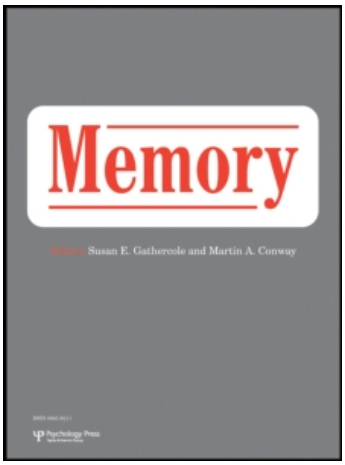

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False and veridical collaborative recognition

Craig Thorley [a]; Stephen A. Dewhurst [b]
[a] Edge Hill University, Ormskirk, UK [b] Lancaster University, UK

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False and veridical collaborative recognition

Craig Thorley
Edge Hill University, Ormskirk, UK

Stephen A. Dewhurst
Lancaster University, UK

Participants studied DRM words lists (Deese, 1959; Roediger & McDermott, 1995) and then completed a recognition test individually or in a collaborative pair, trio, or quartet. The collaborative groups' responses were compared to those of equivalent sized nominal groups. Non-studied critical lure and studied word recognition increased with group size and these increases were greatest for the collaborative groups. The collaborative groups' critical lure and studied word recognition rates were facilitated as they lowered their response criterion thresholds towards all test words semantically related to those in the DRM lists. Prior collaboration also enhanced later individual critical lure and studied word recognition. The group members believed the critical lures and studied words recognised during collaboration were studied, and they therefore repeated these judgements when tested alone.

Keywords: False recognition; DRM; Collaborative groups; Nominal groups; Memory conformity.

There are many instances in everyday life where people collaborate to remember a shared experience prior to making judgements based on what they have jointly recalled. In some instances these judgements will be made individually. For example, jurors deliberate over evidence prior to making individual judgements regarding a defendant's innocence. In other instances consensual group judgements will be made. For example, interview panels discuss several candidates' qualities before jointly agreeing who to employ. The present experiment reports conditions under which both false and veridical consensual collaborative recognition judgements relating to studied word lists can be enhanced, and also considers the impact that prior collaboration can have on the accuracy of group members' subsequent individual recognition judgements.

To date, collaborative remembering researchers have primarily studied false and veridical recall (e.g., Basden, Basden, Thomas, & Souphasith, 1998; Takahashi, 2007; Thorley & Dewhurst, 2007). As the methodologies and stimuli used in these studies are similar to those of the present experiment, an overview of them is provided. In these experiments, the collaborative groups' recall was compared to the recall of equivalent-sized nominal groups. Nominal groups are created by pooling the non-redundant responses of individuals who recall alone, and their output represents the number of non-studied and studied items a collaborative group would be expected to recall. If a collaborative group remembers more information than an equivalent-sized nominal group then collaborative facilitation has occurred. If a collaborative group remembers less information than an equivalent-sized nominal group then collaborative inhibition has occurred. As error rates were of interest in these experiments, the researchers ensured there were high levels of false recall by utilising word lists from the Deese-Roediger-McDermott (DRM) paradigm as stimuli (Deese,

Address correspondence to: Craig Thorley, Department of Social and Psychological Sciences, Edge Hill University, Ormskirk, L39 4QP, UK. E-mail: craig.thorley@edgehill.ac.uk

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1959; Roediger & McDermott, 1995). In the DRM paradigm individual participants learn lists of words that are each semantically associated to a non-studied critical lure. The typical finding is that the false recall and false recognition rates for these critical lures are similar to the correct recall and recognition rates for the studied words, and the participants often claim to vividly remember the critical lures they falsely recall and falsely recognise (for reviews see Roediger, Balota, & Watson, 2001a; Roediger, McDermott, & Robinson, 1998). As collaboration influenced critical lure and studied word recall differently in the above studies, the findings in relation to these will be considered in turn.

Basden et al. (1998) had trios study DRM lists and then engage in either turn-taking collaborative recall, where each group member contributes one item at a time in a sequential order, or nominal group recall. The collaborative and nominal trios falsely recalled an equivalent number of critical lures. Takahashi (2007) later presented pairs with DRM lists and had them engage in either free-for-all collaborative recall, where deliberation is allowed and participants respond freely, or nominal group recall. Again, both group types recalled an equivalent number of critical lures. Thorley and Dewhurst (2007), however, presented individuals, pairs, trios, and quartets with DRM lists and had the pairs, trios, and quartets engage in either turn-taking, free-for-all, or nominal group recall. Critical lure recall increased with group size across all conditions. The turn-taking groups, however, falsely recalled the most critical lures, with there being no difference in the critical lure recall levels of the free-for-all and nominal groups. Thorley and Dewhurst argued that turn-taking recall places group members under pressure to contribute list words and the items the group members generate are often the strongly associated critical lures. This collaborative facilitation was not observed in the earlier Basden et al. study, as the DRM lists they used had weaker associations to the critical lures (see Roediger, Watson, McDermott, & Gallo, 2001b). The members of their turn-taking trios were therefore less likely to think of the critical lures when under pressure to respond.

Basden et al. (1998), Takahashi (2007), and Thorley and Dewhurst (2007) also examined studied word recall. Thorley and Dewhurst found that studied word recall increased with group size for the turn-taking, free-for-all, and nominal groups. Moreover, in each of the above experiments collaborative inhibition was observed, whereby the turn-taking and free-for-all groups recalled fewer studied words than their equivalent-sized nominal groups. This latter finding is consistent with other studies in the collaborative recall literature where lists of unrelated words were used as stimuli (e.g., Andersson & Ronnberg, 1995; Basden, Basden, Bryner, & Thomas, 1997; Basden, Basden, & Henry, 2000; Finlay, Hitch, & Meudell, 2000; Takahashi & Saito, 2004). Collaborative inhibition has been interpreted in terms of the retrieval-strategy disruption hypothesis (Basden & Basden, 1995; Basden et al., 1997). This theory posits that each collaborative group member has their own preferred retrieval strategy when recalling studied items. When group members hear different retrieval strategies during collaboration, their own individual retrieval strategies become disrupted resulting in all group members failing to recall to their maximum potential. As nominal group members are tested individually they are not subjected to this disruption and recall more studied items than the collaborative group members.

To date, no comparison has been made between collaborative and nominal groups' false and veridical recognition levels. However, Clark, Hori, Putnam, and Martin (2000, Exp. 1) have examined word list recognition in collaborative pairs and trios who were required to make consensual judgements to each test item. In their experiment individual participants first studied a list of unrelated words and then completed an old/new recognition test. These individuals then formed pairs or trios and the number of non-studied and studied words they recognised when tested individually were averaged to predict the number they would recognise as a collaborative group on the same test. This averaging process does not consider whether group members recognised the same or different words when tested individually and may therefore be an underestimation of each collaborative group's potential recognition levels. The pairs and trios then completed the same test a second time in their collaborative groups. The collaborative pairs recognised more non-studied words than their own predicted group average. The collaborative trios, however, recognised fewer non-studied words than both the collaborative pairs and their own predicted group average. Clark et al. also reported that studied word recognition increased with group size and that the collaborative groups recognised more studied words than their predicted group average. Several authors have cited this latter finding as evidence of

collaborative facilitation (e.g., Finlay et al., 2000; Takahashi & Saito, 2004). As no nominal groups were tested, it is not known whether collaboration can facilitate or inhibit studied word recognition.

Clark et al. (2000, Exp. 1) interpreted their findings in terms of dual-process models of recognition (Atkinson & Juola, 1974; Jacoby, 1991; Rajaram, 1993; Tulving, 1985). Clark et al. argued that the probability of a group member recognising both studied and non-studied words increases with collaborative group size. When a group member claims to recognise a word, they must convince their fellow collaborator(s) that it was studied. If the word was not studied then they can only use weak familiarity-based arguments to convince their collaborative partner(s) that it was. For example, a group member may claim that the non-studied word ''chair'' is familiar but can offer no evidence to support this claim. Collaborative trios can reject these weak familiarity-based arguments through majority rule but collaborative pairs cannot. This results in collaborative pairs having greater levels of non-studied word recognition than collaborative trios. Conversely, if a word has been studied the participant can use powerful recall-based arguments to convince their collaborative partner(s) of this. For example, the participant may claim to remember the studied word ''table'' as it was first on the study list, or the participant may argue that the word's presentation at study immediately brought to mind the fact that they have recently purchased a new table and that is why they recognise it. As larger groups are more likely to recognise studied words and their members can use powerful recall-based arguments to justify classing them as studied, there is an increase in veridical recognition with group size.

Clark, Abbe, and Larson (2006, Exps 1 & 2) later conducted a series of experiments that provided further support for Clark et al.'s (2000, Exp. 1) dual-process model of collaborative recognition. They provided pairs of participants with an associative recognition task in which they first studied word pairings and then had to individually discriminate between intact (studied) and rearranged (non-studied) word pairings. The numbers of hits and false alarms made by each member of the pair were then averaged to predict the number they would make as a collaborative pair. The pairs then collaborated to complete the same test again, making consensual recognition judgements to each word pairing. This task was chosen as it allows group members to offer strong recall-based arguments for classing rearranged pairings as non-studied. For example, a group member can argue that a rearranged word pair was not studied by instead recalling the intact word pair. Collaborative false recognition was lower than predicted, as group members used recall-based evidence to reject arguments that rearranged pairings had been studied. Conversely, veridical recognition was greater than the predicted group average, as participants used recall-based arguments to support their claims that intact pairings had been studied.

The influence of prior collaboration on later individual recognition has also been studied. Rajaram and Pereira-Pasarin (2007, Exp. 1) found that participants who discussed studied lists of unrelated pictures and words in trios prior to completing an individual recognition test were more accurate than individuals who did not have a prior discussion. However, these authors deliberately chose stimuli that would produce low levels of false recognition. In a study more relevant to the present one, Basden, Reysen, and Basden (2002) examined the influence of prior collaborative recall on later individual recognition using a memory conformity paradigm. Memory conformity occurs when a participant's memory report of an event is influenced by another participant's differing memory report of the same event. Basden et al. (2002) had individual participants study DRM lists and then collaborate on a turn-taking recall test with three confederates who deliberately recalled several non-studied critical lures. On a subsequent individual recognition test, the participants recognised these non-studied critical lures. Moreover, prior collaboration also enhanced later individual studied word recognition. Basden et al. explained the later individual increases in critical lure recognition in terms of memory conformity, whereby participants felt the non-studied items recalled by the group during collaboration had been studied. The later individual increases in studied word recognition were attributed to the re-exposure the participants received during collaboration to words that they may otherwise have forgotten if working alone.

The above literature review has demonstrated how progress is being made in understanding how collaboration can influence both false and veridical recall. It is not known, however, whether collaboration can facilitate or inhibit false and veridical recognition. To redress this balance, the primary aim of the present experiment was to compare the DRM list critical lure and studied word recognition

rates of individuals and collaborative pairs, trios, and quartets to those of equivalent-sized nominal groups. As the recognition test also included unrelated distractor items, these were examined in additional analyses. Clark et al.'s (2000, Exp. 1) model of collaborative recognition predicts that studied word recognition will increase with collaborative group size but that non-studied item recognition will be greatest in the collaborative pairs. DRM list critical lures, however, are designed to induce high levels of false recognition, and participants who falsely recognise them often claim to vividly remember their presentation at encoding. It is therefore possible that both critical lure and studied recognition rates will increase with collaborative group size in the present experiment, as group members utilise recall-based arguments to justify classing both types of item as studied. It is also anticipated that the critical lure, studied word, and distractor item recognition rates will be equivalent in the collaborative and nominal groups in the present experiment. In the collaborative recall studies discussed it was found that placing group members under pressure to generate words could facilitate critical lure recall (Thorley & Dewhurst, 2007), whereas all collaborative groups had inhibited studied word recall due to retrieval strategy disruption (Basden et al., 1998; Takahashi, 2007; Thorley & Dewhurst, 2007). Given that it is not possible to place participants under such pressure in a recognition task, and participants do not have to generate elaborate retrieval strategies to discriminate between studied and non-studied items, it is unlikely that these factors will influence the collaborative group's performance.

A second aim of the present experiment was to examine the influence of prior collaboration on subsequent individual recognition judgements towards critical lures and studied words. Distractor item recognition was analysed in additional analyses. In line with the findings of Basden et al. (2002) it is anticipated that in the present experiment prior collaboration will enhance later individual critical lure and studied word recognition only.

METHOD

Participants

A total of 240 Lancaster University undergraduates participated in the present study. Of these, 120 were in the collaborative group condition and were divided up so that there were 12 individuals who worked alone, 12 collaborative pairs, 12 collaborative trios, and 12 collaborative quartets. The remaining 120 formed the nominal group condition. All participants in this condition worked alone and were randomly pooled so that there were 12 individuals (whose role was identical to that of the 12 individuals in the collaborative group condition), 12 nominal pairs, 12 nominal trios, and 12 nominal quartets. All participants were native English speakers.

Stimuli

The 10 DRM lists least effective in producing individual false recognition according to research by Stadler, Roediger, and McDermott (1999) were used as stimuli. These lists were chosen to avoid any potential ceiling effects that might be found if collaborative false recognition increased with group size. All words were recorded on an audiotape by a male speaker at a rate of approximately one every 2 seconds. Prior to each list the speaker identified the list number.

The recognition test was composed of 70 words. Of these, 30 had previously been studied by the participants and the remaining 40 had not previously been studied by the participants. The 30 studied items were obtained by selecting 3 items from each of the 10 studied lists (always those items in serial positions 1, 8, and 10). Of the remaining 40 non-studied words, 10 were critical lures that related to the studied lists. The remaining 30 words were unrelated distractor items taken from 10 non-studied DRM lists (again from serial positions 1, 8, and 10 of each word list). The 70 words were randomly placed on a recognition test sheet and beside each item were the words Old and New.

Procedure

Participants were tested individually, or in pairs, trios, or quartets. All participants were seated at a single table and informed that they would receive an auditory presentation of 10 word lists during which they should not talk or write anything down. The individuals were instructed to learn these words as they would be later asked to remember them alone. Those in collaborative pairs, trios, and quartets were also

asked to try and remember the words, as they would later be asked to recognise them collaboratively. Following the presentation of all 10 lists, the participants were given a simple 2-minute mathematical distractor task to reduce recency effects. The participants were then given a recognition test booklet and asked to work through it in their groups (or individually if they were working alone). The individuals and collaborative groups were asked to make single old/new recognition judgements for each test item. It was explained that an Old (O) response was appropriate if they recognised a word from the audio presentation and a New (N) response was appropriate if they did not recognise a word. The collaborative group members were asked to deliberate amongst themselves prior to making each consensual old/new judgement, but no guidelines were offered on how to resolve disputes as it was felt that this would make the interactions more naturalistic. The groups (and individuals working alone) were asked to verbally report their judgements to the experimenter who then noted their answers on a separate recognition test sheet. The participants did not have to do any writing. The test was participant paced.

Following the initial recognition test the collaborative group members were moved to separate tables and given a surprise individual recognition test (SIT). The second recognition test was identical to the first. It was emphasised to the participants that they should give their own private judgements during this second recognition test, and that they should not try and emulate the responses of their collaborative partners if they did not agree with them. Individuals from the collaborative group condition who initially worked alone also completed the second recognition test alone. The participants from the nominal group condition did not complete this second test. During the SIT, the participants made O/N judgements on the test sheet by circling the appropriate answers with a pen. This second recognition test was also participant paced. Upon finishing, the participants were debriefed and asked to refrain from discussing the experiment with other students until the project was completed. The entire procedure typically lasted between 25 and 35 minutes with the members of the collaborative groups taking the longest due to the deliberation process they engaged in.

RESULTS

The experiment contained two identical recognition tests. The first test compared the number of critical lures, studied words, and unrelated distractor items recognised by the 12 individuals, 12 pairs, 12 trios, and 12 quartets in the collaborative group and nominal group conditions. For the 12 individuals in both conditions and for each of the collaborative groups the raw number of items recognised on each dependent measure was scored. The nominal group data for each dependent measure were scored by randomly dividing the responses of the remaining 108 individuals who were tested alone into pairs, trios, and quartets and then eliminating all redundant responses. The mean proportions of critical lures, studied words, and distractor items recognised by each of the collaborative and nominal groups can be found in Table 1.

The second recognition test examined the number of critical lures, studied words, and unrelated distractor items recognised by former collaborative group members on the SIT. For the participants who were tested alone twice, the raw number of items recognised on each dependent measure was scored. For the participants who had been in the collaborative groups, the mean number of critical lures, studied words, and distractor items recognised on the SIT were calculated to provide a single measure. The mean proportions of critical lures, studied words, and distractor items recognised by participants according to their prior group size can be seen in Table 2. For the sake of brevity, the results of main effects that are also addressed in greater detail in significant interactions are omitted. All post-hoc tests were conducted using Tukey's HSD and all interactions were analysed using simple main effects. Alpha was set at 0.05 for all statistical tests.

Critical lures

Critical lure recognition on the first test by was analysed using a 2 (Group Type: collaborative or nominal) × 4 (Group Size: individuals, pairs, trios, or quartets) between-participants ANOVA. A Group Size × Group Type interaction was found, $F(3, 88) = 3.25$, $MSE = 0.28$, $\eta_p^2 = .10$. Critical lure recognition increased in relation to group size for both the collaborative groups, $F(3, 44) = 129.56$,

TABLE 1
Mean proportion of critical lures, studied words, and distractor items recognised by collaborative and nominal groups of four sizes

	Group sizes			
	1	*2*	*3*	*4*
Critical lures				
Collaborative groups	.50 (.13)	.68 (.14)	.75 (.20)	.85 (.15)
Nominal groups	.50 (.14)	.60 (.12)	.68 (.14)	.80 (.13)
Studied words				
Collaborative groups	.67 (.07)	.82 (.07)	.94 (.08)	1.00 (.00)
Nominal groups	.66 (.06)	.76 (.07)	.84 (.08)	.92 (.06)
Distractor items				
Collaborative groups	.12 (.02)	.14 (.03)	.15 (.03)	.16 (.03)
Nominal groups	.12 (.02)	.13 (.03)	.15 (.03)	.16 (.03)

Standard deviations are in parentheses.

$MSE = 0.24$, $\eta_p^2 = .89$, and the nominal groups, $F(3, 44) = 61.75$, $MSE = 0.31$, $\eta_p^2 = .81$. Individuals in the collaborative and nominal group conditions recognised a similar number of critical lures, $F(1, 22) = 0.10$, $MSE = 0.40$, $p = .75$, $\eta_p^2 = .05$. Fewer critical lures were recognised by the nominal pairs, trios, and quartets than their equivalent-sized collaborative pairs, $F(1, 22) = 11.88$, $MSE = 0.28$, $\eta_p^2 = .35$, trios $F(1, 22) = 24.75$, $MSE = 0.24$, $\eta_p^2 = .53$, and quartets $F(1, 22) = 16.20$, $MSE = 0.21$, $\eta_p^2 = .42$. Collaboration can therefore facilitate critical lure recognition.

False recognition on the SIT was examined using a one-way between-participants ANOVA. It was found that critical lure recognition increased in relation to the participants prior collaborative group size, $F(3, 44) = 28.72$, $MSE = 1.01$, $\eta_p^2 = .66$. The only non-significant increase was between those participants who had been in trios and quartets. Prior collaboration can therefore increase later individual critical lure recognition.

Studied words

Studied word recognition on the first test was analysed using a 2 (Group Type: collaborative or nominal) × 4 (Group Size: individuals, pairs, trios, or quartets) between-participants ANOVA. There was an interaction between Group Size and Group Type, $F(3, 88) = 4.25$, $MSE = 1.90$, $\eta_p^2 = .13$. There was an increase in the number of studied words recognised with each group size for both the collaborative groups, $F(3, 44) = 147.13$, $MSE = 1.54$, $\eta_p^2 = .91$, and the nominal groups, $F(3, 44) = 56.84$, $MSE = 2.30$, $\eta_p^2 = .79$. Unfortunately, there was evidence of ceiling effects in the collaborative quartets' studied word recognition rates. Individuals in the collaborative and nominal group conditions recognised the same number of studied words, $F(1, 22) = 0.17$, $MSE = 2.19$, $p = .68$, $\eta_p^2 = .01$. However, the nominal pairs, trios, and quartets recognised fewer studied words than their equivalent-sized collaborative pairs, $F(1, 22) = 7.59$, $MSE = 2.42$, $\eta_p^2 = .26$, trios $F(1, 22) = 31.40$,

TABLE 2
Mean proportion of critical lures, studied words, and distractor items recognised by collaborative group members on a subsequent surprise individual test

	Former group sizes			
	1	*2*	*3*	*4*
Critical lures	.47 (.11)	.59 (.10)	.68 (.13)	.75 (.12)
Studied words	.67 (.06)	.71 (.05)	.79 (.05)	.84 (.05)
Distractor items	.10 (.02)	.12 (.03)	.13 (.03)	.13 (.03)

Standard deviations are in parentheses.

$MSE = 1.72$, $\eta_p^2 = .59$, and quartets $F(1, 22) = 23.65$, $MSE = 1.28$, $\eta_p^2 = .52$. Collaboration can therefore facilitate studied word recognition.

Studied word recognition on the SIT was examined using a one-way between-participants ANOVA. There was an overall increase in studied word recognition on the SIT that was in relation to prior collaborative group size, $F(3, 44) = 37.13$, $MSE = 1.42$, $\eta_p^2 = .72$. Collaboration can enhance later individual studied word recognition.

Distractor items

The numbers of distractor items recognised on the first test were analysed in a 2 (Group Type: collaborative or nominal) × 4 (Group Size: individuals, pairs, trios, or quartets) between-participants ANOVA. Distractor items are important in the present experiment as they help to demonstrate whether collaboration increases false recognition overall or whether it only increases specific critical lure false recognition. Distractor item recognition was found to increase with group size, $F(3, 88) = 10.28$, $MSE = 0.61$, $\eta_p^2 = .26$. Quartets recognised more distractors than individuals and pairs. No other increases were significant and there was no significant interaction. These results therefore demonstrate that distractor item recognition only marginally increases with both collaborative and nominal group size.

Distractor item recognition on the SIT was analysed using a one-way between-participants ANOVA. It was found that there were no significant increases in distractor item recognition as a function of prior collaborative group size, $F(3, 44) = 2.02$, $MSE = 0.63$, $\eta_p^2 = .12$. Therefore prior collaboration does not enhance later individual distractor item recognition.

GENERAL DISCUSSION

The primary aim of the present experiment was to compare the DRM list critical lure, studied word, and distractor item recognition rates of individuals and collaborative pairs, trios, and quartets to those of equivalent-sized nominal groups. Critical lure and studied word recognition rates increased with both collaborative and nominal group size but these increases were greater for the collaborative groups. However, the collaborative and nominal groups recognised an equivalent low number of unrelated distractor items, and there were only marginal increases in the recognition of these with group size. A secondary aim of the present experiment was to examine the influence of prior collaboration on later individual critical lure, studied word, and distractor item recognition. Prior collaboration in all groups increased later individual critical lure and studied word recognition. Prior collaboration failed to enhance later individual distractor item recognition.

The present experiment is the first to demonstrate that critical lure recognition can increase with collaborative group size. Although the present experiment was not a direct test of Clark et al.'s (2000, Exp. 1) model of collaborative recognition, the above finding can be interpreted in terms of it. To recap briefly, this model suggests that as group sizes increase so does the probability of a group member recognising a test word. When a group member recognises a studied word they can use powerful recall-based arguments to justify classing it as studied, resulting in an increase in studied word recognition with group size. The present experiment utilised DRM lists as stimuli and these lists are effective in producing high levels of individual critical lure recognition. Moreover, participants often claim to vividly remember the critical lures they falsely recognise (for reviews see Roediger et al., 1998, 2001a). As critical lures are often mistaken for studied words, it is possible that in the present experiment they were subject to the same collaborative group processes as the studied words in Clark et al.'s model. Thus, as the collaborative group sizes increased, the probability of at least one group member falsely recognising a critical lure also increased. In these instances the collaborative group member(s) may claim to vividly remember a critical lure being studied, and offer convincing, but incorrect, recall-based arguments to support their judgement. This would then result in an increase in critical lure recognition with group size.

The increases in studied word recognition with collaborative group size in the present experiment replicate Clark et al.'s (2000, Exp. 1) earlier finding with collaborative pairs and trios, and also expand upon it by demonstrating that this trend continues when collaborative quartets are tested. This finding is also consistent with Clark et al.'s model of collaborative recognition.

The marginal increases in distractor item recognition with collaborative group size in the

present experiment contrast with the earlier findings of Clark et al. (2000, Exp. 1). Their model predicts that although the probability of a group member recognising a distractor item increases with group size, the collaborative trios and quartets would have the lowest levels of non-studied word recognition, as group members who recognise these items can only use weak familiarity-based arguments to support their judgements and these arguments can be rejected in groups where a majority is possible. If the collaborative groups' false recognition judgements towards the distractor items in the present experiment were based on familiarity-style arguments, then these arguments may be more convincing than was initially speculated by Clark et al.

Further research needs to be conducted to confirm, first, whether the probability of a collaborative group member recognising each type of test item does increase with group size and, second, whether the group members use recall-based arguments to justify classing critical lures and studied words as studied, and familiarity-based arguments to justify classing distractor items as studied. To examine this first issue the group members could be asked to make private individual recognition judgements prior to making their consensual collaborative group judgements. To examine whether the consensual group judgements were made as a result of recall- or familiarity-based arguments the collaborative groups could also be asked to make Remember (R) and Know (K) judgements for each recognised word (see Gardiner, 1988; Tulving, 1985). An R judgement would indicate that the group vividly remembered a word being studied, and would suggest that recall-based arguments were used to support this decision. A K judgement would indicate that the group merely felt a word was familiar, and would suggest that they used familiarity-based arguments to support this decision.

The present experiment is also the first to demonstrate that critical lure and studied word recognition can exceed the levels expected if participants were working individually and their responses pooled. However, this latter finding does support the previously untested claims made by Finlay et al. (2000) and Takahashi and Saito (2004) that studied word collaborative facilitation can occur. No collaborative facilitation was observed for the distractor item judgements, with the collaborative groups and their nominal group equivalents both recognising an equally low number. For collaborative facilitation to occur, collaborative group members would need to recognise critical lures and studied words that none of them would have recognised independently. This raises the possibility that there was a criterion shift during collaboration, whereby the participants within the collaborative groups were more willing to classify test words semantically related to the DRM list words as studied than those test words not semantically related to DRM list words. For example, group members may not remember the test word *Tamer* being studied. They may, however, remember non-test words such as *Circus*, *Roar*, and *Mane*, and also remember that other related words were studied. Based on this, the group may decide to classify *Tamer* as studied. This could be investigated by shortening the number of studied words presented in each DRM list and including the non-studied DRM list words on the collaborative recognition test. If the suggested criterion shift did occur, then there should also be collaborative facilitation towards these non-studied DRM list words.

The present study is the first to demonstrate that prior collaborative recognition can enhance later individual critical lure and studied word recognition. It was also found that participants who had been in the larger groups recognised the most critical lures and studied words. This extends previous findings where prior collaborative recall has been shown to enhance later individual critical lure and studied word recognition (Basden et al., 2002). It is suggested that critical lure and studied word recognition was enhanced on later individual testing as a result of memory conformity, whereby group members believed that the critical lures and studied words recognised as a group during collaboration had been studied. As the participants in the larger groups had encountered the most critical lures and studied words during collaboration, they recognised the most when later tested alone. Finally, prior collaboration failed to enhance later individual distractor item recognition. This suggests the participants were aware that during collaboration some distractor items may have been recognised in error by their fellow collaborators(s) and when tested alone they failed to repeat these errors.

Traditionally, collaborative memory researchers have focused their efforts on understanding the conditions under which collaboration can facilitate false recall and inhibit veridical recall (e.g., Basden et al., 1998; Takahashi, 2007; Thorley

& Dewhurst, 2007). These researchers have also sought to explain why prior collaborative recall can enhance later individual false and veridical recognition (Basden et al., 2002). The present experiment is the first to demonstrate that collaboration can facilitate false and veridical recognition. Likewise it is the first to demonstrate that prior collaborative recognition can enhance later individual critical lure and studied word recognition. While further research is needed to fully explain why these effects occur, the present experiment has taken the first steps towards achieving this goal.

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