Group Cohesiveness as a Predictor of False Memories and Collaborative Inhibition

Thesis submitted to

The Institute for Graduate Studies in Social Sciences

in partial satisfaction of the requirements for the degree of

Master of Arts

in

Psychology

by

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Boğaziçi University

2005

Acknowledgements

I would like to express my deep gratitude and sincere appreciation to Associate Professor Ali Tekcan for his supervision and trust in me. I also thank him for supporting me in the effort of integrating social and cognitive psychology.

Professor Hamit Fişek not only shared his critical comments, but he was also very understanding about my hurry to finish this thesis in short time. I would also like to thank him for being very considerate about me throughout my assitantship.

I would like to reveal my deepest appreciation to Assitant Professor Bilge Ataca for believing in me in the first place and for providing valuable feedback in a limited time. None of this could have been possible without her generous support.

A special mention is reserved for Professor Nuran Hortaçsu, who has always been kindly accessible and attentive to my needs in the last year. Many thanks to her for being just one door away to share my future plans and concerns.

During the period I worked as a research assistant of Professor Güler Fişek and Professor Ayhan Aksu-Koç, they were more than kind and understanding. By working with them, I was able to concentrate on other research, which motivated me to return to my thesis with greater enthusiasm. I also want to express my gratitude to Professor Fişek for helping me in the formation of a new scale.

I would like to thank my assistant friends, especially to Serdar and Berna for their emotional and practical support as well as their valuable friendship.

Also, beyond my research, I would like to recall the role of all of the friends from my MA class, with whom we have engaged in lively discussions and spent quality time outside school.

I should also mention the positive influence of my dear friends Gizem, Yaprak and Kaan on this thesis. Without the *night outs* at significant times, the whole process would have been harder.

Finally, apart from offering me their love and patience during the last year, my parents Neşe Peker and Mustafa Peker have provided free 24/7 mentoring for me. I am grateful for them for always encouraging me to follow the path that I chose and for being far more than just parents. Thank you...

Abstract

Group Cohesiveness as a Predictor of False Memories and Collaborative Inhibition.

by Müjde Peker

The aim of the present study is to look at the effects of cohesiveness on false memory creation, social contagion and collaborative inhibition. 15 friend, 14 ad hoc and 14 nominal three person groups saw categorical word lists. Friend and ad hoc group members were subject to collaborative recall, while nominal group members recalled these words alone (control group). Later, all participants received recognition judgments together with remember/know judgments and confidence ratings. Members of friend groups filled out a cohesiveness scale in the end. The findings on collaborative inhibition was contrary to expectations, such that friends engaged in collaborative inhibition whereas ad hoc groups did not. Together with the within group variability differences it was concluded that, without the moderating variables, cohesiveness does not necessarily lead to productivity. The findings on social contagion were in the expected direction, such that friend groups engaged in social contagion while ad hoc groups did not. Interestingly, the R/K judgments and confidence ratings of friend groups showed that friend group members are less able to make clear distinctions between what they saw and did not see in the first phase of the experiment. Overall, these results showed that people who know one another can be influenced by the mistakes of others in their group and accept these mistakes as actual truths.

Özet

Yanılgılı Bellek ve Ketlemenin Grup Kohezyonuyla olan İlişkisi

Müjde Peker

Bu çalışmada, grup içindeki kohezyonun yanılgılı bellek ve kollektif bellek performansına olan etkilerini araştırmak amaçlanmaktadır. Üç kişilik gruplar halindeki, 15 arkadaş, 14 sözde (gerçekten bir grup olmayan ancak analizlerde grup olarak varsayılan) ve 14 yeni kurulmuş gruba kategorik kelime listeleri gösterilmiştir. Arkadaş grubu ve yeni grup üyeleri kelimeleri birlikte hatırlarken, sözde grubun üyelerinden ayrı ayrı hatırlamaları istenmiştir (kontrol grubu). Daha sonra, katılımcılar hatırlıyorum/biliyorum yargıları ve bu yargılarına olan güvenlerini belirtmişlerdir. Arkadaş gruplarının grup hafızaları sözde gruplara göre daha düşük çıkarken, sözde gruplar ve yeni gruplar arasında böyle bir fark bulunmamıştır. Grup içi değişkenlik farklılıklarının da gösterdiği gibi, ara değişkenler olmadan kohezyonun grup üretkenliğine yol açtığı söylenemez. Kendi grubunun elemanlarının hatırladıkları ancak listede olmayan kelimelerin diğer grup elemanları tarafından benimsenmesi (social contagion) üzerine olan bulgular beklenilen yöndedir. Arkadaş gruplarında bu durum gözlenirken, yeni gruplarda bu etki görülmemiştir. Arkadaş grubu üyelerinin Hatırlıyorum/Biliyorum yargıları ve bu yargılarına olan güven değerlendirmeleri göstermiştir ki, arkadaş grubu üyeleri diğer grupların üyelerine kıyasla deneyin ilk aşamasında gördükleriyle görmedikleri arasında iyi bir ayrım yapamadığını göstermektedir. Sonuçlar, birbirlerini tanıyan insanların grup içinde birbirlerinin hatalarından etkilenebileceği ve bu hataları gerçekmiş gibi kabullenebileceği yönündedir.

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Introduction

The primary purpose of this study is to look at the effect of group cohesiveness on group memory. There are two interrelated aims. The first aim is to show that group cohesiveness, which is argued to pressure group members to behave in a uniform way, increases the creation of false memory by subtly forcing the members to conform to group norms. Second, since members of cohesive groups are expected to share memories and know each other's cognitive style better than members of less cohesive groups, collaborative inhibition (i.e. collaborative groups' memory scores being lower than nominal groups' scores), is expected to be observed less in cohesive groups. In doing this, the aim is also to point out that, ad hoc groups that dominate experimental psychology literature today, might not reflect the true nature of social groups and thus the processes and levels of memory distortion and collaborative inhibition might be different in reality.

In his influential book "On Collective Memory" sociologist Maurice Halbwachs (1950/1992) underlines the fact that collective memory is the essential ingredient for the formation of group identities and cohesion with its specific emphasis on the sense of common history shared by members of the group. Although one would expect to see the reflections of this definition in the works of social psychologists, the issue has failed to receive the consideration that it deserved (Roediger, Meade, & Bergman, 2001). On the other hand, cognitive psychologists studying memory viewed remembering as occurring "only within the individual" (Roediger et al., 2001, p. 365). Despite the early emphasis of Bartlett (1932) on remembering as a social process, many researchers up to date studied the phenomenon by testing subjects alone, without taking into account the effects of the social setting.

Although there has been considerable emphasis to the notion of false memory, which can be defined as the difference between the input of human memory from the output (Schacter, 1997), it is only recently that a group of socially oriented researchers inspired by the works of Bartlett and Halbwachs developed an interest on the creation of false memory in groups (e.g., Connerton, 1989; Fentress & Wickham, 1992; Middleton & Edwards, 1990; Pennebaker, Paez, & Rimé, 1997). While criticizing mainstream psychology, Middleton and Edwards (1990), like Bartlett, underlined the fact that individuals' memory is not a "passive storehouse of past experience, but changes what is remembered in ways that enhance and transform it according to present circumstances" (p. 6). This 'reconstruction' of memories is argued to take place under societal pressures (Halbwachs, 1950/1992). As Baumeister and Hastings (1997) have underlined, most social groups prefer to hold a positive view of themselves and this preference results in distortions in group memories. In the words of Bartlett (1932, p. 254-5)
"... we have got to admit that the specific bias... in the group, awakens in the individual too an active tendency to notice, retain and construct specifically along certain directions."

It is evident from these arguments that collective memory directly "affects people's perceptions of individuals, groups, and events, and has consequences for actions and reactions towards them" (Weldon & Bellinger, 1997, p. 1161). Moreover, strong collective memories, real or imagined, can be the precursor of wars, prejudice, nationalism, and cultural identities (Baumeister & Hastings, 1997). Therefore, studying the mechanisms of group remembering and the social influences acting upon, would provide valid implications for the social, cultural and political dynamics. Specifically, by investigating the conditions under which social groups distort reality and the social

psychological processes responsible for these distortions, one would be able to develop ways to control these group biases (Bartlett, 1932).

On the other hand, over the years the literature on group cohesiveness has consistently shown that the pressure imposed upon the members of cohesive groups force them to behave uniformly and to conform to group norms (Festinger, 1950/1969; Hogg, 1992). In other words, it was found that as the cohesiveness of a group increases, its power on conformity to its norms, acceptance of its goals and assignment to tasks and roles increase as well (Cartwright, 1969). Although the behavioural consequences of group cohesiveness have been widely investigated, its effects on group memory (i.e., both individual's memory in a group and group's collective memory) did not receive the deserved emphasis.

The following reviews the early works that are conducted on group memory distortion followed by a review of the empirical findings on false memory literature starting with the misinformation paradigm and continuing with later works on false memory creation in groups. Then the role of familiarity with group members in reducing collaborative inhibition will be examined. Next, group cohesiveness and the reason why it should determine the amount of social influence will be discussed and how it can be integrated into the research on false memory creation and collaborative inhibition will be examined.

Early Works on Group Memory Distortion

Bartlett's (1932) classic experiments in which he searched for the constructive nature of remembering include two methods, namely, the serial reproduction technique and the repeated reproduction technique. In the former, a subject is exposed to some

material, such as a story, and is asked to recall it. Afterwards, a second subject is asked to read the first subject's account of the original event followed by his/her recall. This is followed by a third subject's reading of second subject's account, and so on. After elaborate analysis, Bartlett (1932) reported distortions in the story that are mainly based on transformation of details according to the interests and conventions of a group and concluded that collective recall reduces accuracy.

In his second technique, the method of repeated reproduction, an old Indian legend entitled "The War of the Ghosts" was read to subjects twice. After a 15-min delay, they were asked to recall the story followed by their subsequent recalls at later points in time. The primary aim of Bartlett (1932) was to investigate how the story had been altered by subjects across repeated occasions. He found that subjects engaged in a process of rationalization such that omissions, explanations by the addition of material and recall of events that were not in the story were evident "whenever anything appeared incomprehensible" (p. 68). For example, instead of recalling the word "canoe" in the story, it was usually replaced by a more familiar word "boat". In another case, an anthropology student who was interested in topics of kinship names and clan systems transformed the Indian character in the story into a hero, while in the story he was not depicted as such. Once again, it was underlined that the attitudes and special interests of a person may cause him/her to distort the remembered material unintentionally. Although the distortions in recall of the story increased over both repeated and serial reproductions, they were less evident in repeated reproduction than in serial reproduction (Bergman & Roediger, 1999).

The typical experiments on group memory predominantly used nonsense materials, such as 2-syllable nonsense words for comparing the recall of individuals to

that of groups (Hoppe, 1962; Lorge & Solomon, 1955; Perlmutter & deMontmollin, 1952; Ryack, 1965, as cited in Basden, Basden, Bryner, & Thomas, 1997). In fact, these studies on the accuracy of group recall are rather problematic and have many contradictions (see Basden et al., 1997, for a review). There are mainly two problems concerning them. The first one is that in these experiments, the memory performance of a collaborative group in which the individuals interact with each other, is compared to the memory performance of a single individual. Basden et al. (1997) argue that in order to come up with a fair evaluation of the data, one should "compare the total output of collaborative groups with the total (nonredundant) output of nominal groups which consist of an equal number of participants tested individually" (p. 1177). After gathering some of these earlier data and creating nominal groups by adding the performance of individuals, Basden et al. (1997) was able to compare the output to that of collaborative groups. Unfortunately, this procedure could not be applied to all of the findings because researchers had asked for group consensus before the subjects told an item. This made these collaborative groups incomparable to nominal groups. In terms of the studies, in which Basden et al. (1997) were able to compare collaborative and ad hoc nominal group performances, it was found that collaborative groups were more accurate than nominal groups. Moreover, there were studies showing that groups produced fewer intrusions than individuals (Perlmutter & deMontmollin, 1952; Yuker, 1955; as cited in Basden et al., 1997).

After having participants recall "War of the Ghosts" as individuals, Perlmutter (1953) tested the recall of collaborating two and three-person groups and concluded that the errors that had been produced previously by individuals is reproduced again in the group, thus making the errors cumulate across the group and cause collaborative recall

to be less accurate than individual recall. Perlmutter and deMontmollin (1952; as cited in Basden et al., 1997) had also underlined that invented words are produced more by individuals than groups and that groups recalled and rerecalled invented words (i.e., intrusions). On the other hand, for the subsequent research that followed the footsteps of experiments demanding 'group consensus', it was not surprising to find that the groups were more accurate than individuals (e.g., Vollrath, Sheppard, Hinsz, & Davis, 1989; as cited in Basden et al., 1997).

What is evident from the findings above is that the results of the early studies are very much open to debate and that no consensus is achieved over whether collaborative group recall increases or decreases the creation of false memories compared to nominal group recall.

Social Influences on False Memory in Groups

Although early research on group memory generally compares the amount and quality of collaborative and individual recall, they do not directly attempt to explain the mechanisms of social influence. According to Roediger, Bergman and Meade (2000), the systematic body of research on the influence of other peoples' accounts on the recollections of an individual started with the misinformation paradigm developed by Loftus and colleagues (Loftus & Palmer, 1974). In these experiments, an accident or a crime was shown to subjects via slides or a videotape. Afterwards, for some items misinformation is added either into the narrative or the questionnaire. The question was whether the participants would add this misinformation into their memory of the accident/crime or not. Results suggested that they usually did. Roediger et al. (2000) argue that this paradigm shows the impact of social influence in the sense that, as most

of the information given in the narrative fits to the actual events from the scene, subjects might believe that the narrator is in fact a good observer. Therefore with a high confidence in the narrator, subjects are more likely to think that the misinformation also existed.

While reviewing studies that look at an individual's memory for events after they are being exposed to misinformation presented by another person, Roediger et al. (2000) point to the study of Betz, Skowronski and Ostrom (1996) in which subjects read a short story and asked questions about it while being presented with information that hypothetical people had answered correctly or incorrectly. It was found that participants changed their responses to be in line with the memories of the hypothetical others. Meade and Roediger (2002) argue that there are two main problems with this research. First, as in the Loftus experiments, the other person does not exist so it is not an actual social influence. Second, it is unclear whether subjects actually changed their beliefs (i.e. private conformity) or rather conformed to others' responses even though they know their conforming response is wrong (i.e. public conformity) (Roediger et al., 2001).

The first problem is solved when Schneider and Watkins (1996) and Wright, Self and Justice (2000) used actual subjects/confederates as misinformation sources. Schneider and Watkins (1996) tested participants' recognition response to a just-studied word list when they were together with another subject/confederate. Subjects studied a long list of words followed by a recognition test in which they took turns to respond on a six-point scale whether the item shown was in the list or not followed by a confidence rating of this response in public. It was found that the confidence ratings and the recognition responses that the actual subject gave after the other subject/confederate had

been largely affected by the latter's recognition response. When the confederate provided a false positive response (i.e. claimed that the word was on the list when in fact it was not), subjects tended to respond in line with this response. This finding showed that "social influence serves to push responses towards reporting of false memories" (Roediger et al., 2000, p.131).

While discussing the previous research, Meade and Roediger (2002) argue that since the subjects rated their confidence publicly, it is hard to draw a conclusion as to whether they engaged in public or private conformity. According to these authors, *public conformity* occurs when subjects change their responses to be in line with other group members' responses, although they know that they are giving wrong answers. *Private conformity,* on the other hand, is argued to occur when subjects believe in the truth of the incorrect answer because their social environment has influenced them a great deal. The study conducted by Wright and colleagues (2000) sheds light on the public/private conformity debate. In their second experiment, pairs of subjects were shown a story book which depicted a crime. All of the pictures were the same for these two subjects except one (i.e., the thief did/did not have an accomplice). Subjects were given questionnaires about the events, together with their confidence ratings, before and after discussing the event with the other member of the pair. The findings revealed that although the initial memories had been very accurate, most pairs conformed after discussing the crime with the other person in the pair. Their confidence ratings, which were individually filled out, were in favour of private conformity such that, after having heard contradictory information from the confederate, subjects became less confident in their responses.

In order to see the extent to which false responses altered the private

recollections of the participants, Roediger et al. (2001) developed the *social contagion paradigm,* which is argued to intermix Asch's (1956) conformity paradigm and Loftus' (1979) misinformation paradigm. In this paradigm, a confederate and the subject saw six scenes of typical household scenes such as a kitchen and were later subjected to a collaborative recall test in which they took turns to recall 12 items from each scene, 6 items for the confederate and 6 for the subject. In fact some of the items that were recalled by the confederate had been incorrect and among the incorrect items some were typical of a scene (e.g. a toaster for the kitchen scene) whereas others were less typical (e.g. oven mitts). The results showed that when given an individual recall test, the items that were falsely reported by the confederate were recalled more than the items that had not been suggested by the confederate, especially when the suggested information was typical of a scene.

Furthermore, this study revealed that subjects were more likely to claim that they *knew* the suggested items had been in the scenes rather than to report that they actually *remembered* them there. This difference deserves further consideration since *remember* response is indicative of the fact that the subject consciously recollected the item from the scene while *know* response indicates that the subject did not have a specific recollection of the item, but was confident that the item had occurred in the scene. Although the former is a stronger evidence towards the internalization of false memories (i.e., private conformity), Meade and Roediger (2002) underline that if the subjects follow the typical instructions for R/K judgments, *know* responses would also be indicative of private rather than public conformity.

While the use of pictures, scenes or stories has been a prevailing method for investigating memory distortions in groups, word lists are also used as materials for the

same purpose in several studies (e.g., Basden et al., 1997; Basden, Basden, Thomas, & Souphasith, 1998; Basden, Reysen, & Basden, 2002; Reysen, 2003; Weldon & Bellinger, 1997). In fact, these recent research reveal outcomes which are contradictory to earlier findings. For example, Basden and colleagues (1997) found that participants in the collaborative group who took turns while answering an oral free-recall test showed greater amount of memory intrusions than participants in the nominal group.

Another difference of Basden et al.'s (1997) study from earlier research is the use of associatively related or categorized word lists as materials, since it is argued that recalling lists of unrelated words is more artificial for the group setting than it is to individuals. In the first of the two experiments Basden et al. (1998) conducted, they applied the DRM procedure (Roediger & McDermott, 1995) to the group such that after seeing these associatively related word lists, group participants received an oral free recall test in which they were asked to take turns when recalling the words on the list. After this test, they received an individual recognition test sheet and were asked to provide *remember, know,* or *new* judgments. The results showed that there was no difference between collaborative and nominal groups in terms of the recall of critical nonpresented words.

However, when the authors conducted the same experiment by using categorical words as materials, they found that recall of critical nonpresented words was greater in collaborative groups than in nominal groups while for the recognition test, collaborative group members falsely recognized more of the critical lures compared to nominal group members. There was no difference for the remember judgments between the two groups to critical lures. The difference in these two experiments is argued to imply that there exist two different processes (Basden et al., 1998). For the former, 'strong interitem

associations' cause false recall in individuals whereas for the latter 'strong superordinate-to-instance associations' are evident. This latter association type seems to be much more operant in collaborative groups (Basden et al., 1998).

In fact categorized lists are argued to be the "middle ground between random word lists and organized stories" (Weldon & Bellinger, 1997, p. 1172). Since it is quite hard to decide what would be evaluated as an intrusion idea in a story, the best way that is closest to real life circumstances is to use categorized lists (Basden et al., 1997). Therefore, the most appropriate material to study group memory distortions seem to be categorized word lists. Basden et al. (1998) summarize the real world implications of using categorized word lists

"When group members are certain of a general topic, i.e., are provided with a superordinate retrieval cue such as sexual abuse, and are pressured to participate in group discussions, it is likely that they lower their criterion for offering an experience as remembered" (p. 240).

Similarly, when given a superordinate retrieval cue such as a dominant negative view of the members of another group (e.g. 'violent Turks') as a result of the social pressures, members of this social group might be more likely to create superordinate-to-instance associations and they would be more likely to judge that they remember the instances falsely depicted by the members of his/her own group.

Before concluding this part, it is important to point out one final aspect of false memory creation in groups. In many studies it was found that groups are more confident in their recollections and this is the case for both false and accurate recalls (Meudell, Hitch, & Kirby, 1992). In the words of Stephenson and Wagner (1989), "dyads, and four-person groups even more so, are unjustifiably confident about the truth of the errors

they make when subsequently questioned about details of what they have observed" (see Stephenson & Wagner, 1989, p. 228). Not only is this evidence crucial for questioning the truth-value of group interrogations about a crime, it is also important to ask whether this overconfidence results in or is a result of social psychological processes such as stereotyping and discrimination.

Friendship Groups and Collaborative Inhibition

Before explaining the notion of group cohesiveness and integrating it into the false memory framework, it is important to underline a widely held phenomenon about group performance which is the fact that in almost all research that has been conducted, collaborative group's memory scores are distinctively lower than nominal group's scores (see Andersson & Rönnberg, 1995 for a review). This collaborative inhibition (also known as productivity loss) is attributed to several motivational and cognitive factors ranging from social loafing to retrieval strategy disruption (see Weldon & Bellinger, 1997 for a review). However, the reason behind collaborative inhibition goes beyond the scope of group recall. According to the phenomenon of part-set cuing inhibition, which was named by Slamecka (1968; as cited in Basden, Basden, & Stephens, 2002), when participants are provided with some of the items they had studied as cues, this impairs the recall of the items that are not cues. In other words, it was found that participants recall fewer words when they are given cues than when they are not (Basden et al., 2002).

Many researchers tried to explain the reason behind this phenomenon. In his model, Rundus (1973; as cited in Basden et al., 2002) argued that the items that are given as cues are strengthened more than noncue items, causing these noncue items to be

weakened with subsequent attempts of retrieval. However, as this model assumes only superordinate-to-instance associations (i.e. associations between category labels and instances), it is criticized by not taking into account interitem associations. Similarly, in their model, Anderson, Bjork and Bjork (1994) focus on superordinate-to-instance associations as playing a crucial role in part-list cuing inhibition and they blame retrieval practice of cued items as explanatory of part-list cuing inhibition such that, when the noncue items compete with the rehearsal of cued items, they are inhibited or suppressed.

On the other hand, Basden and Basden (1995) proposed an alternative model that explains part-list cuing inhibition. According to this model, when individuals are asked to recall a list, they want to use their own retrieval strategies to recall efficiently. However, when part-list cues are given to them, their strategies are subject to disruption and individuals fail to come up with their intended recall and therefore recall less than they normally would.

Similarly, when an individual is exposed to the recall of other participants in a collaborative context, as the other participants recall only part of the list in a strategy possibly dissimilar to him/her, his/her own organized retrieval strategy gets disrupted (Basden et al., 1997). In their study on memory distortion among groups, Basden and colleagues (1998) examined whether the different scores between nominal and collaborative groups might be the result of clustering differences. After comparing the number of clusters made by associative set (i.e. group of items from one category recalled one after another without any intrusion from other categories), they found that clustering was higher for nominal groups than for collaborative groups. This was given as evidence towards the fact that disrupted organizations inhibited the recall in collaborative groups.

Following the footsteps of this idea, it was hypothesized that collaborative inhibition may be reduced when group members are familiar with each other (Andersson & Rönnberg, 1995; 1996; 1997). The underlying assumption behind this was that a friend might provide more specific retrieval cues to his/her group than a stranger (Basden et al., 1997) since friends are known to share memories and know the cognitive styles of each other (Wegner, Erber, & Raymond, 1991). Moreover, instead of shifting from one category to another, friends might cue each other to stick to one category rather than shifting across categories.

The findings of Andersson and Rönnberg (1995; 1996) confirmed this hypothesis that collaborative inhibition can be reduced with friends rather than ad hoc groups (non-friends). In their typical experiment, subjects free recalled words and stories first individually then in dyads (i.e., as friends or non-friends). The ratio between newly generated and forgotten items in second recalls were compared to the ratio of individual subjects who recalled twice on their own. It was found that both friends and non-friends performed less well than individuals recalling alone. However, when the tasks were more complex (i.e., story recall), friends' ratio was higher than non-friends' implying that friends can cue each other more effectively than non-friends especially when task complexity is high. They concluded that if individuals socialize in their free time with the person they are to collaborate, this would reduce collaborative inhibition (Anderson & Rönnberg, 1996).

After seeing the differences in memory performance among friendship groups and ad hoc groups, the generalizability of the findings on group false memories, whose subjects are exclusively unfamiliar with each other, becomes questionable. In fact Bartlett's (1932) early definition of the social group is quite beneficial in understanding

the ecologically valid description of a group

"A social group is never merely a collection of people, but is always in some way organized. There must be some active influence which, so long as it is effective, brings and holds together the people who make up the group" (p. 253).

It is not only Bartlett who emphasized the importance of studying memory in natural rather than ad hoc groups. By underlining the fact that collective memory cannot be imagined without a common past or history, Bangerter (1997) underlined that the use of ad hoc groups in experiments might in fact destroy the actual nature of the phenomenon.

In line with these arguments, as stated previously, this research will compare the amount of false memory creation and collaborative inhibition of friendship groups to that of ad hoc and nominal groups. However, the crucial variable in this research, which is that of group cohesiveness, deserves special emphasis before specifying the hypotheses.

Group Cohesiveness

As stated previously, while defining collective memory, Halbwachs (1950/1992) underlined the fact that collective memory was crucial for the emergence of group cohesion. By reversing the emphasis, one can ask whether group cohesiveness can be effective in determining collective memories, by increasing the false memories of its members and decreasing the process of collaborative inhibition.

The term group cohesiveness was at first a descriptive one on its own, later to became a theoretical construct in 1950 with Festinger, Schachter and Back's formal statement (Hogg, 1992). While the main focus of the early definition of group

cohesiveness was the degree of interpersonal attraction among group members (Festinger, 1950/1959), Hogg and his colleagues (Hogg, 1992; Hogg & Hains, 1996; Hogg, 2001) reformulized the construct by arguing that group cohesion should not be viewed as only attraction among group members, it should rather concern "the entire range of effects of categorization-based depersonalization" (Hogg, 2001, p. 65). According to this framework, the critical aspect of cohesiveness is social attraction rather than interpersonal attraction, such that members of a group are not liked as unique individuals but rather liked as being part of the group.

The social attraction dimension of cohesiveness also brought Janis' (1982; as cited in Hogg and Hains, 1998) notion of groupthink to the forefront. Groupthink is defined as "a mode of thinking that people engage in when they are deeply involved in a cohesive ingroup, when members' strivings for unanimity override their motivation to realistically appraise alternative courses of action" (p. 324). In this regard, cohesiveness is argued to create several symptoms of groupthink, such that it causes members to have strong desire for consensus, be more effortful to reach agreement and pressure other members, who argue against group stereotypes (Hogg & Hains, 1998). In short, it is associated with "conformity, concurrence, agreement and ethnocentrism" (p. 336).

In terms of the relationship of cohesiveness and conformity, Festinger (1950/1969) was one of the first to state that conformity to group norms and uniform behaviour emerges as a result of the pressure imposed upon the members of cohesive groups. Following Festinger, Lott and Lott (1961; as cited in Prapavessis & Carron, 1997) had also found that high cohesive groups exerted more pressure on its members for acting out in accordance with group norms than low cohesive groups. Subsequent studies up to date supported this finding (see Prapavessis & Carron, 1997 for a review).

When integrating these findings on group cohesiveness to the research on group memory, the findings on conformity may be explanatory for false memory creation in groups such that the pressure that comes along with conformity, may act as a precursor for involuntary participation. As a result of this, the reconstruction of memories, which takes place under societal pressures, might occur.

Unfortunately, the relationship between cohesiveness and productivity is not as clear as cohesiveness and conformity. Among the several studies conducted on this issue, some found that cohesive groups were more productive, while others found the reverse to be true. There are even studies that could not find any relationship between the two variables (see Podsakoff, MacKenzie, & Ahearne, 1997 for a review). In their meta-analytic study, Mullen and Copper (1994) show that the cohesiveness-performance effect actually exists to a highly significant degree. They argue that the use of artificial groups is responsible for the weaker cohesiveness-performance effect and when real groups are concerned, this effect is quite evident.

The studies, which did not find a direct link between cohesiveness and performance, came up with moderating variables such as task complexity, task interdependence, group goal acceptance and group drive (Podsakoff et al., 1997). For example, Gully, Devine and Whitney's (1995) meta-analysis revealed the importance of task interdependence as a moderator between cohesion and performance. They found that cohesive groups performed well on interdependent tasks as group efforts can be more easily coordinated in these types of tasks by cohesive groups. For independent tasks, no effect of cohesiveness was observed since coordination had no benefit for these types of tasks (Gully et al., 1995).

On the other hand, Seashore (1954; as cited in Craig & Kelly, 1999), had argued

that one cannot give a direction of productivity for cohesive groups but can only claim that they will act uniformly in what they engage to do. In his study, he found that cohesive groups with high performance goals acted in a uniform way and were more productive whereas cohesive groups with low performance goals acted again in a uniform way and were less productive. As well as showing the importance of performance goals as an important moderator, this statement also underlines the fact that within group variability among cohesive groups should be lower than noncohesive groups.

Looking at the issue in terms of collaborative inhibition among cohesive groups, this study aims to investigate whether the productivity loss that arises as a result of performing in groups could be reduced, if real and cohesive groups are taken into account instead of ad hoc ones. Collaborative inhibition might be reduced either because cohesion influences how hard the group members work to achieve their goals or it might be the fact that, members of cohesive groups share their memories and know the cognitive styles of each other, which cause them to shift less among categories while recalling, thus not disrupting other members' retrieval strategies as much as ad hoc groups.

Aims and Hypotheses

There are three aims of this research. The first one is to look at whether a group's level of cohesiveness affects the amount of false memory creation and social contagion. The second aim is to investigate whether group cohesiveness affects collaborative inhibition. In line with these two aims, the final aim is to show that the amounts of false memory and collaborative inhibition of ad hoc groups, which can be regarded to have

the lowest level of cohesiveness, will be significantly different than the corresponding amounts among friend groups.

The specific hypotheses are:

In terms of recall,

Hyp 1: Friend groups will show lower collaborative inhibition than ad hoc groups since they are expected to make less categorical shifts than ad hoc groups.

Hyp 2: Members of friend groups will recall significantly higher number of nonpresented words as compared to ad hoc and nominal group members.

Hyp 3: Members of high-cohesive friend groups will recall higher number of nonpresented words as compared to low-cohesive friend groups.

In terms of recognition,

Hyp 4a: Members of friend groups will incorrectly judge critical and noncritical distractors as seen in the first phase of the experiment (i.e. will give false alarms) more than members of ad hoc and nominal groups.

Hyp 4b: Members of friend groups will accompany their false alarms to critical distractors more with remember judgments than know judgments compared to members of ad hoc and nominal groups.

Hyp 4c: Members of friend groups will give higher confidence ratings to their R/K judgments to critical and noncritical distractors compared to ad hoc and nominal groups.

Hyp 5a: Members of high-cohesive friend groups will give false alarms more than members of low-cohesive friend groups.

Hyp 5b: Members of high-cohesive friend groups will accompany their false alarms to critical distractors more with remember judgments than know judgments

compared to members of low-cohesive friend groups.

Hyp 5c: Members of high-cohesive friend groups will give higher confidence ratings to their R/K judgments to critical and noncritical distractors compared to members of low-cohesive friend groups.

Hyp 6: Members of nominal groups will incorrectly judge presented words as not seen in the first phase of the experiment (i.e. will miss) more than members of friend and ad hoc groups.

In terms of social contagion,

Hyp 7a: Members of friend groups will claim that they have seen the word in the first phase of the experiment, when in fact the words is generated by the other group member in the collaborative recall phase (i.e. will be subject to social contagion) more than members of ad hoc and nominal group members.

Hyp 7b: Members of high-cohesive groups will be subject to social contagion more than members of low-cohesive groups.

Method

Participants

A total of 129 introductory psychology students at Boğaziçi University, Istanbul, Turkey participated in this experiment. They received one credit for their participation. There was 43 three-person groups; 14 collaborative ad hoc groups, 15 collaborative friendship groups and 14 nominal groups. The nominal and collaborative ad hoc group members were randomly distributed to the two groups whereas the members of the collaborative friendship groups consisted of three people, who claimed to be friends with each other.

Materials

The materials that were used in this study were constructed upon the materials that were used in Basden et al.'s (1998) second study. The materials were presented via computer and the oral responses of ad hoc and friendship groups were presented on the computer monitor throughout the recall test whereas members of nominal groups were asked to write their own responses on a A4 paper.

The list consisted of thirty medium to high taxonomic frequency instances from each of the six categories. These words were selected from the Peynircioğlu (1988) norms. Fifteen instances were selected for presentation (Appendix A) and fifteen instances (five critical and ten noncritical) were chosen as distractors on the recognition test. The five critical words included the most frequently given instance. Therefore, the presentations included 90 words, 15 from each six category plus three extra words at the beginning and at the end of the presentations in order to eliminate the primacy and recency effects. The recognition sheet consisted of twenty randomly mixed items from

each category of six separate blocks, including five of the fifteen presented words, five critical nonpresented words and ten noncritical distractors.

Group Cohesiveness

Both the definition and the measurement of the group cohesiveness construct has always been the subject of controversy. Although there are numerous measures of this construct, they are generally applicable to therapy groups, task-oriented groups and sports groups (Cota, Evans, Dion, Kilik, & Longman, 1995). In order to measure the cohesiveness of friendship groups efficiently, a new scale is devised from the integration of two preexisting scales that measure this construct. The first of these scales is Group Attitude Scale (Evans & Jarvis, 1986; as cited in Hogg, 1992), which is a 20-item scale that conceptualizes cohesiveness as attraction to the group. More specifically, they define attraction to group as "an individual's desire to identify with and be an accepted member of the group" (Evans & Jarvis, 1986; as cited in Hogg, 1992, p. 47). One major drawback of this scale is the fact that it is constructed and validated almost exclusively on responses of personal growth groups and it is not certain whether it can be generalized to other group situations (Hogg, 1992). The items that are directly related to the actions of personal growth groups were omitted with relevant changes within the remaining items.

The second scale, which is Family Adaptability and Cohesion Evaluation Scales III (FACESIII) is developed by Olson, Portner and Lavee (1987). This is a 20-item scale, containing 10 items measuring cohesion and 10 items measuring adaptability. The items that are related to the cohesion dimension of this scale were selected and the sentences that are related to family dynamics were changed into friendship-cohesion items.

The resulting scale consisted of 24 items with a 5-point Likert response format ranging from 1 *almost always* to 5 *almost never*. To test this "Friend Group Cohesiveness Scale", a pre-test was conducted on 136 introductory psychology students at Boğaziçi University. The negatively loaded items (item numbers 1, 4, 5, 6, 7, 11, 15, 16 and 19) were reverse scored before evaluating the data. After deleting five items from the scale, the Cronbach's alpha reliability of the scale changed from .88 to .90. The final scale consisted of 19 items (Appendix B).

The dimensionality of the 19 items from the Friend Group Cohesiveness Scale was analyzed by principal component factor analysis. Only one factor emerged, accounting for 37% of the item variance. The scree plot confirmed this finding. The correlations between cohesiveness items and the cohesiveness factor can be seen in Table 1.

Table 1

Correlations between the Cohesiveness Items and the Cohesiveness Factor

Items	Cohesiveness Factor
If it were possible to move to another group, I would.	.60
Compared to other friend groups I know of, I feel my group is better than most.	.52
In my friend group, we like to spend free time with each other.	.56
I feel my absence would not matter to the group.	.53
I don't care what happens in this group.	.50
In my friend group, we do not consult each other on our decisions.	.35
I do not feel involved in what is happening in my group.	.40
We can easily think of things to do together as a friend group.	.49
I would like to remain a member of this group.	.51
In my friend group, we ask each other for help.	.58
I am dissatisfied with my friend group.	.58
I feel included in my friend group.	.71
In spite of individual differences, a feeling of unity exists in my group.	.57
In my friend group, we feel closer to each other than to people outside the group.	.47
I do not feel a part of the group's activities.	.51
In my friend group, group togetherness is not important for us.	.58
I would feel badly if I could not meet with my friends for one day.	.46
The stability of my friend group is important for me.	.83
In my friend group, we do not feel close to one another.	.60

Design and Procedure

The methodology of this research is largely constructed on Basden et al.'s (1998) second experiment with four differences, which are the inclusion of friendship group, the actual social presence of group members in ad hoc and friendship groups, a confidence rating at the end of R/K judgments and finally friendship group cohesiveness

scale for friendship groups at the end of the recognition phase.

In the present study, participants were told that they were going to participate in a memory experiment. Ad hoc and nominal group members were randomly assigned to these conditions, while members of friend groups participated in the study in their own group. Participants in nominal group conditions were seated alone in a room. Group of three participants in friendship and ad hoc groups were seated next to each other facing a projector, which was connected to a computer in front of the experimenter. The experimenter read all the instructions aloud. Participants were told to study the word sets in preparation for a subsequent recall test. These word sets were associatively related to each other and the order of the words were randomly distributed. Participants in the friendship and ad hoc groups were asked not to talk to each other during the experiment, adding that they will not be given credits if they did. The words were then presented at a 2-sec rate on the computer monitor. Two random presentation orders were generated with the restriction that all items were blocked by the associative set. These two different presentation orders were created for counterbalancing. After the presentation of 90 items, in order to reduce the recency effects, participants completed a simple math task on their own. This task continued for thirty seconds.

The first phase of the experiment was followed by an oral free recall test for friend and ad hoc groups in which these participants were asked to recall the words they had studied in any order they found convenient. Each recalled word was typed by the experimenter to the computer and participants viewed these words while they tried to recall. They took turns and no participant was allowed to recall more than one word per turn. The experimenter typed the words in the order of occurrence during recall and each typed word was seen throughout this phase of the experiment. If the named participant

did not give a response for ten seconds, the experimenter pronounced the next participant's name. In terms of the nominal group members, they were given a blank A4 paper and were asked to recall the words that they had seen in the first phase of the experiment in any order that they liked.

After five minutes, for all the three groups members, these papers were collected and individual recognition test sheets were administered asking participants to mark the words, which they thought had occurred on the study list. Participants were instructed that if the word was marked as studied, they should distinguish between remembering and knowing by choosing R or K response which was next to the word. Remember/Know judgments were defined on the basis of Tulving's (1985) Remember-Know Procedure. This procedure was standardized into Turkish by Demiroğlu (2002). Next to the R/K judgments, a 5-point Likert scale confidence rating existed, asking the participants to indicate how confident they were (1 *not confident at all*, 5 *highly confident*) that they knew or remembered the item. Instructions were both written and orally read before participants started to fill the recognition sheet. These instructions and recognition sheets can be seen in Appendices C and D, respectively. Finally, participants in the friendship group were asked to fill the Friendship Group Cohesiveness Scale. All participants were debriefed and later dismissed.

Results

The Cronbach's alpha of the Friend Group Cohesiveness Scale was .85, which suggested that the scale scores are reasonably reliable for participants. The scale scores were calculated by first reverse scoring and then averaging the items. The possible range of scores was 1 to 5 whereas the actual scores ranged from 2.74 to 4.89. The scale had a mean of 4.03 (SD = 0.53), which is quite high. The participants whose means are below 4 were named as low-cohesive and those who were 4 or above were named as high cohesive. The mean scores are quite high and it is important to keep in mind that low cohesive group members do not actually represent low-cohesiveness in the sense that we wished to examine. There were 17 participants in the low cohesive and 28 participants in the high cohesive group.

Recall, recognition and social contagion findings will be given separately below.

Recall

Recall was scored by adding number of words that were correctly and incorrectly recalled in the collaborative recall phase separately. For the analyses, which involved friend, ad hoc and nominal groups, the unit of analysis was the group and the scores of the three members of a group were added together for these analyses.

Recall of Presented Words Among Groups

In order to test the hypothesis on collaborative inhibition, a one-way between subjects ANOVA was performed on presented words that were recalled among friend, ad hoc and nominal groups. While estimating the total recall of nominal group members,

their individual recalls were summed and the words, which were correctly recalled by two or three people in the group, were regarded as redundant repetitions such that only one of these correct recalls were counted. Overall ANOVA was found to be significant, F (2, 40) = 5.90, p = .006 (eta square = .23). Tukey's HSD tests revealed that friend groups (M = 48.27, SD = 9.35) recalled significantly fewer presented words than nominal groups (M = 59.36, SD = 8.53), p = .004, thus indicating collaborative inhibition. On the other hand, the difference between ad hoc (M = 52.0, SD = 8.49) and nominal groups approached significance, p = .082. The results did not differ among friend and ad hoc groups, p = .496. Contrary to our expectation, collaborative inhibition was evident among friend but not among ad hoc groups.

It is possible that these differences are due to clustering. As mentioned earlier, clusters are defined as groups of items from one category, which are recalled one after another without the intrusion of other category items. To test the idea that the collaborative inhibition findings might be the result of this clustering difference between groups, a one-way between subjects ANOVA was performed with the division of total recall to the number of category shifts in a group as the dependent variable and the type of group as the independent variable. Category shifts measured the number of times participants shifted from a word that is related to one category (i.e. piano for musical instruments category) to another word that is related to another category (i.e. hand for body parts). For friend and ad hoc groups, the category shifts in group recall were taken into account, while for nominal group members, each individual's shifts were measured and summed together. Total recall was divided by these category shifts. The relationship between clustering and group was significant, F (2,40) = 20.11, p < .001 (eta square = .50). Tukey's HSD tests showed that categorical shifts were significantly less among

nominal groups (M = 3.46, SD = 0.59) than ad hoc (M = 2.35, SD = 0.65) ($p = .001$) and friend groups (M = 3.46, SD = 3.53) ($p < .001$). There was no clustering difference between friend and ad hoc groups, $p = .115$. Although this is regarded as an evidence towards a disrupted organization (Basden et. al., 1998), the fact that the difference was found both in friend and ad hoc groups brings out the question as to why collaborative inhibition is found only among friend groups.

Independent samples t-test is conducted on the total number of words recalled by members of high/low cohesive groups. The results did not reach significance, t (43) = 1.10, $p = .276$ (eta square = .03). However, the observed power was small (.191) to draw strong conclusions.

Recall of Nonpresented Words Among Groups

Next, a one-way between subjects ANOVA was performed on the number of nonpresented words recalled among group members. It was hypothesized that members of friend groups will recall higher number of nonpresented words as compared to ad hoc and nominal group members. Since the underlying motivation of this analysis is to see whether categorical intrusions exist differently among members of three groups, the false recall of participants were counted only if these recalled words were among the nonpresented words on the recognition list. There was no effect of group, $F < 1$ (eta square = .004). However, the observed power was too small (.092) to draw strong conclusions.

In order to see whether this insignificance resulted from coding only the nonpresented words from the recognition list, the same analysis was performed on overall intrusions (i.e. nonpresented words from the recognition list as well as extralist

intrusions). The ANOVA remained nonsignificant, $F < 1$ (eta square = .003). The observed power was again too small (.074) to draw strong conclusions. Similarly, for the high/low cohesive group differences in terms of overall intrusions, results were not significant, t (43) = 0.37, p = .715 (eta square = .003) and the power was small (.065).

Recognition

Recognition was scored by adding the number *yes* responses to presented words, critical distractors and noncritical distractors and dividing the sums by the total number of words in these categories and multiplying the number by 100 in order to compare the scores effectively.

The proportion of positive recognition responses for presented words and critical and noncritical distractors among friend, ad hoc and nominal groups can be seen in Table 2.

Table 2

Proportion of Positive Responses for Presented Words, Critical and Noncritical Distractors Among Groups

	Groups		
	Friends	Ad hoc	Nominal
Presented	74.5	80.6	71.7
Critical Dist.	27.2	26.3	21.5
Noncritical Dist.	14.1	13.5	12.5

Differences in False Alarm and Miss Ratings among Groups

To look at whether the words incorrectly judged to be seen in the first phase of the experiment (i.e. false alarms) differed across groups, a one-way between subjects

ANOVA was performed. The dependent variable was the total number of false alarms for critical distractors, while the independent variable was type of group: friend, ad hoc and nominal. It was hypothesized that members of friend groups will incorrectly judge critical and noncritical distractors as seen in the first phase of the experiment (i.e. will give false alarms) more than members of ad hoc and nominal groups. The ANOVA was not significant, $F(2,126) = 1.39$, $p = .253$ (eta square = .02). When the dependent variable was changed to the total number of false alarms for noncritical distractors, the results remained nonsignificant, $F < 1$. The results were close to significance for the differences among high/low cohesive groups in terms of the number of overall false alarms, $t(43) = 1.75$, $p = .088$ (eta square = .07) such that high cohesive group members gave more false alarms compared to low cohesive group members (observed power = .400).

The same analysis was conducted for the words incorrectly judged not to be seen in the first phase of the experiment (i.e. misses) among friend, ad hoc and nominal groups. It was hypothesized that members of nominal groups will incorrectly judge presented words as not seen in the first phase of the experiment (i.e. will miss) more than members of friend and ad hoc groups. Results partially confirmed this hypothesis, $F(2,126) = 4.83$, $p = .010$ (eta square = .07). Tukey's HSD tests revealed that there was a significant difference between ad hoc and nominal groups such that, *misses* were higher for nominal groups ($\underline{M} = 8.33$, $\underline{SD} = 4.35$) than for ad hoc groups ($\underline{M} = 5.67$, $\underline{SD} = 3.62$), $p = .006$. There was no difference between friend ($\underline{M} = 7.24$, $\underline{SD} = 3.86$) and nominal groups, $p = .405$ or friend and ad hoc groups, $p = .151$. After seeing that nominal group members, who did not engage in collaborative recall, *missed* the presented words more than the members of other two groups, it becomes evident that collaborative recall had a

beneficial effect on overall recognition of presented words (Basden et al., 1998).

Remember/Know Judgments

The means and standard deviations of presented words, critical distractors and noncritical distractors to remember/know recognition judgments by members of friend, ad hoc and nominal groups can be seen in Table 3.

Table 3

Means and Standard Deviations of R/K Judgments by Members of Three Groups for Presented Words, Critical Distractors and Noncritical Distractors

Presented Words	Groups					
	Friends		Ad hoc		Nominal	
	M	SD	M	SD	M	SD
Remember	11.69	6.44	14.74	7.46	14.31	5.40
Know	10.69	4.98	9.45	6.20	7.22	4.69

Critical Distractors	Groups					
	Friends		Ad hoc		Nominal	
	M	SD	M	SD	M	SD
Remember	2.02	2.44	2.45	2.86	1.88	1.74
Know	5.97	3.95	5.45	4.64	4.52	3.80

Noncritical Distractors	Groups					
	Friends		Ad hoc		Nominal	
	M	SD	M	SD	M	SD
Remember	2.07	3.24	2.29	3.02	1.90	2.13
Know	6.38	5.52	5.80	5.74	5.62	5.69

Remember/Know Judgments to Presented Words among Groups

A 3 (type of group) X 2 (type of response Remember/Know) mixed model ANOVA was performed on recognition judgments to presented words. There was a

main effect of group, F (2, 126) = 4.61, p = .012 and a main effect of type of response, F (2,126) = 20.66, p < .001. This main effect indicated that remember judgments were given more frequently than know judgments for presented words. The interaction between group and type of response was also significant, F (2,126) = 3.459, p = .034 (eta square = .05). Simple tests revealed that, although friend groups gave more remember judgments than know judgments, their know judgments were significantly more than the know judgments of ad hoc and nominal groups whereas their remember judgments were less than the remember judgments of ad hoc and nominal group members. These results highlight the fact that members of friend groups make less of a distinction between what they saw and did not see in the first phase of the experiment.

Remember/Know Judgments to Critical Distractors among Groups

Another 3 (type of group) X 2 (type of response) mixed model ANOVA was conducted on critical distractors. Our hypothesis stated that, members of friend groups will accompany their false alarms to critical distractors more with remember judgments than know judgments compared to members of ad hoc and nominal groups. There was no main effect of group, F (2,126) = 1.40, p = .251. However, the main effect of type of response was significant, F (2,126) = 61.66, p < .001 indicating that for all of the three groups, know judgments were given more than remember judgments for the critical distractors when participants claimed that they had seen the word in the first phase of the experiment. The interaction between type of group and type of response was not significant, F < 1 (eta square = .02). The hypothesis about friend groups giving more remember judgments to critical distractors than other two groups were not supported.

Remember/Know Judgments to Noncritical Distractors among Groups

When the same analysis was performed on noncritical distractors, the findings were similar to the ones found for critical distractors such that there was no main effect of group, $F < 1$ and a significant main effect of type of response, $F\ (2, 126) = 50.17, p < .001$. Members of all three groups gave more know judgments than remember judgments to noncritical distractors. There was no interaction between type of group and type of response, $F < 1$ (eta square = .003). Together with the findings on critical distractors, the finding that know judgments are given more often to false alarms than remember judgments is an indicator that the same level of internalization was not attained for false responses (see Roediger et al., 2001 for a brief discussion).

Confidence Ratings

The confidence ratings are evaluated in terms of whether they are given to remember or to know judgments. The confidence ratings of participants to these two types of judgments were summed and divided by the number of R/K judgments for presented, critical and noncritical words separately. Figures 1, 2 and 3 represent these average confidence ratings for presented words, critical distractors and noncritical distractors respectively.

Confidence Ratings for Presented Words among Groups

In order to see whether confidence ratings to presented words differed among the three groups, a 3 (type of group) X 2 (type of response) mixed model ANOVA was performed on the average confidence ratings for presented words. There was a main effect of type of CR response, $F\ (2,123) = 162.08, p < .001$ (eta square = .57) such that

confidence ratings given to remember judgments were higher than confidence ratings given to know judgments. The group main effect was not significant, F (2,123) = 2.486, p =. 087 and there was an interaction effect between confidence ratings to remember/know judgments and type of group, F (2,123) = 5.861, p = .004 (eta square = .09). Simple tests showed that although all groups gave higher confidence ratings to remember judgments than to know judgments, members of friend groups gave higher confidence ratings to know judgments than nominal groups.

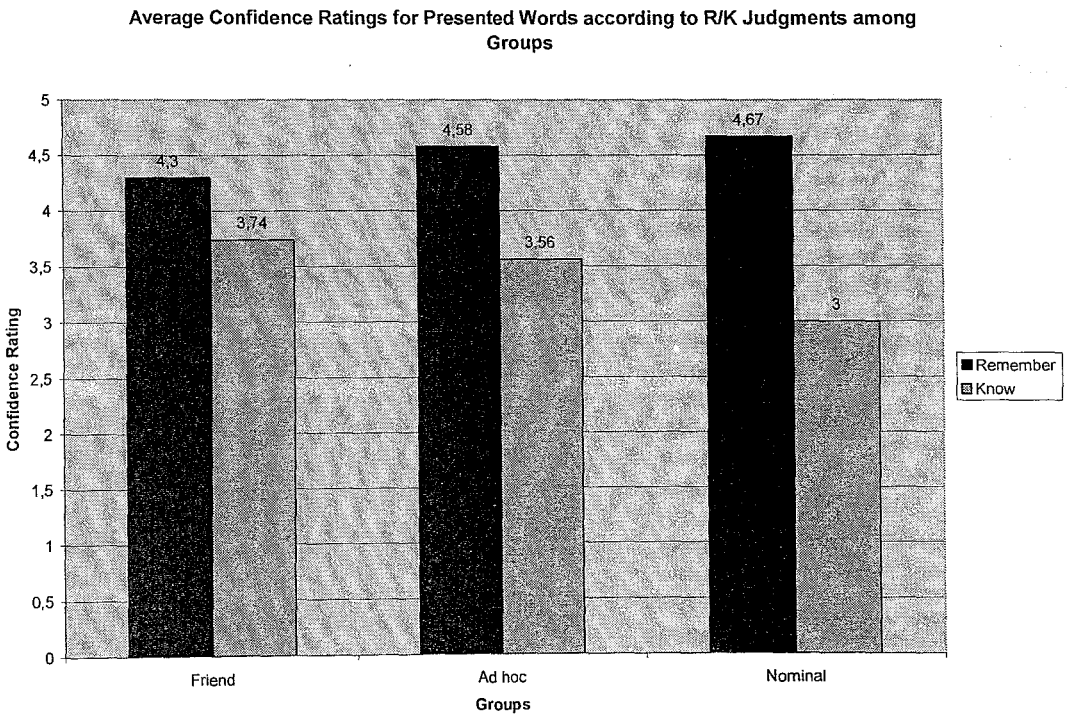

Figure 1: Average Confidence Ratings for Presented Words according to R/K Judgments among Groups.

Together with the findings on R/K judgments to presented words, one can conclude that members of friend groups not only gave more know judgments to presented words than members of the other two groups, but they also gave higher confidence ratings to these know judgments. Their failure to make clear distinctions

between what they saw and did not see in the first phase of the experiment, might be the result of the intrusion of nonpresented words to memory. In other words, they may be more distracted by the recall of nonpresented words in the collaborative recall phase as compared to ad hoc group members and this distraction might have led to the blurred R/K judgments. After seeing a presented word, members of friend groups seem to question whether the word was actually presented or not and this suspicion brings with it know instead of remember judgments and higher confidence ratings to know judgments than other two groups.

Confidence Ratings for Critical Distractors among Groups

A 3 (type of group) X 2 (type of response) mixed two way ANOVA was performed on confidence ratings for critical distractors. It was hypothesized that members of friend groups will give higher confidence ratings to their R/K judgments to critical and noncritical distractors compared to ad hoc and nominal groups. The main effect of group was not significant, $F < 1$. However, there was a main effect of type of response, $F(2,77) = 49.24$, $p < .001$ (eta square = .39), such that confidence ratings to remember judgments were significantly higher than confidence ratings of know judgments. There was no interaction effect, $F(2, 77) = 1.46$, $p = .238$ (eta square = .04).

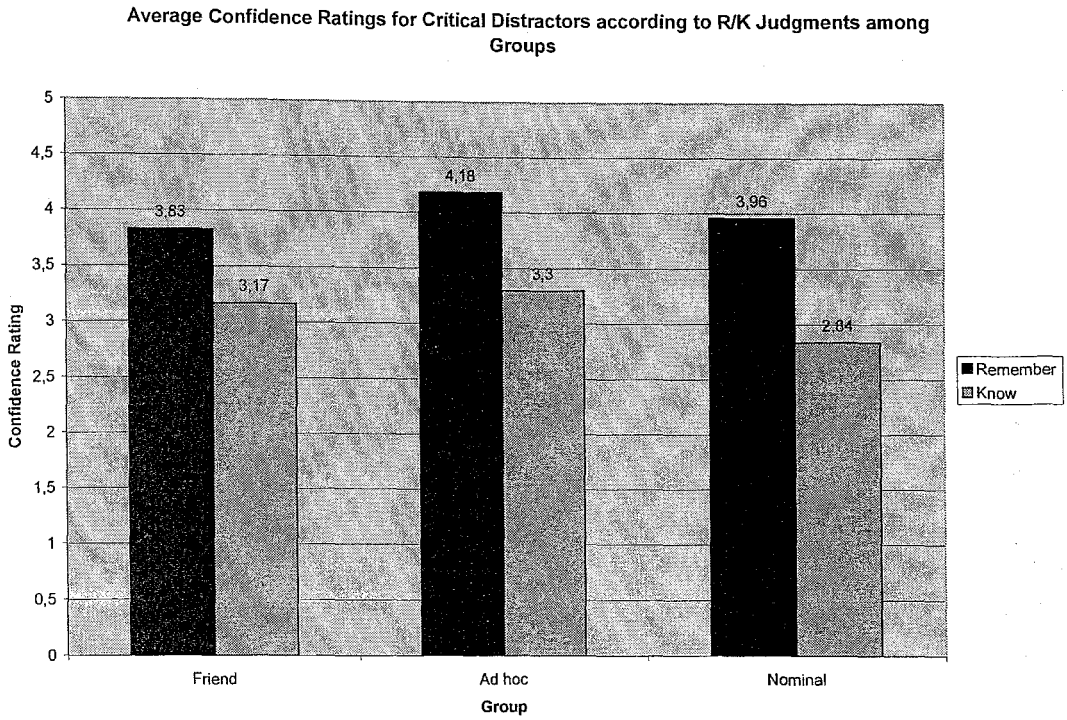

Figure 2: Average Confidence Ratings for Critical Distractors according to R/K Judgments among Groups.

Confidence Ratings for Noncritical Distractors among Groups

Finally, the same 3 (type of group) X 2 (type of response) mixed two way ANOVA was conducted on confidence ratings for noncritical distractors. The main effect of group was not significant, $F(2, 70) = 2.09$, $p = .132$. Again, the main effect of type of response remained significant, $F(2, 70) = 30.24$, $p < .001$ (eta square = .30). There was no interaction effect, $F < 1$ (eta square = .02).

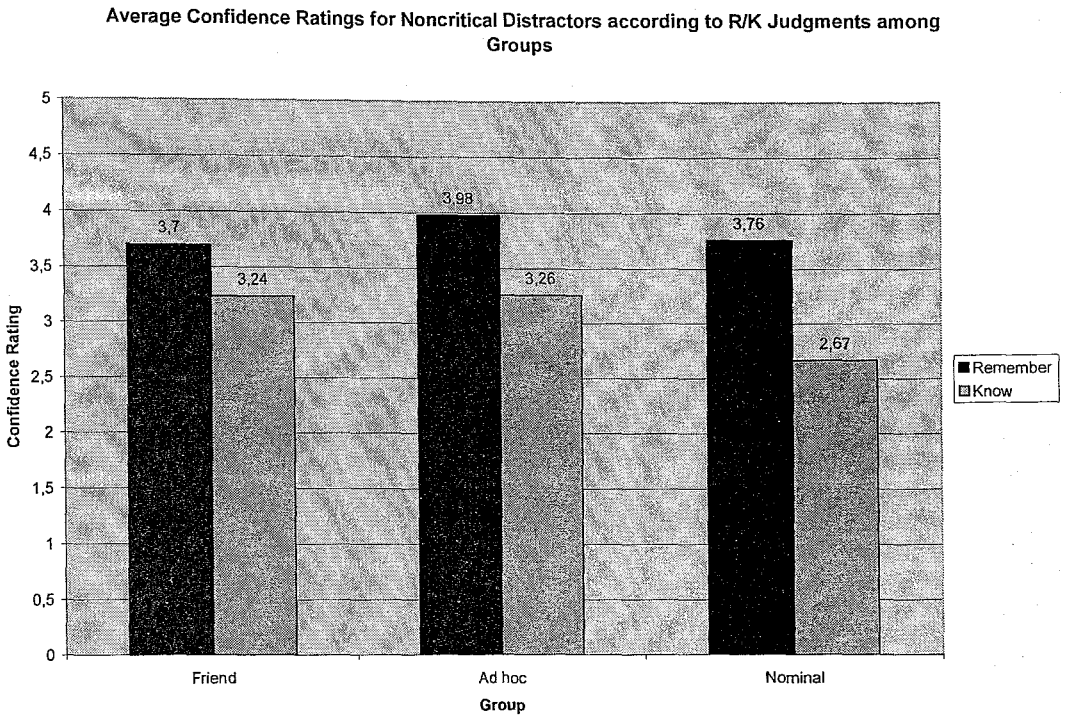

Figure 3: Average Confidence Ratings for Noncritical Distractors according to R/K Judgments among Groups.

Social Contagion

In this study, social contagion was examined by counting the number of distractors, which participants argued that they had seen in the first phase of the experiment, but were in fact generated by other members of the group in the second phase. Since members of friend and ad hoc groups were subject to collaborative recall, it is highly likely that they might be influenced by the responses of other subjects. In order to see whether these influences actually exist, the responses of nominal groups are taken into account as a control group. Although these participants did not actually recall the studied words collaboratively, when coding the responses it is assumed as if they did. It was hypothesized that members of friend groups will claim that they have seen the word in the first phase of the experiment, when in fact the words is generated by the other

group member in the collaborative recall phase (i.e. will be subject to social contagion) more than members of ad hoc and nominal group members. A one-way ANOVA was conducted on social contagion judgments among groups. After removing 5 outliers using Cook's distance, the relationship between type of group and social contagion was found to be significant, F (2,123) = 4.771, p = .010 (eta square = .08). Dunnett's T3 tests revealed that social contagion was evident among members of friend groups ($\underline{M}$ = 1.16, $\underline{SD}$ = 1.13) since they had higher social contagion ratings than nominal group members ($\underline{M}$ = 0.48, $\underline{SD}$ = 0.89), p = .007. Social contagion ratings of ad hoc group members ($\underline{M}$ = 0.92, $\underline{SD}$ = 1.08) was not significantly higher than nominal group members, p = .138. Although there was no difference between friend and ad hoc group members in terms of social contagion ratings, (p = .704), the significance of friend-nominal difference as compared to the nonsignificance of ad hoc-nominal difference might be regarded as evidence towards the fact that social contagion occurs more in friend groups.

Similarly, an independent samples t-test is conducted to evaluate the hypothesis that the amount of social contagion will be higher for high-cohesive groups than for low-cohesive groups. The test was not significant, t (43) < 1 (eta square = .005). However, the observed power was too small (.072) to draw strong conclusions.

Finally, bearing in mind the underlying assumption of Seashore (1954; as cited in Craig & Kelly, 1999) that within group variability in cohesive groups is less than that of noncohesive groups, we performed an individual samples t-test on standard deviations of friend and ad hoc groups in terms of their individual recalls in the collaborative recall phase and found a significant within group variability difference, t (27) = 3.83, p = .023 (eta square = .18). The within group variability, which was smaller in friend groups indicated that friend group members worked in accordance with one another, and

whether a friend group member recalled more or less than the member of another group was largely determined by the performance of other two members of the friend group.

Discussion and Conclusions

The primary aim of the present study was to test the relationship between group cohesiveness and group memory. It was hypothesized that friend groups, which consist of members who are cohesive to one another, will create more false memories and will show lower collaborative inhibition compared to ad hoc groups. Moreover, it was hypothesized that among friend groups, high-cohesive ones will create more false memories and will show lower collaborative inhibition compared to low-cohesive groups. Some of the analyses did not support these hypotheses and there were also contradictory findings. In terms of collaborative inhibition findings, the results were the opposite of what was expected, such that friend groups showed collaborative inhibition while ad hoc groups did not.

Before explaining the possible factors that might have led to these findings, it is important to point out one thing about our scale. As mentioned before, the scores in Friend Group Cohesiveness Scale were generally very high and although groups were divided into low and high cohesive ones, the results actually represented that there were only high and not-so-high cohesive groups. In line with this, some of the analysis conducted on comparing low and high-cohesive groups led to insignificant results, while others are not conducted since similar analysis performed among friend, ad hoc and nominal groups did not show a promising pattern.

Since the cohesiveness of friend groups were found to be very high, one could expect to see differences between friend and ad hoc groups even more so when comparing false memories and collaborative inhibition. However, the results did not support this prediction. In terms of collaborative inhibition, it was found that friend groups showed collaborative inhibition while ad hoc groups did not. To see whether this

occurs as a result of higher number of category shifts in friend groups, number of category shifts were compared among three groups. The finding that the total number of category shifts were similar for friend and ad hoc groups eliminated this explanation. Next, Seashore's (1954; as cited in Craig & Kelly, 1999) argument that cohesive groups will act in a more uniform way compared to noncohesive groups was tested and within group variability differences supported this argument. This finding also shed partial light on the cohesiveness-performance relationship by underlining that, without the inclusion of moderating variables, such as group goal acceptance, task interdependence and task complexity, one cannot argue that cohesiveness always leads to productivity. Karau and Hart (1998) argued that an individual will be willing to work hard on a collective task, provided that he expects his efforts to be useful by leading to outcomes that he personally values. It is highly likely that some of the members of our friend groups neither believed in the usefulness of their efforts nor thought that the results would lead to valued outcomes. Together with Seashore's predictions, it is evident that some of the friend groups in our study had high performance goals and acted uniformly and produced more words, whereas others did not have any performance goals and acted uniformly and produced less words.

Although it was hypothesized that friend group members will recall higher number of nonpresented words and will show higher number of false alarms as compared to ad hoc and nominal group members, the results did not support these predictions. There are two arguments, which can be made regarding these unexpected findings.

The first argument is concerned with the experiment material and task at hand. As mentioned earlier, the material that is used in this study is categorical words from six

categories including names of jobs, instruments, four-legged animals, body parts, sports and house wares. These words were expected to be neutral for emotionality and were chosen in order to show that, even with emotionally neutral words such as these, the dynamics of social influence will work differently among people who know each other compared to people who do not. However, it seems as if this is not the case. In their article about the motivational effects in reconstructive memory, McDonald and Hirt (1997), argue that an individual changes the information in memory to make it more consistent with his desires. Similarly, Vorauer and Ross (1993; as cited in Mc Donald & Hirt, 1997) claim that the current motives and beliefs of a person may cause him to distort his memories in line with these motives and beliefs. In our study, even though high cohesive friend groups existed, there was no motivation factor, which can cause them to alter their original memories. If instead of using neutral words, stories concerning the successes or failures of another group had been used, the motivation factor would be more evident. In this case, cohesive friend groups might have been able to produce greater false memories in line with their expectancies and desires.

Another possible factor, which might have led to the inconclusive findings is the use of friend groups instead of a social group such as a supporters of a political party or a football team. As Hogg and Hains (1996) mention, there is the danger of viewing cohesiveness in interpersonal terms instead of group terms when dealing with friend groups. In other words, the groupthink that is evident in supporters of a political party might be missing among friends, since they might be more open to discussions, have less desire for consensus and pressure one another less for conformity (Hogg & Hains, 1996). In line with this, perhaps it is the lack of this depersonalized social attraction that caused friend group members to have less motivation to participate and be influenced by

other members of the group to a smaller degree.

In spite of these possible problems, when we look at the findings on social contagion, we see that they are quite in line with our expectations. After comparing the social contagion findings of friend and ad hoc groups to that of nominal groups, it was found that friend groups engaged in social contagion, while for ad hoc groups the results did not reach significance. Despite the possible problems regarding the neutrality of our material, the lack of task commitment or goal acceptance of friend groups and the possible lack of groupthink among friends, the fact that members of friend groups are influenced from one another while ad hoc members are not, is an indicator of how effective social influence can be among people who know each other. Although the materials did not have a special importance and the other members were not experts in this domain, friend group members seem to take for granted the mistakes of others in their group and accept these mistakes as actual truths.

Moreover, the fact that friend group members gave more know judgments to presented words than ad hoc and nominal group members and they accompanied these judgments with higher confidence ratings than members of two other groups is an indicator that friend groups were less able to make clear distinctions between what they saw and did not see in the first phase of the experiment. In fact, the recall of nonpresented words by other group members in the collaborative recall phase might have caused friend group members to be more questioning about whether they actually saw the word or not, leading to more know judgments. In other words, although critical distractors did not have a direct effect on friend groups, it affected their memories by blurring the differences between seen and unseen words. This is important in the sense that, together with the social contagion results, it shows that just by being a member of a

familiar group, not only is an individual led to believe that he recognizes words not actually presented, but the actual memories become blurred, making him unnecessarily judge their truth value.

Moreover, the differences between ad hoc and friend groups in terms of collaborative inhibition, social contagion, R/K judgments, confidence ratings and within group variabilities support one of the main purposes of this study, which is the fact that ad hoc groups dominating the psychology literature today might hinder the actual dynamics of group memory.

The present study shows that people who know one another can be influenced by the mistakes of others in their group and accept these mistakes as actual truths even though these people are not regarded as experts or the topic is not relevant to the group. In real world, members of social groups act with their biases towards outgroup members. If this bias is also taken into account, it is without doubt that the effects of social contagion would be even higher. Therefore, it is suggested that for future studies, materials highlighting the ingroup-outgroup differences should be used in order to see the magnitude of the social contagion effect.

References

Anderson, M. C., Bjork, R. A., & Bjork, E. L. (1994). Remembering can cause forgetting: Retrieval dynamics in long-term memory. *Journal of Experimental Psychology: Learning, Memory and Cognition, 20,* 1063-1087.

Andersson, J. & Rönnberg, J. (1995). Recall suffers from collaboration: Joint recall effects of friendship and task complexity. *Applied Cognitive Psychology, 9,* 199-211.

Andersson, J. & Rönnberg, J. (1996). Collaboration and memory: Effects of dyadic retrieval on different memory tasks. *Applied Cognitive Psychology, 10,* 171-181.

Andersson, J. & Rönnberg, J. (1997). Cued memory collaboration: Effects of friendship and type of retrieval cue. *European Journal of Cognitive Psychology, 9 (3),* 273-287.

Bangerter, A., vonCranach, M., & Arn, C. (1997). Collective remembering in the communicative regulation of group action: A functional approach. *Journal of Language and Social Psychology, 16 (4),* 365-388.

Bartlett, F. C. (1932). *Remembering.* Cambridge: Cambridge University Press.

Basden, D. R. & Basden, B. H.. (1995). Some tests of the strategy disruption interpretation of part-list cuing inhibition. *Journal of Experimental Psychology: Learning, Memory and Cognition, 21 (6),* 1656-1669.

Basden, B. H., Basden, D. R., Bryner, S., Thomas III, R. L. (1997). A comparison of group and individual remembering: Does collaboration disrupt retrieval strategies? *Journal of Experimental Psychology: Learning, Memory, and Cognition, 23 (5),* 1176-1189.

Basden, B. H., Basden, D. R., & Henry, S. (2000). Costs and benefits of collaborative

remembering. *Applied Cognitive Psychology, 14,* 497-507.

Basden, B. H., Basden, D. R., & Stephens, J. P. (2002). Part-set cuing of order information in recall tests. *Journal of Memory and Language, 47, 517-529.*

Basden, B. H., Basden, D. R., Thomas III, R. L., & Souphasith, S. (1998). Memory distortion in group recall. *Current Psychology, 16 (3/4),* 225-246.

Basden, B. H., Reysen, M. B., & Basden, D. R. (2002). Transmitting false memories in social groups. *American Journal of Psychology, 115 (2),* 211-231.

Baumeister, R. F. & Hastings, S. (1997). Distortions of collective memory: How groups flatter and deceive themselves. In J. W. Pennebaker & D. Paez (eds.) *Collective Memory of Political Events: Social Psychological Perspectives.* Hillsdale, England: Lawrence Erlbaum.

Bergman, E. T. & Roediger III, H. L. (1999). Can Bartlett's repeated reproduction experiments be replicated? *Memory & Cognition, 27 (6),* 937-947.

Cartwright, D. (1968). The nature of group cohesiveness. In D. Cartwright & A. Zander (eds.) *Group Dynamics.* New York: Harper & Row.

Cota, A. A., Evans, C. R., Dion, K. L., & Longman, R. S. (1995). The structure of group cohesion. *Personality and Social Psychology Bulletin, 21 (6),* 572-580.

Connerton, P. (1989). *How Societies Remember.* Cambridge, UK: Cambridge University Press.

Craig, T. Y. & Kelly, J. R. (1999). Group cohesiveness and creative performance. *Group Dynamics: Theory, Research and Practice, 3 (4),* 243-256.

Demiroğlu, E. S. (2002). *False memory in bilinguals.* Unpublished master's thesis, Bogazici University, Turkey.

Fentress, J. & Wickham, C. (1992). *Social Memory.* Oxford, UK; Cambridge, Mass.:

Blackwell.

Festinger, L. (1950/1968). Informal social communication. In D. Cartwright & A. Zander (eds.) *Group Dynamics.* New York: Harper & Row.

Fişek, G. & Peker, M. (2005). Arkadaş Grubu Bağlılık (Kohezyon) Ölçeği. Unpublished manuscript, Boğaziçi University.

Gully, S. M., Devine, D. J., & Whitney, D. J. (1995). A meta-analysis of cohesion and performance: Effects of level of analysis and task interdependence. *Small Group Research, 26,* 497-520.

Halbwachs, M. (1950/1992). *On Collective Memory.* Chicago: The University of Chicago Press.

Hogg, M. A. (1992). *The Social Psychology of Group Cohesiveness: From Attraction to Social Identity.* London: Harvester Wheatsheaf.

Hogg, M. A. (2001). Social categorization, depersonalization, and group behavior. In M. A. Hogg & S. Tindale (eds.). *Blackwell Handbook of Social Psychology: Group Processes.* Oxford: Blackwell.

Hogg, M. A. & Hains, S. C. (1996). Intergroup relations and group solidarity: Effects of group identification and social beliefs on depersonalized attraction. *Journal of Personality and Social Psychology, 70,* 295-309.

Karau, S. J. & Hart, J. W. (1998). Group cohesiveness and social loafing: Effects of a social interaction manipulation on individual motivation within groups. *Group Dynamics: Theory, Research and Practice, 2 (3),* 185-191.

Karau, S. J. & Williams, K. D. (1993). Social loafing: A meta-analytic review and theoretical integration. *Journal of Personality and Social Psychology, 65,* 681-706.

Loftus, E. F. & Palmer, J. C. (1974). Reconstruction of automobile destruction: An example of the interaction between language and memory. *Journal of Experimental Psychology: Human Learning and Memory, 4,* 19-31.

McDonald, H. E. & Hirt, E. R. (1997). When expectancy meets desire: Motivational effects in reconstructive memory. *Journal of Personality and Social Psychology, 72 (1),* 5-23.

Meade, M. L. & Roediger III, H. L. (2002). Explorations in the social contagion of memory. *Memory & Cognition, 30 (7),* 995-1009.

Meudell, P. R., Hitch, G. J., & Kirby, P. (1992). Are two heads better than one? Experimental investigations of the social facilitation of memory. *Applied Cognitive Psychology, 6,* 525-543.

Middleton, D. & Edwards, D. (1990). *Collective Remembering.* London: Sage.

Mullen, B. & Copper, C. (1994). The relation between group cohesiveness and performance: An integration. *Psychological Bulletin, 115, (2),* 210-227.

Olson, D. H., Portner, J., & Lavee, Y. (1987). Family adaptability and cohesion evaluation scales III. In N. Fredman and R. Sherman (Eds.), *Handbook of measurements for marriage and family therapy* (180-185). New York: Brunner/Mazel.

Pennebaker, J. W., Paez, D., & Rimé, B. (1997). *Collective Memory of Political Events. Social Psychological Perspectives.* Hillsdale, England: Lawrence Erlbaum.

Perlmutter, H. V. (1953). Group memory of meaningful material. *Journal of Psychology, 35,* 361-370.

Peynircioğlu (1988). Türkçe Kategori Normları. *Journal of Human Science, 7 (2),* 133-185.

Podsakoff, P. M., MacKenzie, S. B., & Ahearne, M. (1997). Moderating effects of goal acceptance on the relationship between group cohesiveness and productivity. *Journal of Applied Psychology, 82 (6),* 974-983.

Prapavessis, H. & Carron, A. V. (1997). Sacrifice, cohesion, and conformity to norms in sport teams. *Group Dynamics, 1 (3),* 231-240.

Reysen, M. B. (2003). The effects of social pressure on group recall. *Memory and Cognition, 31 (8),* 1163-1168.

Roediger III, H. L., Bergman, E. T., & Meade, M. L. (2000). Repeated reproduction from memory. In A. Saito (Ed.), *Bartlett, Culture and Cognition* (pp.115-134), Cambridge: Psychology Press.

Roediger III, H. L. & McDermott, K. B. (1995). Creating false memories: Remembering words that were not presented in lists. *Journal of Experimental Psychology: Learning, Memory and Cognition, 21,* 803-814.

Roediger III, H. L., Meade, M. L., & Bergman, E. T. (2001). Social contagion of memory. *Psychonomic Bulletin and Review, 8 (2),* 365-371.

Schacter, D. L. (1997). Memory Distortion: History and Current Status. In D. Schacter (Ed.), *Memory Distortion* (pp. 1-43), Cambridge: Harvard University Press.

Schneider, D. M. & Watkins, M. J. (1996). Response conformity in recognition testing. *Psychonomic Bulletin and Review,* 3 (4): 481-485.

Stephenson, G. M. & Wagner, W. (1989). Origins of the misplaced confidence effect in collaborative recall. *Applied Cognitive Psychology, 3,* 227-236.

Tulving, E. (1985). Memory and consciousness. *Canadian Psychologist, 26,* 1-12.

Wegner, D. M., Erber, R., & Raymond, P. (1991). Transactive memory in close relationships. *Journal of Personality and Social Psychology, 61,* 923-929.

Weldon, M. S., Blair, C., & Huebsch, P. D. (2000). Group remembering: Does social loafing underlie collaborative inhibition? *Journal of Experimental Psychology: Learning, Memory and Cognition, 26 (6),* 1568-1577.

Weldon, M. S. & Bellinger, K. D. (1997). Collective memory: Collaborative and individual processes in remembering. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 23 (5),* 1160-1175.

Wright, D. B., Self, G., & Justice, C. (2000). Memory conformity: Exploring misinformation effects when presented by another person. *British Journal of Psychology, 91,* 189-202.

Appendices

APPENDIX A: PEYNİRCİOĞLU (1988) NORMLARINA GÖRE SEÇİLEN 6 KATEGORİDEKİ KELİMELERİN LİSTESİ

Kategori 1: Dört Ayaklı Hayvanlar

1- fare

2- zebra

3- eşek

4- kaplan

5- at

6- tavşan

7- kuzu

8- manda

9- leopar

10- köpek

11- öküz

12- ayı

13- sırtlan

14- keçi

15- kurt

Kategori 2: Ev Eşyaları

1- avize

2- fırın

3- buzdolabı

4- yastık

5- masa

6- lamba

7- divan

8- vazo

9- teyp

10- koltuk

11- perde

12- ayna

13- bulaşık mak.

14- radyo

15- sehpa

Kategori 3: Müzik Aletleri

1- klarnet

2- çello

3- bateri

4- flüt

5- keman

6- trombon

7- akordeon

8- darbuka

9- tef

10- piyano

11- arp

12- kemençe

13- mızıka

14- saz

15- mandolin

Kategori 4: Sporlar

1- atıcılık

2- karate

3- güreş

4- yüzme

5- tenis

6- judo

7- su topu

8- yelken

9- okçuluk

10- basketbol

11- koşu

12- ping pong

13- beyzbol

14- hentbol

15- jimnastik

Kategori 5: Vücut Kısımları

1- omuz

2- yüz

3- gövde

4- kol

5- baş

6- diz

7- kalça

8- baldır

9- kalp

10- ayak

11- kafa

12- dirsek

13- kaş

14- göz

15- boyun

Kategori 6: Meslekler

1- eczacı

2- sekreter

3- dişçi

4- öğretmen

5- tüccar

6- hakim

7- çöpçü

8- kasap

9- çiftçi

10- doktor

11- bakkal

12- sosyolog

13- berber

14- memur

15- marangoz

APPENDIX B: ARKADAŞ GRUBU BAĞLILIK (KOHEZYON) ÖLÇEĞİ (FİŞEK & PEKER, 2005)

Aşağıdaki soruları şu anda içinde bulunduğunuz arkadaş grubunu düşünerek cevaplayınız.

Neredeyse Hiçbir Zaman 1 2 3 4 5 Neredeyse Her Zaman

1- Eğer başka bir gruba geçmem mümkün olsaydı, geçerdim. 1 2 3 4 5

2- Bildiğim diğer gruplara kıyasla, benim arkadaş grubum birçoğundan daha iyidir. 1 2 3 4 5

3- Arkadaş grubumda boş zamanlarımızı birlikte geçirmekten hoşlanırız. 1 2 3 4 5

4- Yokluğumun grubum tarafından önemsenmeyeceğini hissediyorum. 1 2 3 4 5

5- Arkadaş grubumda neler olduğu umrumda değil. 1 2 3 4 5

6- Arkadaş grubumda kararlarımızı birbirimize danışmayız. 1 2 3 4 5

7- Arkadaş grubumda olan bitene çok karışmam. 1 2 3 4 5

8- Arkadaş grubumda beraber yapılacak birçok şeyi kolaylıkla yürütebiliriz. 1 2 3 4 5

9- Arkadaş grubumun bir üyesi olarak kalmayı isterim. 1 2 3 4 5

10- Arkadaş grubumda herkes birbirinden yardım ister. 1 2 3 4 5

11- Arkadaş grubumdan çok memnun değilim. 1 2 3 4 5

12- Kendimi içinde bulunduğum arkadaş grubuna ait hissediyorum. 1 2 3 4 5

13- Kişisel farklılıklara rağmen, grubumda bir birlik hissi vardır. 1 2 3 4 5

14- Arkadaş grubumda grubun dışındakilere kıyasla birbirimize daha yakın hissederiz. 1 2 3 4 5

15- Kendimi grubun aktivitelerine dahil hissetmiyorum. 1 2 3 4 5

16- Arkadaş grubumda grup olarak bütünlük bizim için çok önemli değildir. 1 2 3 4 5

17- Arkadaşlarımla birgün buluşamasam, kendimi kötü hissederdim. 1 2 3 4 5

18- Şu anda içinde bulunduğum arkadaş grubunun kalıcı olması benim için önemlidir. 1 2 3 4 5

19- Arkadaş grubumda birbirimize çok yakın hissetmeyiz. 1 2 3 4 5

APPENDIX C: HATIRLIYORUM/BİLİYORUM YARGILARI YÖNERGESİ

Deneyin bu son aşamasında, başka bir kelime hatırlama testi alacaksınız. Bu aşamada size üzerinde Türkçe kelimeler olan üç sayfa verilecektir. Her bir kelimeyi dikkatle okuyun. Sizden bu kelimelerin deneyin ilk aşamasında gördüğünüz kelimeler arasında olup olmadığına karar vermeniz istenmektedir. Eğer o kelimenin gördüğünüz kelime listesi içinde olduğunu düşünüyorsanız, kelimenin yanında bulunan evet/hayır bölümündeki evet kısmına çarpı işareti koyun. Bunun ardından evet yargısında bulunduğunuz kelimelerin herbiri için "hatırlıyorum" veya "biliyorum" yargısı yapmanız istenmektedir. "Hatırlıyorum" yargısı, söz konusu kelimeyi listede gördüğünüz anı hatırladığınızın göstergesidir. Buna ek olarak o kelimeyi görürken, kelimeyle ilgili olarak yaşadığınız bazı ayrıntıları da hatırladığınızın da göstergesidir. Mesela, o kelimenin listedeki yeri, hangi kelimeden önce veya sonra geldiği, o kelimenin aklınıza getirmiş olduğu bir olayı veya bir düşünceyi veya bir duyguyu hatırlamanız "hatırlıyorum" yargısına verilecek örnekler olabilir. "Biliyorum" yargısı ise "kelimeyle ilgili bir şey hatırlamıyorum ama gördüğümden eminim" anlamına gelmektedir. Diğer bir anlatışla, kelimeyi gördüğünüz anla ilgili bir ayrıntı hatırlamadığınız fakat kelimeyi listede gördüğünüzden emin olduğunuz zamanlarda "biliyorum" yargısını kullanmalısınız. Bu tanımlara dayanarak, eğer siz kelimeyi gördüğünüz anı veya kelimelerle ilgili üstte verilen detayları hatırlıyorsanız "hatırlıyorum" yargısı yapıp o kelimenin yanındaki "hatırlıyorum" bölümünü işaretlemelisiniz. Eğer kelimeyi gördüğünüz anı veya o kelime ile ilgili bir detayı hatırlamıyor fakat kelimeyi listede gördüğünüzden eminseniz, "biliyorum" yargısı yapıp, o kelimenin yanındaki "biliyorum" bölümünü işaretlemelisiniz. "Hatırlıyorum" ve "biliyorum" yargıları, kelimenin gördüğünüz

listede olup olmadığına karar verdikten hemen sonra yapılmalıdır. Deneyin başında size gösterilen listede olmadığını düşündüğünüz kelimeler için kelimelerin yanında bulunan evet/hayır bölümündeki hayır kısmına çarpı işareti koymanız yeterlidir. Bu kelimelerle ilgili hatırlıyorum/biliyorum yargısında bulunmamalısınız. Son olarak, kelimelerin yanlarındaki 1den 5e kadar olan ölçeğe "hatırlıyorum/biliyorum" yargınızdan ne kadar emin olduğunuzu belirten rakamı işaretleyiniz (1- hiç emin değilim, 5- çok eminim).

Örnek:

					1	2	3	4	5
	Evet	Hayır	Hatırlıyorum	Biliyorum					
ağaç	x		x					x	

(Ağaç deneyin ilk kısmındaki listede vardı. Ağacı deneyin ilk kısmındaki listede gördüğümü hatırlıyorum ve bu durumdan eminim.)

					1	2	3	4	5
	Evet	Hayır	Hatırlıyorum	Biliyorum					
kova		x							

(Kova deneyin ilk kısmındaki listede yoktu.)

APPENDIX D: RECOGNITION SHEETS (TURKISH)

					1- hiç emin değilim / 5- kesinlikle eminim				
					1	2	3	4	5
	Evet	Hayır	Hatırlıyorum	Biliyorum					
göğüs									
omuz									
karın									
diz									
burun									
bacak									
saç									
gövde									
kol									
el									
sırt									
boyun									
kulak									
ağız									
bilek									
mide									
bel									
dil									
parmak									
tırnak									

					1- hiç emin değilim / 5- kesinlikle eminim				
					1	2	3	4	5
	Evet	Hayır	Hatırlıyorum	Biliyorum					
işletmeci									
eczacı									
ekonomist									
hakim									
mimar									
mühendis									
subay									
dişçi									
öğretmen									
avukat									
terzi									
marangoz									
iş adamı									
şoför									
hemşire									
asker									
psikolog									
gazeteci									
işçi									
manav									

					1- hiç emin değilim / 5- kesinlikle eminim				
					1	2	3	4	5
	Evet	Hayır	Hatırlıyorum	Biliyorum					
zürafa									
fare									
tilki									
tavşan									
koyun									
kedi									
maymun									
eşek									
kaplan									
inek									
katır									
kurt									
geyik									
deve									
domuz									
panter									
fil									
gergedan									
aslan									
boğa									

					1- hiç emin değilim / 5- kesinlikle eminim				
					1	2	3	4	5
	Evet	Hayır	Hatırlıyorum	Biliyorum					
kanepe									
avize									
iskemle									
lamba									
dolap									
televizyon									
ütü									
buzdolabı									
yastık									
sandalye									
abajur									
sehpa									
gardrop									
video									
büfe									
tablo									
çamaşır mak.									
karyola									
halı									
müzik seti									

					1- hiç emin değilim / 5- kesinlikle eminim				
					1	2	3	4	5
	Evet	Hayır	Hatırlıyorum	Biliyorum					
viyolonsel									
klarnet									
zurna									
trombon									
saksafon									
gitar									
ney									
bateri									
flüt									
davul									
kontrbas									
mandolin									
kanun									
viyola									
ud									
kaval									
trompet									
zil									
org									
obua									

					1- hiç emin değilim / 5- kesinlikle eminim				
					1	2	3	4	5
	Evet	Hayır	Hatırlıyorum	Biliyorum					
eskrim									
atıcılık									
dağcılık									
judo									
boks									
futbol									
bisiklet									
güreş									
yüzme									
voleybol									
binicilik									
jimnastik									
hokey									
tekvando									
halter									
yüksek atlama									
kayak									
cirit									
atletizm									
kürek									

APPENDIX D: CATEGORICALWORD LISTS FROM SIX CATEGORIES ACCORDING TO PEYNİRCİOĞLU (1988) NORMS

Category 1: Four-legged Animals

1- mouse

2- zebra

3- donkey

4- tiger

5- horse

6- rabbit

7- lamb

8- water buffalo

9- leopard

10- dog

11- ox

12- bear

13- hyena

14- goat

15- wolf

Category 2: House Wares

1- chandelier

2- oven

3- refrigerator

4- pillow

5- table

6- lamp

7- sofa

8- vase

9- tape

10- armchair

11- curtain

12- mirror

13- dishwasher

14- radio

15- coffee table

Category 3: Musical Instruments

1- clarinet

2- cello

3- drum set

4- flute

5- violin

6- trombone

7- accordion

8- darbuka*

9- tambourine

10- piano

11- arp

12- kemençe*

13- harmonica

14- saz*

15- mandolin

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* Turkish musical instruments

Category 4: Sports

1-marksmanship

2- karate

3- wrestling

4- swimming

5- tennis

6- judo

7- water polo

8- sailing

9- archery

10- basketball

11- running

12- ping pong

13- baseball

14- handball

15- gymnastics

Category 5: Body Parts

1- shoulder

2- face

3- body

4- arm

5- head*

6- knee

7- hip

8- thigh

9- heart

10- foot

11- head*

12- dirsek

13- eyebrow

14- eye

15- neck

Category 6: Jobs

1- pharmacist

2- secretary

3- dentist

4- teacher

5- merchant

6- judge

7- garbage man

8- butcher

9- farmer

10- doctor

11- grocer

12- sociologist

13- barber

14- civil cervant

15- carpenter

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* In Turkish, two different words are used for head with a slight difference in meaning.

APPENDIX F: FRIEND GROUP COHESIVENESS SCALE (FİŞEK & PEKER, 2005)

Please answer the following questions by considering your current friend group.

Almost Never 1 2 3 4 5 Almost Always

1- If it were possible to move to another group, I would.	1	2	3	4	5
2- Compared to other friend groups I know of, I feel my group is better than most.	1	2	3	4	5
3- In my friend group, we like to spend free time with each other.	1	2	3	4	5
4- I feel my absence would not matter to the group.	1	2	3	4	5
5- I don't care what happens in this group.	1	2	3	4	5
6- In my friend group, we do not consult each other on our decisions.	1	2	3	4	5
7- I do not feel involved in what is happening in my group.	1	2	3	4	5
8- We can easily think of things to do together as a friend group.	1	2	3	4	5
9- I would like to remain a member of this group.	1	2	3	4	5
10- In my friend group, we ask each other for help.	1	2	3	4	5
11- I am dissatisfied with my friend group.	1	2	3	4	5
12- I feel included in my friend group.	1	2	3	4	5
13- In spite of individual differences, a feeling of unity exists in my group.	1	2	3	4	5
14- In my friend group, we feel closer to each other than to people outside the group.	1	2	3	4	5
15- I do not feel a part of the group's activities.	1	2	3	4	5
16- In my friend group, group togetherness is not important for us.	1	2	3	4	5
17- I would feel badly if I could not meet with my friends for one day.	1	2	3	4	5
18- The stability of my friend group is important for me.	1	2	3	4	5
19- In my friend group, we do not feel close to one another.	1	2	3	4	5

APPENDIX G: RECOGNITION SHEETS

					1- not confident at all / 5- highly confident				
					1	2	3	4	5
	Yes	No	Remember	Know					
chest									
shoulder									
abdomen									
knee									
nose									
leg									
hair									
body									
Arm									
hand									
back									
neck									
ear									
mouth									
wrist									
stomach									
waist									
tongue									
finger									
nail									

					1- not confident at all / 5- highly confident				
					1	2	3	4	5
	Yes	No	Remember	Know					
administrator									
pharmacist									
economist									
judge									
architect									
engineer									
officer									
dentist									
teacher									
lawyer									
tailor									
carpenter									
business man									
driver									
nurse									
soldier									
psychologist									
journalist									
worker									
green grocer									

					1- not confident at all / 5- highly confident				
					1	2	3	4	5
	Yes	No	Remember	Know					
giraffe									
mouse									
fox									
rabbit									
sheep									
cat									
monkey									
donkey									
tiger									
cow									
mule									
wolf									
deer									
camel									
pig									
panther									
elephant									
rhinoceros									
lion									
bull									

					1- not confident at all / 5- highly confident				
					1	2	3	4	5
	Yes	No	Remember	Know					
couch									
chandelier									
stool									
lamp									
cupboard									
television									
iron									
refrigerator									
pillow									
chair									
lampshade									
coffee table									
wardrobe									
video									
buffet									
painting									
washing mach									
bedstead									
carpet									
music set									

					1- not confident at all / 5- highly confident				
					1	2	3	4	5
	Yes	No	Remember	Know					
cello									
klarinet									
zurna*									
trombone									
saxophone									
guitar									
ney*									
drum set									
flute									
drum									
bass viol									
mandolin									
kanun*									
viola									
ud*									
pipe									
trompet									
zil*									
organ									
oboe									

* Turkish musical instruments

					1- not confident at all / 5- highly confident				
					1	2	3	4	5
	Yes	No	Remember	Know					
fencing									
marksmanship									
climbing									
judo									
boxing									
football									
cycling									
wrestling									
swimming									
volleyball									
horse riding									
gymnastics									
hockey									
tae kwon do									
weight lifting									
spring									
skiing									
jeered									
athleticism									
rowing									