experimental procedure began. All participants were tested individually in a quiet environment and were debriefed at the end of the experiment. There were three separate groups in the study:

6.3.3.1.Context shift group

First, participants were provided with category-word pairs as in the standard RIF paradigm. Category-exemplar pairs were presented with the videos that belong to own-culture (described above) in a random order except that exemplars from the same category were not presented consecutively and videoclips were category blocked which means each exemplar from the same category was presented with the same videos. This procedure was implemented in order to activate the participants' own internal cultural context. In the second phase of the experiment, participants were required to practice half of the items from half of the categories with a cued recall test in which the first letter of the item is provided (Anderson, Bjork, & Bjork 1994). Practiced items were randomly selected and were practiced three times each with the restriction that the items from the same category were not presented consecutively. In other words, at least an item from a different category was practiced between items from the same category. The category-stem pairs were presented while one of the

other-culture videoclips was presented in the background. As in the study phase, three videoclips were used for three different practiced categories. Videoclips were matched with the practiced categories such that a similar type of cultural ceremony was selected. For example, if fruit category was matched with the own-culture wedding ceremony videoclip at the study phase, the other culture wedding ceremony videoclip was also matched with the practiced fruit category at retrieval practice phase. After the retrieval practice phase, a 5 minute quantitative distractor test was given. In the final test, all category-word pairs were given to participants with the first letter stem recall test in a category blocked way. Presentation order of the all categories was random but RP- items were tested first for the RP categories.

According to the second assumption of context account (Jonker et al., 2013), retrieval practice context is automatically activated during the final recall test because of its recency and strengthened retrieval status. Therefore, RIF effect is expected in this condition, because both assumptions of context account are met.

6.3.3.2. No-context shift group:

The procedure is exactly the same as the procedure for the Context Shift group, except that, in the retrieval practice phase, participants practice half of the items from half of the categories while own-culture videoclips are presented in the background for 5 seconds. For the no context shift condition, practiced categories were matched with the own culture videoclips which are the same as the context shift condition. If the fruit category was randomly assigned to retrieval practice category, same type of cultural videoclips were matched with fruit category at retrieval practice phase. This manipulation is assumed to prevent context shift from study to retrieval practice phase. Since the first assumption of context account is not met, reduced RIF effect

should be observed for this condition according to the context account. Inhibition account would predict intact RIF effect because context shift manipulation would not have an impact on the RIF effect.

6.3.3.3. Control group

The procedure is exactly the same as the procedure for the other two groups, except that there is no video manipulation. This condition serves as a control condition and involves a standard RIF paradigm. Both context account and inhibition account would predict RIF effect in this condition, but for different reasons. Context account explains RIF effect in terms of the context shift from study to retrieval practice phase and reinstatement of retrieval practice context during test phase (assumptions of context account). However, inhibition account attributes the observed effect to retrieval practice phase. In other words, unpracticed items compete for retrieval during retrieval practice phase. To successfully retrieve target items, unpracticed items are inhibited and are less likely to be recalled at test (See Storm & Levy, 2012; for a review).

6.3.4. Results

6.3.4.1. Descriptives

Percent mean recall and standard deviation for each item, RP+, RP, and NRP, are shown in Table 3 for each condition, control, context-shift, and no-context shift.

Mean and standard deviation of word test for each group was also shown in Table 4.

Table 3
Descriptive statistics for age and item types for each condition

		Min	Max	Mean	SE
Context-shif (N = 30)	Age	20	29	23.93	0.54
	Correct recall RP+	50	100	82.5	2.54
	Correct recall RP-	8.33	83.33	53.05	2.89
	Correct recall NRP	25	95.83	65.94	3.45
No-context-shift (N = 30)	Age	19	29	23.93	0.43
	Correct recall RP+	50	100	83.33	2.91
	Correct recall RP-	25	91.67	60.27	2.95
	Correct recall NRP	41.67	100	70.83	2.82
Control (N= 30)	Age	19	27	21.67	0.29
	Correct recall RP+	75	100	90.55	1.68
	Correct recall RP-	25	83.33	59.17	2.86
	Correct recall NRP	45.83	95.83	73.89	2.17

Table 4
Descriptive statistics for word test

	Context-shift				No-Context-shift			Control			
	Min	Max	Mean	SE	Min	Mean	SE	Min	Max	Mean	SE
Word Test	37	66	52.13	1.57	39	69	59.5	43	70	59	1.38

6.3.4.2. Inferential statistics

Three repeated measure analysis of variances (ANOVA) were conducted to assess whether there are practice and RIF effect in three groups seperately. In other words whether RP+ items were recalled significantly better than RP- and NRP items (practice effect) and whether NRP items were recalled significantly better than RP- items. Results showed that an effect of item type was significant in all groups ($F(2,58) = 21.50, p < .001$ for no-contex shift group; $F(1.64, 47.46) = 43.28, p < .001$ for

context shift group; *F(2,58) = 70.56, p < .001* for control group). Mean and SE was shown in Table 3. As a post hoc comparison, three paired sample t-test was conducted to test whether standard RIF effect and practice effect was observed for each group. In the no-context-shift condition, RP+ items were significantly recalled better than RP- (*t(29) = 6.06, p < .001)* and NRP *(t(29) = 4.22, p < .001)* items showing practice effect. RIF effect was also revealed in the no-context shift condition which means NRP items were significantly recalled better than RP- items (*t(29) = -2.83, p < .05).* In the context-shift condition, RP+ items were significantly recalled better than RP- (*t(29) = 10.45, p < .001)* and NRP *(t(29) = 6.14, p < .001)* items showing practice effect. RIF effect was also revealed in the context shift condition which means NRP items were significantly recalled better than RP- items (*t(29) = -3.28, p < .05).* In the control condition, RP+ items were significantly recalled better than RP- (*t(29) = 11.38, p < .001)* and NRP *(t(29) = 8.14, p < .001)* items showing practice effect (see Figure 2). RIF effect was also revealed in the control condition which means NRP items were significantly recalled better than RP- items (*t(29) = -4.86, p < .001).*

Moreover, between subject ANOVA was conducted to test whether recall percentage of each item type was differed across conditions. It was found that recall percentage of RP+ items was statistically different between groups (*F(2,87) = 3.320 p < .05*). However, recall percentage of RP- and NRP items was found not to be statistically different across conditions (*F(2, 87 = 1.79 p > .05* for RP-, *F(2, 87) = 2.09, p > .05* for NRP). Post-hoc comparison was conducted with Tukey-test and showed that recall percentage of RP+ items was marginaly lower in context-shift *(M = 82.5, SE = 2.54)* than control conditions (*M* = 90.56, *SE = 1.68*).

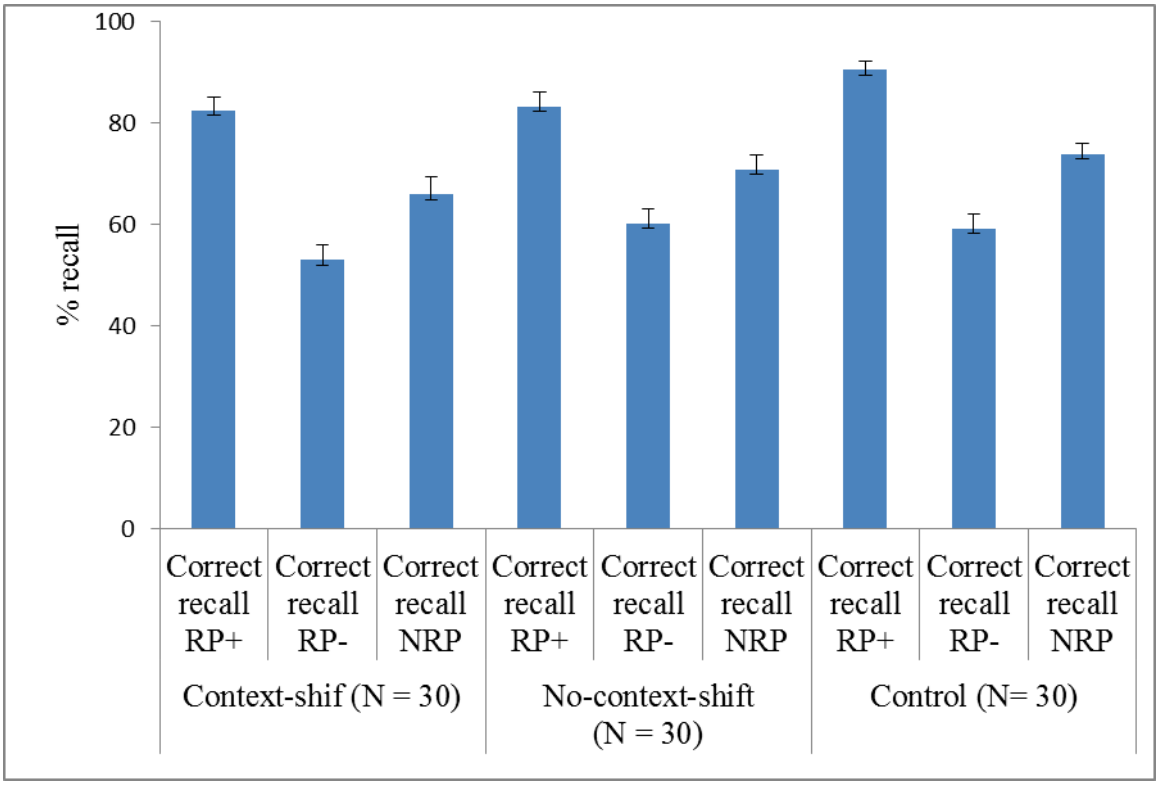

Figure 2. Mean percentages of correct recall for each item for each group

Magnitude of the RIF effect was calculated by subtracting the number of correct NRP recall from correct RP- recall. Mean and standard errors were given in Table 5. In the all between groups, there were significant RIF effect ($t(29) = 2.82\ p < .05$ in the no-context-shift condition, $t(29) = 3.28\ p < .05$ in the context-shift condition, $t(29) = 4.86\ p < .001$ in the control condition). In order to test the significance of between group differences, between subjects ANOVA was conducted. The magnitude of the RIF effect among context shift, no-context-shift and control conditions did not differ from each other significantly ($F(2) = .343,\ p > .05$).

Table 5

Descriptive statistics of RIF effect for all groups

	Context shift		No-Context Shift		Control	
	Mean	SE	Mean	SE	Mean	SE
RIF effect	12.64	3.85	10.56	3.73	14.72	3.03

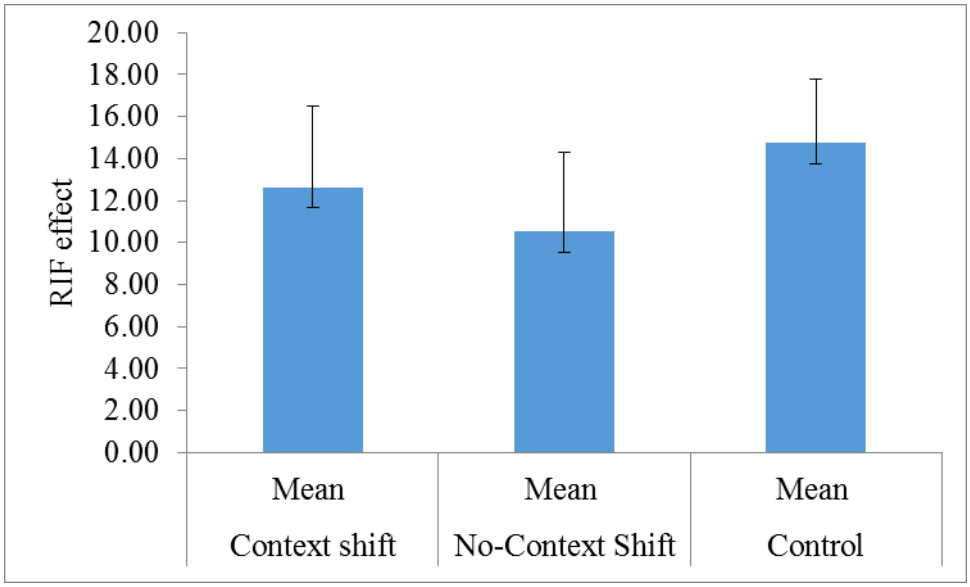

Figure 3. RIF effect of all groups

7. DISCUSSION

In the first place, as Murayama and his colleagues (2015; for a review see also Storm and Levy, 2012) stated in their recent metaanalysis, none of the theories that try to explain the RIF effect sufficiently explain the effect. There are more than two hundred empirical studies about RIF and each of them focus on different theoretical perspectives. For this reason, supporting one of the perspectives in a study does not mean rejecting all the other perspectives. It is possible that not only inhibition, but also competition-based theories, including the context account, have at least a partial role on RIF effect.

7.1. Interpretation of the results

Retrieval-induced forgetting literature showed consistent RIF effects across different types of materials and applications (for an extensive review of different applications of RIF see, Storm et al., 2015). Standard finding of RIF effect was confirmed in the current study by using Turkish category norms (Peynircioğlu, 1988). In the all groups, context-shift, no-context-shift and control, RIF effect was found to be significant, meaning that recall percentage of Nrp items was significantly higher than RP- items. The other expected finding of RIF paradigm was also confirmed that RP+ items were retrieved more than the other two types of items (RP- and Nrp items, practice effect) (Anderson, Bjork & Bjork, 1994). Thus, the findings replicated the standard RIF effects.

Jonker and her collegues (2013) proposed a new theoretical account for the RIF effect. They claimed that RIF effect occurs because of the context shift between study and retrieval practice phases rather than interference during retrieval practice phase, resulting in inhibition of RP- items. Their account has two tenets necessarily be met in order for RIF effect to occur. First assumption is that there should be two contexts for the study and retrieval practice phases. The second assumption is that retrieval practice context shold be reinstated for all of the RP items (RP+ and RP- items) and study context should be reinstated for Nrp items. The current study aimed to test the first assumption of their account by preventing the context shift between study and retrieval practice phases by using the standard RIF paradigm. Culture is internalized from the beginning of the lifespan and continued as an internal context in the mind (Zittion and Gillespie, 2015; Valsiner and Lawrence, 1997). However, in the present study, internal context of culture is externally manipulated by the other-culture videoclips. According to the context account, the magnitude of the RIF effect should

be significantly different between groups in the current study, such that context-shift condition should have the highest magnitude of RIF effect while no-context-shift condition shows the lowest. A significant difference between context-shift and no-context shift conditions in terms of the magnitude of the RIF effect was expected. In other words, blocking context shift by external cultural context manipulation should reduce the magnitude of the RIF effect according to the context account in the no-context shift condition. However, the hypothesis was not confirmed. The magnitude of the RIF effect was not reduced in the no-context-shift condition compared to the context-shift and control conditions. Therefore, the first assumption of the context account failed to account for the RIF effect. However, the result of the current study is consistent with the inhibitory account of RIF.

7.2. Support for the inhibition account

A major theoretical difference between the context account and the inhibition account is the retrieval specificity assumption of the inhibition account (Anderson, 2003). To test the assumption, extra-study task is used instead of retrieval practice task. While retrieval practice task is an active process that participants are asked to recall items, extra-study task is a passive process that participants are required to read and learn items. There are a lot of studies showing that retrieval practice task but not extra-study task results in RIF or RIF-like effect (e.g., Ciranni and Shimamura, 1999; Shivde and Anderson, 2001). However, context account predicts RIF effect resulting from context change. Therefore, a RIF-like effect is not predicted when extra-study task is used instead of retrieval-practice task. Jonker and her collegues (2013) found no RIF-like effect in their extra-study variant of RIF experiment (i.e. Experiment 1) and claimed that this failure to a find RIF-like effect is considered a support for the context account. Even if inhibition account also predicts no RIF-like effect with the

extra-study task, its rationale is different. Supporters of the inhibition account (Anderson and Spellman, 2000; for review, Storm and Levy, 2012) called this as retrieval-specificity. According to inhibition account, RIF effect is competition dependent meaning that inhibition of the RP- items is due to competition between RP+ and RP- items during retrieval (for review, Storm and Levy, 2012). Not only retrieval practice task itself but also other context manipulations may induce context change. For example, imagination task (e.g., Pastötter and Bauml, 2007; Sahakyan and Kelley, 2002; Jonker et al., 2013; Buchli et al., 2016), and semantic generation (e.g., Jang and Huber, 2008; Rupprect and Bauml, 2017) are used to induce internal context change by using videoclips (Jonker et al., 2013). In the current study, major assumption of the context account was not confirmed but the results were consistent with retrieval specificity assumption of the inhibition account. Blocking context shift between study and retrieval practice phase did not result in eliminating competition between RP+ and RP- items. Therefore, active retrieval during retrieval practice phase caused inhibition of the RP- items despite that the videoclips blocked context shift.

7. 3. Arguments against Context account

The current study failed to find evidence for the context account of the RIF effect. Meanwhile, there are other studies testing the assumptions of context account which did not find consistent findings with Jonker and her collegues' (2013) context account.

There were some studies having contradictory findings with the context account before the context account was proposed by Jonker and her collegues (2013). For example, RIF, mood and stress studies showed consistent RIF effects although negative mood and stress were induced during test and retrieval practice phases (see Bauml and Kuhbandner, 2007; Koessler, Engler, Riether, and Kissler, 2009), which

were supposed to reduce the RIF effect because context of study phase and test phase were matched. Contextual match between the study and the test phases for RP items was claimed to reduce RIF effect by the context account (second tenet of the context account, Jonker et al., 2013).

Another evidence against the context account was studied by Buchli and his collegues (2016). They used near vs. far imagination task (Delaney, Sahakyan, Kelley, and Zimmerman, 2010) to test whether the reason for the RIF effect is context shift between study and extra study phases and whether a magnitude of the RIF effect is influenced by the magnitude of context shift between study and extra study phases. They claimed that the far-imagination task produces more context shift than the near-imagination task. They conducted three experiments with large groups of participants and they failed to find the RIF effect in contextual manipulation condition, in an extra study-induced forgetting paradigm. They only found the RIF effect in the standard retrieval-practice condition.

The findings of the current study are consistent with Buchli and his collegues' (2016) study. As Buchli and his collegues (2016) tested the first assumption by using an extra study induced forgetting paradigm in which participants are asked to restudy RP+ items instead of retrieval practice task and induce context shift between study and extra study phases by an experimental manipulation, the current study tested the first assumption of the context account by the standard retrieval-practice paradigm. Context shift is either induced or blocked by the experimental manipulation (videoclips). Buchli and his colleagues (2016) argued that there is a huge difference between their studies and Jonker and her collegues' (2013) finding is due to the methodological differences such as the test phase of the experiments. While Buchli and his collegues (2016) divided the item types into the two blocks as Nrp- for RP-

items and Nrp+ for RP+ items, testing position in Jonker and her collegues (2013) experiment was blocked by category. Based on this difference, Buchli and his collegues (2016) argued that since participants attempted to retrieve all of the RP- items first in their experiment, they could successfully reinstate the study context for RP- items. However, blocked category design makes this impossible so Jonker and her collegues (2013) found RIF-like effect with the extra-study variant of the RIF paradigm by manipulating internal context shift from study to extra-study phase. They called this effect as RIF-like effect because RIF effect is retrieval-induced effect but they did not use retrieval practice paradigm. The method of the present study was the same as Jonker and her collegues (2013) third experiment. The only difference was that they used extra-study phase instead of retrieval-practice phase. Therefore, the findings of the current study contradict with Jonker and her collegues (2013) finding, while they are consistent with Buchli and his collegues (2016) finding. If extra-study paradigm was used in the current study instead of retrieval practice paradigm by using cultural videoclips to shift or block the context between the study and the extra-study phases, the predictions of the context account and the inhibition account would be different. The context account would predict the RIF effect in the context-shift condition only if the context was succesfully manipulated. However, the inhibition account predicted no RIF effect in neither of the groups because of the retrieval specificity assumption. In order for the RIF effect occur, there should be an active retrieval and a competition between RP+ and RP- items during the retrieval practice phase according to the inhibition account. Using the extra-study paradigm in the current study instead of the retrieval-practice paradigm might be a double check for the results.

Another evidence against context account came from Soares, Polack, and Miller (2016). They also tested the first assumption of the context account by minimizing the context shift between the study and the retrieval practice phase. Their main aim was close to the current study, but they manipulated the context by environmental settings rather than videoclips. They also failed to find consistent result with Jonker and her collegues (2013). Minimizing context shift between first and second phase of the standard RIF paradigm did not mediate the magnitude of RIF. They claimed that the results of their study was inconsistent with the predictions of the context account and other interference-based explanations. Although they did not have an aim to test the assumptions of inhibitory account, their result was consistent with the inhibitory account. As inhibitory account predicted, RIF effect arose in all conditions of their study because all conditions had active retrieval practice task during the second phase of the paradigm.

7.3.1. Differences between recall vs. recognition testing

Rupprect and Bauml (2017) conducted three experiments to test the assumptions of the context account. In the first experiment, the main aim was to replicate the standard RIF findings in both recall and recognition testing. RIF effect was previously observed in both types of tests (see Anderson et al., 1994). Furthermore, they induced context change by an imagination task preceded by an extra-study task in experiment 2 and a semantic generation task in experiment 3. Their (2017) manipulation of internal context shift was the same with Jonker and her collegues' (2013) and Buchli and his collegues' (2015) imagination task while they manipulated external context shift by semantic generation task. They hypothesized that RIF and RIF-like effect should arise in both recall and recognition test when context is changed from study to extra-study phases. They (2017) failed to find RIF

effect in both context manipulations (imagination task and semantic generation) with recognition testing, a result inconsistent with the context account.

7. 4. Interpretation of the results in terms of cultural theories

Cultural context was manipulated in the present study to shift the context from the study to the retrieval practice phase. According to Zittoun and Gillespie (2015), culture is internalized based on a culture-specific experiences. They did not specify these culture-specific experiences in their article but these experiences were conceptualized in terms of the differences of ceremonies like wedding ceremonies and religious ceremonies. It was claimed that magnitude of the RIF effect would be significantly different between context-shift and no-context-shift conditions. It was hypothesized that magnitude of the RIF effect would be lower in the no-context-shift condition according to the first prediction of the context account. Moreover, confirming the prediction of the context account would be evidence for Zittoun and Gillespie's (2015) internalization theory in which cultural internalization is a bidirectional process from outer to inner and inner to outer. In other words, shifting internal cultural context (own-culture) by external context (other-culture videoclips) would be possible and internalization of the culture is bidirectional process as they claimed. However, the results of the present study showed that the magnitude of the RIF effect did not differ between the conditions. Apart from the predictions of the context account, failing to find significant difference between context-shift and no-context-shift conditions might be because own-culture is an unchangeable internal property that is impossible to shift it by the external videoclips. It might be possible to test this internalization process of culture by shifting internal context from different types of culture-specific experiences.

7.5. Limitations of the Current Study and Suggestions for Further Research

The major limitation of the study is the fact that there is not a second cultural group in the experiment. Further studies should be conducted with different cultural groups. It was impossible to include a second cultural group in the present study due to practical reasons and for the fact that it would make the design too complicated, resulting in many experimental conditions. Collecting and analyzing data from at least two cultures would provide better evidence about the differences of retrieval practice effects for different cultures.

Another limitation of the current study is the potential failure of the other culture manipulation. Even if manipulation was checked in the current study by asking the questions about given videoclips and seemed that participants culturally diffirentiated the content of the videoclips from each other, Parisi, Cecconi, and Natale (2003) proposed that people from different cultures gained some of their cultural values and beliefs from other cultures by interacting with them. Territorial closeness may be one of the possible factors that contribute to this type of interaction. For this reason, the other culture videoclips were chosen from territorially distant cultures (i.e. Hindu wedding ceremony, Chinese dinner habits, tribe dance) and ceremonies that are not part of the Turkish-Muslim culture (Christian engagement, Jewish teenage ceremony, Christian family habits). In the modern communicative world, people are exposed to almost all cultures at least by the Internet. Parisi and his colleagues (2003) also asserted that interaction among cultures may finally result in a unique and more homogeneous culture but Axelrod (1997) showed that this homogeneity process will not be completed and cultural divergence will always take place instead of the intense interaction and exposure among them. From this point, it could be argued that cultural differences and influences on memory and forgetting

should be studied by more specific and territorial features of the culture. Still, the previous studies showed that context can be manipulated by even videoclips that do not have a particular value for the participants (i.e. Smith and Manzano, 2010; Jonker et al., 2013), thus the results still do not support the context account. Further research, based on the present study, might be conducted by shifting internal cultural context from a near-culture specific experiences that are nearest to the certain cultural territory (sample of the future study) to own-culture specific experiences with that certain cultural territory.

Another limitation is related to the charachteristics of the items. Not only recall performance in the retrieval practice phase but also recall performance for the test phase were quite high. The potential reason underlying this high recall was because items were predictible. Items were chosen from medium frequency words for all categories but category-norm study used in the current study was quite old (Peynircioğlu, 1988). For that reason, frequency of the items may have even changed during the past thirty years. The current study should be replicated by using low frequency items with the same categories or frequency of the items should be manipulated as an independent variable in another study. By manipulating the item frequency and context shift, it would be possible to test the interference dependence and strenght independence properties of the inhibition account (Anderson et al., 1994) in addition to the first assumption of the context account like the current study, and provide insight for the underlying reason of the RIF effect literature.

8. CONCLUSION

Since no study alone can be sufficient to prove a theory, more empirical studies on this topic will help to obtain clearer perspective in the future. To this point, there is

not enough evidence to claim that one of the perspectives is dominant but it seems that inhibition account has at least a partial role on the RIF effect.

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Appendix A: Pretest Informed Consent

Gönüllü Katılım Formu

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Bu çalışma, Yeditepe Üniversitesi Bilişsel Bilimler yüksek lisans programı öğrencisi Demet Ay tarafından yürütülmektedir. Çalışmanın amacı, İngilizce malzemelerle sıkça tekrarlanan bir bellek bulgusunu seçilmiş Türkçe malzemelerle tekrarlamaktır.

Çalışmanın ilk oturumunda sizden ekranda gördüğünüz bazı kelime çiftlerini öğrenmeniz ve daha sonra da iki ayrı test aşamasında hatırlamanız istenecektir. Araştırma ……. dakika sürmektedir.

Çalışma, hiçbir fiziksel ya da psikolojik risk taşımamaktadır. Verdiğiniz bilgilerle kimlik bilgileriniz eşleştirilemeyecek, ayrı yerlerde saklanacaktır. Bütün cevaplar anonim ve toplu olarak yalnızca araştırmacılar tarafından değerlendirilecektir.

Araştırmaya katılım gönüllülük esasına dayanmaktadır. Araştırma boyunca istediğiniz an araştırmayı durdurma ve araştırmadan ayrılma hakkı size aittir. Araştırma sonrasında çalışmayla ilgili ayrıntılı bilgi formu verilecektir ayrıca sormak istediğiniz her türlü soruyu araştırmacılara sorabilirsiniz.

Çalışmaya katılımınız ve ilginiz için şimdiden çok teşekkür ederiz!

Araştırma ile ilgili yukarıda yer alan metni okudum. Çalışmaya tamamen gönüllü olarak katılmayı kabul ediyorum. Bu çalışmayı istediğim zaman ve herhangi bir neden belirtmek zorunda kalmadan bırakabileceğimi biliyorum.

Katılımcının imzası:	
Araştırmacının adı soyadı:	
Araştırmacının İmzası :	

Tarih: ___/___/_____

Appendix B: Category-item pairs

Categories	Items
Dört Ayaklı Hayvanlar	İnek
Dört Ayaklı Hayvanlar	Fare
Dört Ayaklı Hayvanlar	Zürafa
Dört Ayaklı Hayvanlar	Sıçan
Dört Ayaklı Hayvanlar	Geyik
Dört Ayaklı Hayvanlar	Aslan
Dört Ayaklı Hayvanlar	Eşek
Dört Ayaklı Hayvanlar	Koyun
Müzik Aletleri	Davul
Müzik Aletleri	Keman
Müzik Aletleri	Saksafon
Müzik Aletleri	Org
Müzik Aletleri	Akordeon
Müzik Aletleri	Flüt
Müzik Aletleri	Viyolensel
Müzik Aletleri	Gitar
Meyveler	Şeftali
Meyveler	Portakal
Meyveler	Erik
Meyveler	Mandalina
Meyveler	Ayva
Meyveler	Karpuz
Meyveler	Çilek
Meyveler	Üzüm
Sporlar	Voleybol
Sporlar	Yüzme
Sporlar	Tenis
Sporlar	Hentbol
Sporlar	Atletizm
Sporlar	Golf
Sporlar	Kayak
Sporlar	Boks
Vücut Kısımları	Bacak
Vücut Kısımları	El

Vücut Kısımları	Parmak
Vücut Kısımları	Göz
Vücut Kısımları	Ayak
Vücut Kısımları	Kol
Vücut Kısımları	Omuz
Vücut Kısımları	Diz
Marangoz Aletleri	Tornavida
Marangoz Aletleri	Çivi
Marangoz Aletleri	Balta
Marangoz Aletleri	Rende
Marangoz Aletleri	Kerpeten
Marangoz Aletleri	Pense
Marangoz Aletleri	Zımpara
Marangoz Aletleri	Matkap

Appendix C: Distractor

	EQUATION	RESPONSE		EQUATION	RESPONSE
1	_0 + 10 = 20		**31**	10 + 22 = 3_	
2	10 + 25 = _5		**32**	2_ - 15 = 5	
3	10 + _3 = 23		**33**	23 + 10 = 3_	
4	17 - 15 = _		**34**	_2 + 20 = 52	
5	15 + _5 = 30		**35**	15 + 2_ = 35	
6	30 - 1_ = 20		**36**	20 - _2 = 8	
7	25 - 1_ = 10		**37**	20 + 15 = _5	
8	20 - 10 = 1_		**38**	3_ - 28 = 2	
9	1_ + 21 = 31		**39**	2_ + 17 = 37	
10	20 + 22 = _2		**40**	31 - _1 = 20	
11	32 - 12 = _0		**41**	_5 - 15 = 20	
12	10 + 11 = 2_		**42**	23 + 10 = 3_	
13	15 + 20 = 3_		**43**	20 + 17 = 3_	
14	2_ - 15 = 5		**44**	25 - _5 = 10	
15	25 - _3 = 2		**45**	20 + _0 = 30	
16	10 + 22 = _2		**46**	25 + 1_ = 35	
17	20 + _8 = 38		**47**	19 - _0 =9	
18	_0 + 11 = 31		**48**	_0 + 13 = 23	
19	1_ - 10 = 7		**49**	22 + 2_ = 44	
20	30 - 1_ = 20		**50**	_4 - 14 = 0	
21	40 - 35 = _		**51**	25 - _5 = 10	
22	2_ - 19 = 1		**52**	21 - 1_ = 10	
23	10 + 2_ = 33		**53**	_7 + 10 = 27	
24	_5 + 10 = 35		**54**	2_ + 19 = 39	
25	22 - 1_ = 10		**55**	31 - 11 = _0	
26	18 + 30 = 4_		**56**	22 - 1_ = 12	
27	1_ + 20 = 31		**57**	_2 + 22 = 34	
28	25 - 15 = _0		**58**	22 - 20 = _	

29	_5 - 15 = 20		**59**	34 - 14 = _0	
30	37 - 17 = _0		**60**	35 - 25 = 1_	

Appendix D: Vocabulary Test

Uygulama Yönergesi

"Size bazı sözcüklerin anlamlarını soracağım. Bazı sözcükler kolay, bazıları ise çok zor gelebilir. Bilemediğiniz olursa endişelenmeyin. Yanıtlarınız sizin yaş grubunuzdaki insanların bu ölçeğe nasıl yanıt verdikleri konusunda fikir verecektir. Bunun için elinizden geldiği kadar açık ve içtenlikle yanıt vermenizi istiyorum. Yardımınız için şimdiden teşekkür ederim.

Sizin sormak istediğiniz bir şey var mı?"

" Sizden bazı sözcüklerin anlamlarını söylemenizi istiyorum. _____ ile başlayalım. _____ ne anlama gelir?"

Sıralama	Maddeler
1	ekmek
2	konuk
3	israf etmek
4	buz
5	gelir
6	cam
7	tanık
8	anı
9	düğün
10	ezberlemek
11	mektup
12	sabah
13	tohum
14	kumaş
15	sır
16	iplik
17	kürk
18	harita
19	önlem
20	suç

21	iftira
22	hassas
23	çare
24	duman
25	fark
26	heyecen
27	dar
28	hain
29	haber
30	tehlike
31	fedakar
32	derin
33	korku
34	yetki
35	kin

Appendix E: Demographics Form

Demografik Bilgi Formu

1. Yaşınız: ____
2. Cinsiyetiniz: Kadın____ Erkek____
3. Devam etmekte olduğunuz,

   Okulunuz:

   Bölümünüz:

   Sınıfınız: Hazırlık____ 1. Sınıf____ 2. Sınıf ____

   3. Sınıf ____ 4. Sınıf____ Yüksek Lisans____

4. Doğum Tarihiniz (gün/ay/yıl):_____
5. Doğum Yeriniz: _____
6. Sağ elinizi mi yoksa sol elinizi mi daha iyi kullanırsınız? Sağ_____ Sol_____
7. Ana diliniz nedir? _____
8. Üniversiteye başlamadan önce İstanbul'da mı yaşıyordunuz?

   Evet_____ Hayır_____

   Eğer bu soruya cevabınız HAYIR ise, en uzun süre yaşadığınız yeri belirtiniz:

   Büyükşehir_____ İl_____ İlçe_____ Kasaba_____ Köy_____

9. Sağlığınızla ilgili demografik bilgiler:

9.1. Daha önce psikiyatrik ya da nörolojik bir sorununuz oldu mu?

Evet_____ Hayır_____

Eğer cevabınız EVET ise, belirtiniz.

_____

9.2. Şu anda kullanmakta olduğunuz psikiyatrik veya nörolojik bir ilaç var mı?

Var_____

Yok_____

Eğer cevabınız VAR ise, ilaç ya da ilaçların isimlerini belirtiniz.

9.3. Görme sorununuz var mı?

Var_____

Yok_____

Eğer cevabınız VAR ise;

Lens veya gözlük kullanıyor musunuz? Evet_____ Hayır_____

Kullandığınız gözlük veya lens görme sorununuzu tamamen ortadan kaldırıyor mu?

Evet_____ Hayır_____

Renk körlüğünüz var mı?

Evet_____ Hayır_____

9.4. Hiç bilincinizi kaybettiniz mi? Evet____ Hayır_____

Kaybettiyseniz kaç yaşındayken? _____

Hangi nedenle? _____

Ne kadar süre ile bilinçsiz kaldınız? _____

Bilinciniz yerine geldikten sonra olayları hatırlama güçlükleri yaşadınız mı?

Evet_____ Hayır____

Evet, ise lütfen açıklayınız: _____

9.5. Genel olarak sağlık durumunuzdan ne kadar memnunsunuz?

Memnunum_____ Oldukça memnunum_____ Pek memnun değilim_____

Memnun değilim____

9.6. Çok kötü - 1, Çok iyi – 10 olarak düşünürsek, sağlığınızı bu ölçekte kaç olarak

değerlendirirsiniz? _____

Appendix F: Main Test Informed Consent

Gönüllü Katılım Formu

Demet Ay (ddemetay@gmail.com)

Bu çalışma, Yeditepe Üniversitesi Bilişsel Bilimler yüksek lisans programı öğrencisi Demet Ay tarafından yürütülmektedir. Çalışmanın amacı, "Geri getirme yollu unutma" bulgusunun sebeplerini çeşitli değişimlemelerle test etmektir.

Çalışmanın ilk oturumunda sizden ekranda gördüğünüz bazı kelime çiftlerini öğrenmeniz ve daha sonra da iki ayrı test aşamasında hatırlamanız daha sonra ise birkaç anketi doldurmanız istenecektir. Araştırma yaklaşık 40 dakika sürmektedir.

Çalışma, hiçbir fiziksel ya da psikolojik risk taşımamaktadır. Toplanan veri ile kişisel bilgileriniz eşleştirilemeyecektir. Bütün cevaplar anonim ve toplu olarak yalnızca araştırmacılar tarafından değerlendirilecektir. Sonuçlar yayımlandığı takdirde sadece grup verileri yayımlanacaktır. Kişisel veriler yayımlanmayacaktır.

Araştırmaya katılım gönüllülük esasına dayanmaktadır. Araştırma boyunca istediğiniz an araştırmayı durdurma ve araştırmadan ayrılma hakkı size aittir. Araştırma sonrasında çalışmayla ilgili ayrıntılı bilgi formu verilecektir ayrıca sormak istediğiniz her türlü soruyu araştırmacılara sorabilirsiniz.

Çalışmaya katılımınız ve ilginiz için şimdiden çok teşekkür ederiz!

Araştırma ile ilgili yukarıda yer alan metni okudum. Çalışmaya tamamen gönüllü olarak katılmayı kabul ediyorum. Bu çalışmayı istediğim zaman ve herhangi bir neden belirtmek zorunda kalmadan bırakabileceğimi biliyorum.

Katılımcının imzası:	
Araştırmacının adı soyadı:	
Araştırmacının İmzası :	

Tarih: ___/___/_____

Appendix F: Curriculum Vitae of the Author

Demet Ay

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Education

M.Sc.	Yeditepe University, Istanbul Cognitive Science (100% Scholar, Tubitak scholar)
B.A.	Bogazici University, Istanbul Psychology (Tubitak Scholar)

Work Experience

2014 -	Research Assistant Yeditepe University, Istanbul
2013 - 2014	HR intern Turkuvaz Media
2012 -	Research Assisstant Erasmus Internship Tilburg University, The Netherland Advisor: Dr. Elif Durgel

Research Interests

Autobiographical Memory, Forgetting