Introduction

discussed the evidence. This possibility has generated widespread controversy (Brigham & Wasserman, 1999). Group composition like jury needs to reþect the representation of diverse groups, so that its members can add to the collective wisdom with their diverent perspectives and backgrounds. However, diverse social identities may increase task conþict and lead to the distortion of information authenticity (Pepe et al., 2021). How members' social identities aect the comprehensiveness and accuracy of group information gathering and processing may have critical practical consequences.

In this context, the current study used a collaborative retrieval paradigm to investigate the eects of social identity on group information learning. Collaborative retrieval paradigm is used to examine collaborative memory of groups in a laboratory setting (Basden et al., 1997; Rajaram & Maswood, 2017). In this task, participants usually study a series of information individually, and after a delayed interval, complete a retrieval test either collaboratively or individually. Each collaborative group consists of at least two participants who work together to produce a single recall output. Participants who complete the test individually form

a virtual group (nominal group) of the same size as the collaborative group. The pooled number of the non-redundant recalls they produce serves as a baseline and permits valid comparisons with that of the collaborative groups (Rajaram & Maswood, 2017; Browning et al., 2018). Consistent ýndings of comparison between collaborative recall and nominal recall yield two phenomena:
and (e.g., Harris et al., 2013). On one hand, collaboration may damage group recall, termed collaborative inhibition, a counterintuitive but robust phenomenon in which the collaborative groups remember less than the nominal groups (Basden et al., 1997; Marion & Thorley, 2016). On the other hand, collaboration may improve group memory, termed error pruning, by correcting false memory and resulting in fewer errors in the collaborative groups than that of the nominal group (e.g., Ross et al., 2008).

Social identity functions importantly in the formation of collective memory (Yamashiro & Hirst, 2019). Yet the role of social identity in the process of collaborative recall is unclear. Previous studies found that groups of diverent racial composition, or formed on an ad hoc basis, produced comparable collaborative inhibition (Pepe et al., 2021; Weldon et al., 2000). However, these results cannot rule out the possibility that individuals did not perceive the salience of in the memory task. Subjective social identity refers to an external social categorization transformed into an internalized representation. Social identity is a situational relevance varying instantly with the context (Oakes & Turner, 1986). While most people belong to multiple groups simultaneously, the relative degree to which they see each of these diverent identities as self-descriptive in a particular situation will determine the extent to which these identities tend to aject their behaviors (Ellemers et al., 2004). The salience of social categories activates relevant goals and norms of a group (Lee et al., 2015), and was found to facilitate group performance and innovation (Van Knippenberg, 2000; Leicht-Deobald et al., 2021).

Thus, the present research focuses on the eject of subjective social identity on collaborative memory in a context of social categorization (i.e., objective social identity). As a basic motivation for behavior (Brewer, 2001; Pugliese et al., 2023), social identity may inþuence the performance of collaborative memory. When people deýne themselves in terms of group membership, identiýcation elicits a sense of oneness with the group, and helps people to internalize the interests and goals of the group as their intrinsic motivations (van Knippenberg, 2000). The stronger an individual's identiýcation with the group is, the stronger oneôs motivation to make the group superior to competitors will be (Tajfel & Turner, 1986). This motivation could lead to closer in-group cooperation, more individual contribution and better group performance (e.g., Sidorenkov et al., 2022; Ellemers et al., 2004). Since social categorization per se may not be sucient to explain the diverence of group performance, groups may perform better when their members perceive a subjective social identity during the task.

Another aim of this study is to clarify how social identity may motivate the performance of collaborative recall. In addition to incentivizing in-group cooperation, there might be other motive components of social identity which could inþuence group recall. Social identity intrigues both social and epistemic motives (Higgins et al., 2021). People are more likely to build connection with in-group members or trust them as reliable source of information, relative to out-group members (Hogg & Adelman, 2013; Kopietz & Echterhoi, 2014; Shah et al., 1998). When scrutinizing the cognitive process of collaborative recall, it is necessary to see social identity in this framework of two-dimensional motives. People have an explicit epistemic need for information accuracy, and an implicit social need such as a sense of belonging to a group and maintaining good interpersonal relations (Levine, 2018). Given that people see in-group members as more reliable sources of information, their need for information accuracy may moderate the eject of group members' interdependence on collaborative recall.

As for social motives, social identity may lead group members to develop a mixture of a tendency to cooperate with in-group members and to compete with out-group members (Nijstad & De Dreu, 2012). Studies of collaborative memory tend to assume group members as cooperative individuals (Nokes-Malach et al., 2015), which we believe cannot be rigorously scrutinized. Besides the shared goals of groups, members may have a competitive motive to recall more information or to gain higher status (Butera & Darnon, 2017). When people are closely connected, they perceive not only a positive connection, but also a more pronounced perception of competitive relationship with each other. Especially when co-working with outgroup members, people's social identity enhances their competition (Kato & Shu, 2016). Based on the evidence that competitors pay more attention to others' memory (Park et al., 2015), the possible inþuence of competitive motive in collaborative recall is of interest.

On how to mitigate or even eliminate the detrimental eject of collaboration inhibition and enhance the beneýcial eject of error pruning, researchers have pointed out the importance of the motivational process (Levine, 2018). What information is retrieved and how to assess the validity of the information provided by oneself and others are inþuenced by motives (Betts & Hinsz, 2010). Motivational cues are essential to activate the knowledge structure, inþuence the degree to which individuals acquire and process information. Motives such as social loaýng or fear of negative evaluation in collaboration may lead to failure in collaborative

learning (Weldon et al., 2000; Nokes-Malach et al., 2015). But there is still a gap between highlight on motives and experimental evidence. It had been found that social loafing did not a ected collaboration inhibition (Weldon et al., 2000). However, motive in this study was broadly de ned, and whether social loa ng came from a lack of cooperation with other members or a lack of epistemic motive has yet to know. This study aims to directly measure these two motivational components of social identity, which may help us to reveal the real e ect of social identity on collaborative memory.

In the current study, we investigated the in uence of social identity and its motivational components on collaborative inhibition and error pruning in two experiments. In Experiment 1, we manipulated objective social identity of participants, and measured their subjective social identity in a collaborative retrieval task. Based on the literature review above, we predicted that social identity, especially subjective social identity would improve collaborative memory, i.e., it would reduce collaborative inhibition and enhance error pruning. Experiment 2 aimed to investigate the motivational components of social identity which in uenced group recall, including social and epistemic motives. We measured social and epistemic motives of participants in either a cooperative retrieval task or a competitive one. According to De dreu et al. (2006), in higher epistemic motive, cooperative members exchange information more thoroughly, we therefore predicted the joint impact of epistemic motive and cooperative motive would improve collaborative memory performance, and resulted in lower collaborative inhibition and higher error pruning.

Experiment 1: e ects of social identity on collaborative memory

For objective social identity, we divided four stranger participants into two groups by minimal group paradigm, and reinforced their social identity in a cooperative group game. Afterwards, participants completed the collaborative retrieval task with an in-group member and an out-group member respectively. In the collaborative retrieval task, participants encoded a word list individually. Then, some of them recalled the words collaboratively with a partner, while others recalled alone. All participants performed free recall. Finally, we measured participants' subjective social identity in the collaborative retrieval task.

Method

Participants

An a-priori power analysis advised 73 participants for su - cient test power (1 - ß = 0.80; Ŭ = 0.05, two-tailed) to detect a big-sized e ect (f = 0.40) for interactions in an ANOVA. We recruited 80 Chinese university students (24 males, 56 females, mean ± age = 21.77 ± 2.36 years) and o ered a monetary reward of ¥50 (~$7 US) for participation. Four participants came to the laboratory at the same time and formed 2 dyads in the experiment. They reported not knowing others before the experiment. Considering that mixed-sex group may have extra in uence on social memory (e.g., Barber & Mather, 2012), the four participants in one experiment were of the same gender. They reported as native Chinese speakers with normal or corrected-to-normal vision. All participants voluntarily participated in this experiment and gave informed consent before participation. This study was approved by the Committee for Protecting Human and Animal Subjects in the School of the Psychological and Cognitive Sciences, Peking University, and was performed in accordance with the ethical standards laid down in the Declaration of Helsinki.

Materials

Sixty unrelated two-character nouns were selected from the Chinese A ective Words System (Wang et al., 2008) and split in half to form two word lists of 30 words. All words had di erent ýrst and last characters. Two lists were matched in a ect (= 4.96, = 1.73), frequency (= 17.99/million, = 20.00), excitement, dominance, familiarity, strokes in the ýrst character and in the last character, s(58) ≤ 0.91, s ≤ 0.37, s ≤ 0.13.

Design

The experiment had a 2 (retrieval: collaborative, nominal) × 2 (objective social identity: in-group, out-group) mixed-

Fig. 1 for the assignment of participants among different group conditions. Each participant formed an in-group with an in-group member and an out-group with an out-group member. The order in which the participants paired with in-group member or out-group member was counterbalanced across participants. The dependent variables were the number of correct recalls and the number of errors of groups.

Procedure, manipulations, and measures

Measures of individual differences To control individual differences that may influence social identity, participants' self-construal was measured one day before the experiment (Markus & Kitayama, 1991). Self-construal (independent vs. interdependent) reflects how one views him/herself in relations with others (Singelis, 1994). Chinese version of the Self-Concept Scale (SCS; Singelis, 1994) containing 24 items was used to measure independent self-construal (12 items, such as "I enjoy being unique and different from others in many ways"; Cronbach's $\alpha = 0.79$) and interdependent self-construal (12 items, such as "usually sacrifice my self-interest for the benefit of my group"; Cronbach's $\alpha = 0.84$). SCS responses were rated on a Likert-type scale from 1 (strongly disagree) to 7(strongly agree). As an index of self-construal, a relative independence score was computed for each participant by subtracting the standardized interdependence score from the standardized independence score (Holland et al., 2004).

Objective social identity manipulation Following Han et al. (2021), four participants arrived at the laboratory at the same time and were randomly assigned to two teams (red team and blue team) by choosing cards. They were asked to wear T-shirts and wristbands of the corresponding color (red or blue). To reinforce the social identity of assigned teams, the two teams entered two identical laboratory rooms respectively and play the Draw & Guess game instructed by two experimenters of the same gender (female Chinese). In this game, one of the participants described an object to his/her partner (in-group member) without mentioning the name of the object on a flashcard. Their partners needed to guess the name of the object. One point would be added to the team if the guess was correct and the experimenters recorded the scores. Each team played 3 rounds with 3 minutes per round, and the highest score in 3 rounds was the final score of the team. Two teams competed in this game and the experimenters announced the final scores at the end of the game. In fact, all teams were led to believe that they had won, given that the other team's scores were spurious and always 2 points lower than theirs. In order to convince the participants of the authenticity of the intergroup competition, each experimenter left the rooms for about a minute at the end of the game and told the participants that she went to exchange their scores with the other experimenter. This 10 min game and the positive feedback in intergroup competition aimed to increase cohesion and social identification among team members. To check the effectiveness of the group manipulation, participants assessed their identification with the in-group and the out-group on a 9-point Likert scale (1 = extremely unidentified; 9 = extremely identified) at the end of the experiment. They also completed Aron et al.'s (1992) Inclusion of Other in the Self Scale to measure the feelings of closeness with in-group and out-group members, respectively.

Collaborative retrieval task After manipulation of objective social identity, the four participants were divided into two dyads and conducted in two identical test rooms at the same time. The experiment was programmed by Python 3.6 and carried out on a designated computer terminal throughout. Two participants physically present in the same room, and sat in front of their computers in a row at a distance of about 1 m from each other. Their computers were connected with a local network cable to allow for real-time transmission

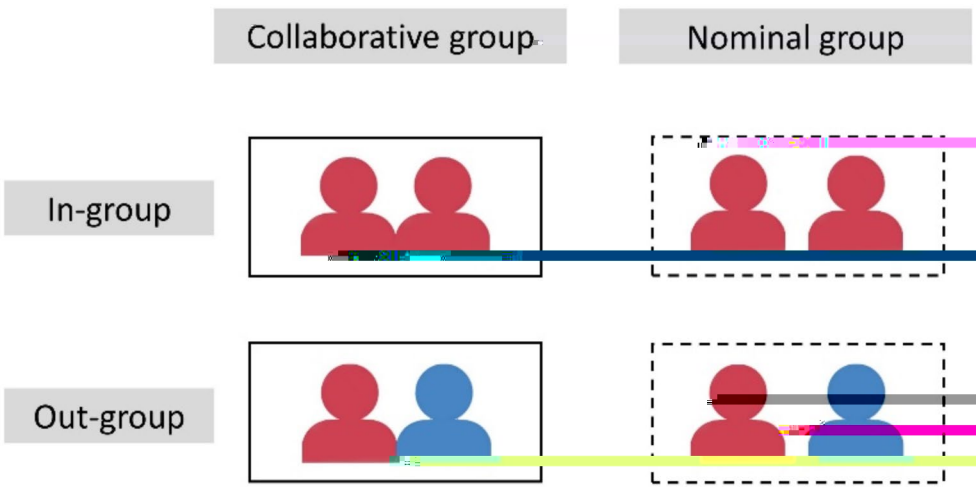

Fig. 1 Assignment of participants in different group conditions. Each grid surrounding two participants (in solid lines or in dotted lines) represents a test room. In nominal groups, dotted lines and separated participants show that they did the task independently

of input between the two participants. Then each participant completed two blocks of collaborative retrieval task. One block was with the in-group member whom he/she had just cooperated with, and another with a random out-group member. Each experimental block consisted of three stages: encoding, delayed interval, and retrieval test (Rajaram & Maswood, 2017). During encoding, items were presented one at a time for 2000 ms at the center of each computer screen in a pseudorandom order, followed by an inter-stimulus interval of 1000 ms. Two participants in one room were asked to independently study word list on their own computers for an unspeciýed memory test. When list presentation was complete, participants worked on an unrelated calculation test (addition and subtraction of two-digit numbers) for 1 min to reduce the recency eꝛect (Wright & Klumpp, 2004).

At retrieval test, participants were asked to recall their previously studied list. Participants in the collaborative groups worked together with their partners. They were asked to type in the answer box on their respective computers in turn, so that each of them had an equal opportunity to contribute. In order to distinguish the contributor of each response, the answer box had two columns, with each for one participant respectively. Participants could only type words in their own column while being able to see their partner's input in another column at the same time. Free discussion was allowed during their recall. In nominal groups, participants were provided with same answer screens, but they were asked to work alone and type their individual responses. Discussion was not allowed, nor could they see their partners' responses. Collaborative groups had 8 min and nominal groups had 4 min to recall. All groups had adequate time for recall or discussion.

After ýrst block, participants had one min to rest before the second block began. The procedures of two blocks were identical, except that participants were paired with partners from diꝛerent groups. The exchange of partners made sure that each participant would be paired with one in-group member and one out-group member for collaborative or nominal retrieval. For example, if the two groups in the ýrst block were formed by participants from the same teams each (i.e., "Red 1- Red 2" and "Blue 1-Blue 2"), then there should be two mixed teams in the second block (i.e., "Red 1-Blue 1" and "Red 2-Blue 2"). The order in which the participants paired with in-group member or out-group member and the order in which the two item lists were presented were balanced among diꝛerent conditions. In the end, each of the four group conditions (collaborative/out-group, collaborative/in-group, nominal/out-group, and nominal/in-group) produced 20 group outputs.

To highlight the membership of each team in retrieval test, the team to which each participant belonged was displayed on the answer screen of each computer. If two participants belonged to the same team, the team name would be displayed in the corresponding color at the top of the screen, such as "Red Team" in red or "Blue Team" in blue. If two participants belonged to diꝛerent teams, the team name of each participant would be displayed in a corresponding color at the top of each one's answer column.

Measures of subjective social identity For subjective social identity, we focused on whether participants felt as part of the red and blue teams during collaborative retrieval task. In order to reþect the context relevance of subjective social identity (Meyer et al., 2011), participants were asked to evaluate their membership during collaborative retrieval at the end of the task ("When you recalled the words, which team do you think you belonged to? Red team/blue team/not belonged to any team"). Participants who reported that they belonged to their own team in the recall task indicated that their social identity was salient and would be therefore deýned as people with subjective social identity. Participants who reported that they did not belong to either team were deýned as individuals without subjective social identity. None of the participants reported belonging to an out-group. In order to tentatively explore the potential mechanisms of subjective social identity eꝛect, participants with subjective social identity were asked to respond to an open-ended question, in which they could report their thoughts or feelings in the group recall. Once the experiment was completed, all participants were thanked and fully debriefed.

Results

Manipulation check and individual di□erences To assess the eꝛectiveness of group formation, we compared each participantôs identiýcation with in-group and out-group as well as their social distance from the in-group partner and the out-group partner. A paired sample t-test revealed a signiý-cant diꝛerence between in-group and out-group identities. Social identity with in-group (8.06 ± 1.21) was higher than that with out-group (3.51 ± 2.32), $(79) = 15.17$, < 0.001, $= 1.71$. Participants also reported closer social distance from the in-group partner (5.28 ± 1.38) than that from the out-group partner (3.35 ± 1.40), $(79) = 11.76$, < 0.001, $= 1.33$. Results showed that group formation eꝛectively forms an in-group and an out-group for each participant.

For the individual diꝛerences related to social identity, we averaged the self-construal scores of two members in each group as a group score. A 2 (retrieval: collaboration vs. nominal, 4.91 ± 0.50 vs. 5.04 ± 0.42) $\times$ 2 (objective social identity: in-group vs. out-group, 5.01 ± 0.46 vs. 4.94 ± 0.46)

between-subjects ANOVA revealed no signiýcant main eýects of retrieval or objective social identity on self-construal, or no signiýcant interaction between retrieval and objective social identity, $s \leq 1.56$, $s \geq 0.22$, $d_p^2 s \leq 0.02$. The result indicated that all experimental conditions were matched in the psychological trait. Therefore, self-construal was not used as a control variable in subsequent analyses.

Coding of subjective social identity There were 44 groups each of whom had at least one member reported identiýcation with their own team in collaborative retrieval, so these groups were deýned as having subjective social identity, and the other 36 groups as having no subjective social identity. Subjective social identity was then coded into dichotomous variables (0 = no subjective social identity, 1 = subjective social identity). The binomial test revealed a $=0.43$, indicating that the subjective social identity conformed to a uniform distribution as a dichotomous variable, and the results of these two conditions could be compared.

Collaborative inhibition: Number of correct recalls in the collaborative groups vs. the nominal groups This study aims to examine the inþuence of social identity on collaborative inhibition and error pruning. For collaborative inhibition, we compared the number of correct recalls in the collaborative groups with that in the nominal groups. The performance of the nominal groups was the pooled correct recall by nominal group members, with the redundant items deleted (e.g., Rajaram & Maswood, 2017). Table 1 shows mean group recall in diýerent group conditions.

First, we focused on the eýect of objective social identity. A 2 (Retrieval: collaborative vs. nominal) × 2 (objective social identity: in-group vs. out-group) between-subjects ANOVA yielded only a signiýcant main eýect of retrieval, $(1,76) = 4.16$, $=0.046$, $d_p^2 = 0.05$. The number of correct recall of collaborative groups was smaller than that of nominal groups, indicating a classical collaborative inhibition eýect. The main eýect of objective social identity was not signiýcant, $(1,76) = 0.05$, $=0.83$, $d_p^2 = 0.001$. Nor was the interaction between retrieval and social identity, $(1,76) = 0.02$, $=0.88$, $d_p^2 < 0.001$. The results did not show an eýect of collaboration with in-group or out-group members on the correct group recall.

Second, we focused on subjective social identity. A 2 (Retrieval: collaborative vs. nominal) × 2 (subjective social identity: no subjective social identity vs. subjective social identity) between-subjects ANOVA yielded a signiýcant interaction between retrieval and subjective social identity, $(1,76) = 4.22$, $=0.04$, $d_p^2 = 0.05$. In follow-up tests, groups with no subjective social identity had collaborative inhibition, in that collaborative groups had fewer correct recall than that of nominal groups, $(76) = 2.98$, $=0.03$, $=1.20$ (with Bonferroni correction, the same below). In contrast, groups with subjective social identity produced a similar number of correct recall in both collaborative and nominal conditions and the collaborative inhibition was eliminated, $(76) = 0.39$, $=0.98$, $=0.13$ (See Fig. 2a). The main eýect of subjective social identity was not signiýcant, $(1,76) = 0.03$, $=0.87$, $d_p^2 < 0.001$.

To further examine whether the eýect of subjective social identity on collaborative inhibition is moderated by in-groups and out-groups, we conducted a 2 (retrieval: collaborative vs. nominal) × 2 (objective social identity: in-group vs. out-group) × 2 (subjective social identity: no subjective social identity vs. subjective social identity) three-way ANOVA. It yielded no signiýcant three-way interaction, $(1,72) = 0.43$, $=0.51$, $d_p^2 = 0.006$. This suggested that no diýerence was found between in-groups and out-groups for the eýect of subjective social identity on collaboration inhibition.

The number of correct recall between collaborative and nominal groups with subjective social identity showed no diýerence, but it should be noted that null-hypothesis signiýcance testing did not provide evidence that there was no eýect (Masson, 2011). We then used the Bayes factor to calculate the ratio of the posterior probability for the null hypothesis (H0) and the alternative hypothesis (H1) being correct based on the current data in subjective social identity condition, and thus quantiýed the relative support of hypotheses (Wagenmakers et al., 2018). The ratio of the posterior probabilities was $BF_{01} = 3.33$. According to the criteria of Jarosz and Wiley (2014), it could be interpreted that the data provided positive evidence in favor of the null hypothesis. The above results suggested that whether participants had subjective social identity in the collaborative recall made a diýerence on correct group recall, and the groups with subjective social identity eliminated collaborative inhibition.

Table 1 Number of correct recall and errors of collaborative and nominal groups in the objective and subjective social identity conditions in experiment 1

	Collaborative recall	Nominal recall	Collaborative error	Nominal error
Objective social identity				
In-group	13.40(3.82)	15.20(4.09)	3.85(3.72)	4.95(3.30)
Out-group	13.00(3.63)	14.90(3.19)	3.85(3.39)	5.10(3.13)
Subjective social identity				
Subjective social identity	13.59(3.61)	14.36(4.11)	2.86(2.92)	5.41(3.58)
No subjective social identity	12.72(3.82)	15.89(2.81)	5.06(3.87)	4.56(3.62)

Values for each variable are means, with standard deviations in parentheses

Error pruning: Number of errors in the collaborative groups vs. the nominal groups For error pruning, we compared the number of errors in the collaborative groups with that of the nominal groups. The performance of the nominal groups was [illegible] out-groups, we conducted a 2 (retrieval: collaborative vs. nominal) × 2 (objective social identity: in-group vs. out-group) × 2 (no subjective social identity vs. subjective social identity) three-way ANOVA, which yielded a significant three-way interaction, $(1,72) = 4.74$, $= 0.03$, $d_p^2 = 0.06$. To explore the pattern of results, we split the data between the in-groups and out-groups. The interaction between subjective social identity and retrieval was found signiýcant only in the in-group condition, $(1,36) = 9.46$, $= 0.004$, $d_p^2 = 0.21$, but not signiýcant in the out-group condition, $(1,36) = 0.01$, $= 0.94$, $d_p^2 < 0.001$. Therefore, only the data of the in-group was included. The post-hoc test found that there was no signiýcant diverence in the amount of recall errors between the collaborative group (6.00 ± 3.97) and the nominal group (3.67 ± 1.41) in the groups without subjective social identity, $(36) = 1.55$, $= 0.78$, $= 0.73$. In contrast, in the groups with subjective social identity, the errors of the collaborative groups (2.09 ± 2.47) were fewer than that of the nominal groups (6.00 ± 4.05), $(36) = -2.87$, $= 0.04$, $= -1.22$. The results indicated that for the groups of two partners belonging to the same team, their team identiýcation reduced the number of recall errors in collaborative memory, i.e. they produced error pruning (see Fig. 2b).

Individual diverences in subjective social identity To investigate the characteristics of groups with subjective social identity, we used a two-sample t-test to compare the self-construal scores of the groups. The relative independence score of the groups with subjective social identity (-0.30 ± 0.53) was lower than that of the groups without subjective social identity (-0.06 ± 0.53), $(78) = 2.16$, $= 0.03$, $= 0.52$. It

suggested that group members with subjective social identity preferred to develop interdependent relationships. Previous studies have found that individuals with interdependent self-construal were more sensitive to situational cues (Sung et al., 2012). This may imply that individuals who prefer interdependent relationships are more likely to be activated by group formation, therefore maintain a more salient social identity in subsequent tasks.

Interim discussion

Experiment 1 established the effect of social identity on group recall outcomes. Specifically, subjective social identity compensated the memory deficiency in the collaborative groups. The collaborative groups' recall was as good as the nominal groups, and reached its overall potential. Subjective and objective social identity jointly affected memory errors. Subjective social identity made a difference in memory errors between the collaborative and the nominal groups, which indicated a correction effect of collaboration. This facilitation was only pronounced for groups in which members were from a same team.

The results on subjective social identity indicated that although the social identity for in-group participants was higher than that for out-group ones in overall sample, not all of them perceived their team membership in the following memory task. SIT suggests that subjective social identity salience depends on the extent to which the group fits comparatively and normatively with current situation (Oakes & Turner, 1986). It is only when the stimuli being represented matches group category that the social identity is salient (Ellemers et al., 2004). Figure 1 illustrates the process of group formation: in the first session of the experiment, the participants formed red and blue teams; and in the second session, the participants formed recall groups with an in-group and an out-group member. Since the memory task might involve collaboration between partners, it might be the exact moment when some participants started to internalized the identity of the red team or the blue team. For other participants, their social identities for the memory groups were more salient, which made them ignore the label of "red/blue". The results suggested that social identity in a specific task might attribute to individual differences such as self-construal.

Experiment 2: the effects of social and epistemic motives on collaborative recall

The first goal of Experiment 2 was to distinguish two social motivational components of social identity – in-group coop effects on collaborative inhibition and error pruning. The results of Experiment 1 on collaborative inhibition did not vary the social relationship between the two partners who worked on group recall, and made it difficult to tell whether the collaboration in the in-group or in the out-group affected the group recall, or both of them did.

However, the answers to the open-ended question on subjective social identity might suggest that the participants felt a reinforcement of cooperation with in-group members in the group recall. In that question, participants with subjective social identity were encouraged to report their thoughts or feelings in the collaborative retrieval task. Twenty-six out of the 44 groups with subjective social identity reported the advantage of collaboration with in-group members in the task, including statements such as: "We wore the same wristband and costumes, and we worked together at the beginning, so I took the two of us as partners in default", "The inexplicable trust with the red team partner, and more confidence when working with the red team partnerò (from a red team member), "Felt more formal with the red team partner, and more psychologically identified with the blue team partner as teammates"(from a blue team member). Another 4 groups reported both cooperation with in-group members and competition with out-group members: "competition brought a sense of pressure, cooperation brought a sense of safety", "it is easier to work with the red team partner, and with the blue team partner I had a clear sense of competition"(from a red team member). These results implied that the influence of social identity on group recall was contributed to in-group cooperation, but the data could not rule out the role of out-group competition.

In-groups tend to sustain and facilitate cooperation, while out-groups may display higher levels of competition, resulting in different implications for team performance (Nijstad & De Dreu, 2012). In general, social identity triggers stronger motive for in-group favoritism, with more positive resource allocated to in-groups than negative resource allocated to out-groups (Otten & Mummendey, 2000). Based on the literature and the results of Experiment 1, we hypothesized that in-group cooperation may be one social motive underpinning social identity to influence group recall.

It should be noted that intergroup comparison is not necessary for developing an in-group perception. Even in the absence of intergroup comparison, intragroup factors, such as interdependence on the goal of the task, named competition and cooperation, are sufficient to increase the social attraction among members (Gaertner et al., 2006). Goal interdependence therefore is usually used to operationalize social identity (Velez et al., 2014), where individuals view cooperators as in-group members and competitors as out-group members. Manipulation of goal interdependence even transcends the original group membership (Adachi et

al., 2016). Therefore, we used the interdependence of goals as the manipulation of social identity, to stimulate participants' social motives in Experiment 2.

Interdependence of goals can be manipulated by the allocation of reward (Nyberg et al., 2018). The reward distributed to all members triggers cooperation among group members, while the reward given to the best performer triggers competition. In Experiment 2, we set both cooperative and competitive contexts by manipulating the allocation of reward to stimulate individuals' social motive to cooperate or compete.

Another goal in Experiment 2 was to focus on epistemic motive. Social identity elicits the need to gain epistemic certainty (Kopietz & Echterhoxi, 2014), which may play a role in collaborative recall. Without epistemic motive, cooperative exchange between in-group members may lead to shallow information processing (e.g., applying simple heuristics such as majority rules) and poor performance on cognitive task (Halevy, 2008). Previous research suggests that how much cooperation axected group outcomes depends on epistemic motivation level (De dreu et al., 2006). Experiment 2 therefore measured both the social and epistemic motives in the cooperative and competitive contexts respectively, and investigated how motivational factors inþuenced the performance of group recall.

Method

Participants

An a-priori power analysis advised 68 participants for suxicient test power (1 - ϐ = 0.80; Ŭ = 0.05, two-tailed) to detect a medium-sized exect ($f^2 = 0.15$) in a linear multiple regression. Since we included a two-level between-subjects variable, we multiplied this number by two. One hundred and sixty Chinese university students (56 males, 104 females, mean ± age = 22.72 ± 2.51 years) were randomly recruited. They received a ýxed reward of Ô35(~$5) and a þoating bonus up to Ô10 based on their performance in the experiment. All participants reported as native Chinese speakers with normal or corrected-to-normal vision. Strangers of the same gender took part in the experiment in dyads. They voluntarily participated in this experiment and gave informed consent before participation. This study was approved by the Committee for Protecting Human and Animal Subjects in the School of the Psychological and Cognitive Sciences, Peking University, and was performed in accordance with the ethical standards laid down in the Declaration of Helsinki.

Materials

The materials were the same as in Experiment 1.

Design

The experiment had a 2 (goal interdependence: cooperation, competition) × 2 (retrieval: collaborative, nominal) mixed-factorial design. The ýrst factor goal interdependence was manipulated between subjects. In the cooperation context, participants tried to win an inter-group competition by jointly recalling as many of the materials as possible with their partners. In the competition context, participants tried to win an intra-group competition by recalling as many materials as possible compared to their partners. The second factor retrieval was manipulated within participants. All groups completed a block of collaborative retrieval and a block of nominal retrieval. Participants recalled together with their partners in the collaborative retrieval, while they recalled independently in the nominal retrieval. The dependent variables were the number of correct recalls and the number of errors of dyads.

Procedure, manipulations, and measures

Measures of individual di□erences To control individual dixerences on cooperative and competitive tendency, participants were asked to complete the scale of cooperative and competitive personality (CCPS; Xie et al., 2006) one day before the experiment. Twenty-three items were used to measure cooperative personality (13 items, such as "at work, I like to work with others") and competitive personality (10 items, such as "I love the challenge that comes with competing with others"). CCPS responses were rated on a Likert-type scale from 1 (strongly disagree) to 9(strongly agree). Subscale scores were combined as an indicator of cooperative personality (Cronbachôs Ŭ = 0.91) and competitive personality (Cronbachôs Ŭ = 0.83), respectively.

Experimental sessions The experiment consisted of two blocks of collaborative retrieval task. The procedure of encoding and delayed interval were the same as Experiment 1. In retrieval test, cooperation or competition contexts were manipulated by instructions, which were given at the beginning of the experiment and each block of test. Following Nyberg et al. (2018), in cooperative condition, group as a whole was rewarded for good performance. Participants were told that if their group recalled more correct words than the average of all groups in this experiment, they would share an extra ¥5 bonus. If they failed, there would be no extra bonus. In competitive condition, participants were told that they would compete with their group partners

in the experiment, and those who recalled more correct items would receive an extra bonus. For each additional item answered correctly, an extra ¥1 would be rewarded. There would be no extra reward for those who recall fewer items or end up a draw. Only after all the participants understand the instructions, the retrieval test was conducted. The answer screen was the same as in Experiment 1, except that no group name was displayed on the screen. The procedure and requirements in the task were the same as those in Experiment 1.

At the end of the 8-minute collaborative retrieval or 4-minute nominal retrieval, the program would count and display the amounts of correct answers by each participant on the computer screen, as well as the reward allocation. For the cooperative condition, the participants who received the reward would read: "Your group met the standard, you and your partner will receive an extra reward of ¥5", and the participants who failed to receive the reward would read: "Your group did not meet the standard". In the competitive condition, the participants who won would read: "You recalled n more words than your partner, you will receive an extra reward of ¥n" (n was the number of correct recalls that the participant exceeded the partner), and the opposite message was displayed for their partners: "Your partner recalled n more words than you, your partner will receive an extra reward of ¥n". Participants with the same number of correct answers would read: "You have the same score".

Each dyad completed one block of collaborative retrieval and one block of nominal retrieval. After one block, the participants took a 1-minute break and followed the steps above to start the second block. The order of collaborative and nominal retrieval, and the order of the two item lists were balanced between cooperation and competition. To test the effectiveness of context manipulation, at the end of the experiment, participants were asked to assess "To what extent do you think you and your partner are competitive/cooperative?" (1 = fully cooperative; 9 = fully competition), and "To what extent do you feel competitive/cooperative?" (1 = extremely cooperative; 9 = extremely competitive) on a 9-point Likert scale.

Measures of social and epistemic motives We measured the main motives in both cooperative and competitive contexts respectively. For social motive, participants in the cooperative context were asked to assess "To what extent did you want to cooperate with your partner in the recall task?"; and participants in the competitive context were asked to assess "To what extent did you want to outperform your partner in the recall task?". Higher scores indicated that the participants were more socially motivated by the connection with their partners. For epistemic motive, all participants were asked to assess "To what extent did you want to recall correct words in the recall task?". Higher scores indicated that the participants were more epistemically motivated by the studied materials. Participants responded above items on a 9-point Likert scale (1 = very little; 9 = very much). These motive-measuring items served as indicators of participants' social and epistemic motives in the experiment. Then the experiment ended, all participants were debriefed and rewarded with the possible extra rewards received in the experiment.

Results

Manipulation check and individual differences To assess the effectiveness of context manipulation, we compared the scores of the cooperative and the competitive groups on the items of manipulation check. A two-sample t-test showed that there was a significant difference between the cooperative and the competitive groups. Participants in the cooperative group (2.88 ± 2.43) were more likely to think of themselves as cooperative with their partners than those in the competition group (5.60 ± 2.13), $(158) = 5.33$, < 0.001, $= 1.19$, and had a stronger feeling of cooperation (3.05 ± 2.11 vs. 5.58 ± 1.87), $(158) = 5.67$, < 0.001, $= 1.27$. These results suggested that the context manipulation was successfully distinguished between cooperation and competition.

For individual differences on cooperation and competition, we averaged the personality scores of two members in each group as a group indicator. A two-sample t-test showed that there was no significant difference in cooperative personality between the cooperative group (6.51 ± 1.01) and the competitive group (6.78 ± 1.06), $(158) = 1.16$, $= 0.25$, $= 0.26$, or in competitive personality (5.07 ± 1.21 vs. 5.26 ± 1.16), $(158) = 0.72$, $= 0.48$, $= 0.16$. The results indicated that cooperative and competitive groups in the experiment were matched in the psychological trait. Therefore, cooperation and competition personalities were not used as a control variable in subsequent analyses.

Collaboration inhibition: the number of correct recalls that the collaborative group had lower than the nominal group We first analyzed the effect of context manipulation on group memory. A 2 (goal interdependence: cooperation vs. competition) × 2 (retrieval: collaborative vs. nominal) repeated-measures ANOVA yielded only a main effect of retrieval, $(1,78) = 28.96$, < 0.001, $\eta_p^2 = 0.27$. The correct recalls of the collaborative groups ($= 13.70$, $= 3.47$) were fewer than those of the nominal groups ($= 15.76$, $= 3.78$), indicating a collaborative inhibition effect.

respectively. We split the data between the cooperation context and the competition context, and included collaborative inhibition score into a hierarchical regression analysis. The ýrst step included social motive and epistemic motive. The second step included the two-way interaction. In cooperative condition, the ýrst step of the model yielded no signiýcant eµect (all $s \geq 0.09$). The second step of the regression yielded a signiýcant interaction between social motive and epistemic motive, (36) = -3.37, = 0.002, ƃ = -0.52, 95% CI = [-0.95, −0.24] (all other $s \geq 0.15$). This model had a φ $^2 = 0.22$, (3, 36) = 5.11, = 0.005. In competitive condition, there was no signiýcant main eµect of social motive or epistemic motive, nor of their interaction ($s \geq 0.37$). To examine the interaction in cooperative condition, we divided groups into high epistemic motivated and low epistemic motivated ones on the basis of median splits, and performed separate simple slope tests. For groups with high epistemic motive (= 8.19, = 0.49), the social motive of cooperation reduced the collaborative inhibition, (36) = -2.22, = 0.04, ƃ = −0.45, 95% CI = [-3.13, -0.09]. For groups with low epistemic motive (= 8.19, = 0.49), the social motive of cooperation had no signiýcant eµect on the collaborative inhibition, (36) = 0.50, = 0.63, ƃ = 0.12, 95% CI =

lower than that of the nominal groups (=6.21, =2.66), indicating an error pruning eect. The main eect of goal interdependence and the interaction between goal interdependence and retrieval were not signiýcant (s≥0.21). The results did not show an eect of cooperative reward and competitive reward on the group recall error.

We focused on how social and epistemic motives inþuenced error pruning in dierent goal interdependence conditions. We deýned error pruning score as the dierence between the number of errors in the nominal groups and that in the collaborative groups, which indicated the reduction of the false recall by collaboration. The higher the error pruning score, the stronger the improvement on group recall. We included error pruning score, social and epistemic motives of group into a hierarchical regression analysis. The ýrst step included goal interdependence conditions (0=competitive, 1=cooperative), social motive, and epistemic motive. The second step included all two-way interactions. The third step included the three-way interaction. In the ýrst step of the model, there was no signiýcant eect (all s≥0.12). The second step of the regression yielded a signiýcant interaction between social motive and goal interdependence condition, (73)=3.57, =0.001, ƃ=0.58, 95% CI = [0.87, 3.07] (all other s≥0.06). This model had a φ ^{2}=0.16, (6, 73)=2.94, =0.13. The third step of the regression had no signiýcant three-way interaction, =0.42.

To further examine the interaction between social motive and goal interdependence, we performed regressions on social motives in cooperative and competitive contexts respectively. Figure 4 shows the regression lines of social motives in two conditions. The social motive of cooperation increased the error pruning, (38)=3.32, =0.002, ƃ=0.47, 95% CI = [0.34, 1.39]. The model had a φ ^{2}=0.22, (1, 38)=10.99, =0.002. However, the social motive of competition had no signiýcant eect on the error pruning, (38) = -1.41, =0.17, ƃ = -0.22, 95% CI = [-0.56, 0.10].

Discussion

This study investigated the eect of social identity on collaborative memory in a motivational approach. The results supported a key role of subjective social identity in that regard. Subjective social identity eliminated the inhibition eect of collaborative retrieval and produced error pruning when people worked with in-group members. This study also examined the social and epistemic motive that social

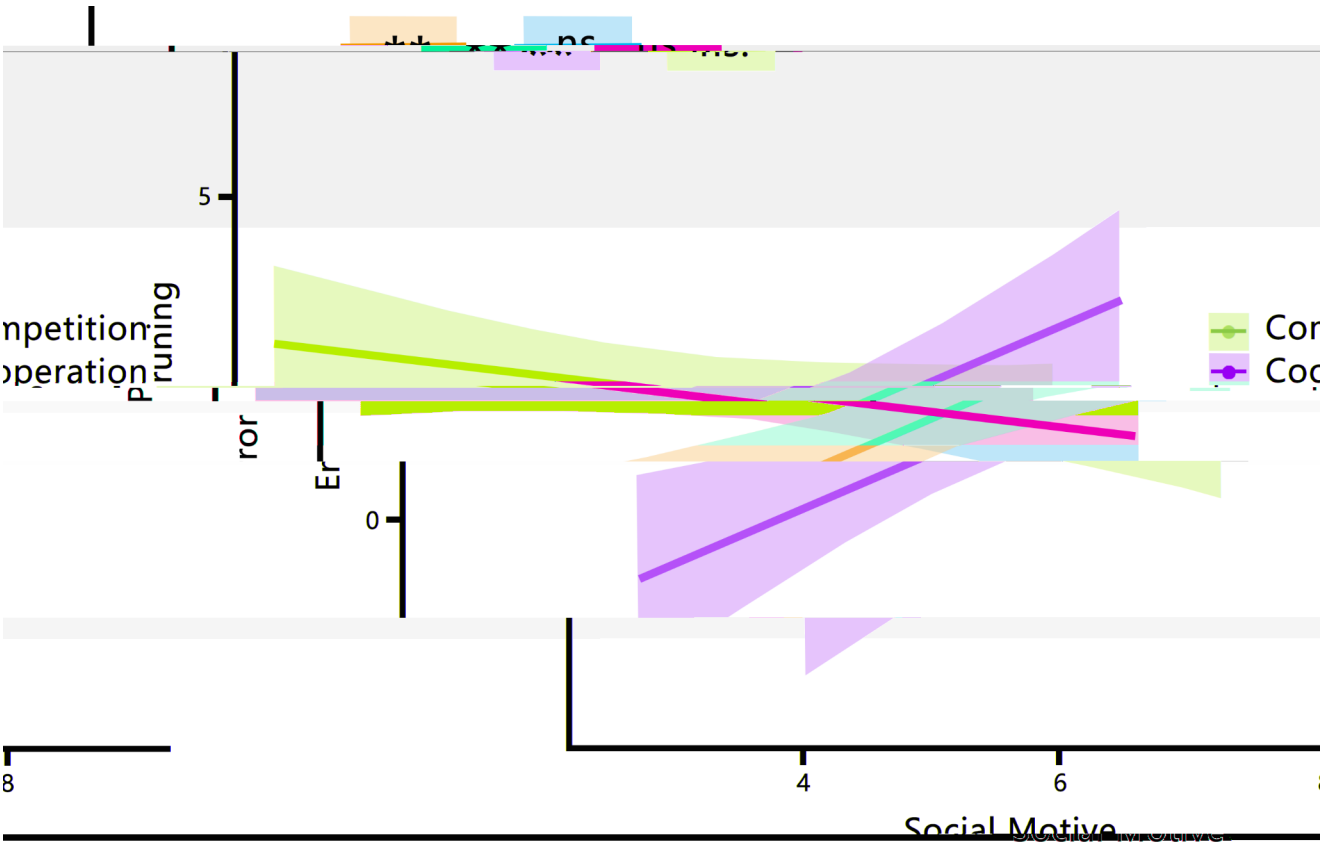

Fig. 4 Regression lines predicting error pruning scores as a function of social motive in cooperation and competition contexts. Shadow bands represent 95% conýdence interval. . ns. >0.05, ** <0.01

identity may intrigue, and found that social motive of cooperation can reduce collaborative inhibition and improve error pruning. The inþuence of cooperative motive on collaborative inhibition was demonstrated only in groups with high

highlights the pervasive role of motivational basis that plays in most phenomena, such as memory (Higgins et al., 2021). From this perspective, when we re-examine the "collaborationò in ñcollaborative memoryò, we may ýnd that collaboration is limited to people working together if motivation is missing. Our ýndings suggest that successful collaboration only beneýts collaborative memory when group members perceive a common identity or shared goals.

Unlike the result on correct recall, the false recall was not affected by epistemic motive. Rather, the cooperative motive directly increased error pruning, implying that the cooperators tend to correct each other's false memory more often. In fact, unlike correct memory, most incorrect answers are unshared by participants. They reþect individualsô unique knowledge background, so it is easier for their partners to distinguish errors without activating high epistemic motive. This is consistent with the results of Ross et al. (2008), who found that partners were more likely to make reservations for the incorrect recall rather than the correct recall. The present research further clariýes that intra-group cooperation makes a positive contribution to false memory ýlter. The common goal for a group reward helps for quality control of group memory.

The present research found the difference between objective and subjective social identity in predicting group recall, which highlighted the importance of subjective social identity to group memory. Consistent with Pepe et al. (2021), we found that objective social identity of participants did not affect collaboration inhibition of groups. However, subjective social identity affected group recall, with participants who perceived group identity during memory task improved group performance. SIT suggests that social behavior is closely related to subjective social identity (van Knippenberg, 2000). A group can only apply how their members behave if they are highly aware of their group membership, and the extent to which their behavior is affected depends on the degree to which they perceive their social identity (Ellemers et al., 2004). When participants switched between different tasks in the experiment, they may change group labels in consistent with the current task. This potential ambiguity of identity makes it possible for objective social identity to ignore the individual difference on group perception. Thus, labeling group membership does not guarantee the difference on group performance, while group identity based on subjective evaluation plays a unique role. The present study also extends the research on subjective social identity of beneýt on individual memory (Yang et al., 2008) by demonstrating an improvement on joint memory.

In this study, groups of strangers were used to control for cognitive familiarity among group members, which may provide an explanation for the inconsistent results in previous studies on social relationships. Most of these studies

used cognitive mechanisms to explain the effects of social relationship on group memory (Browning et al., 2018), suggesting that group members interrupted others' preferred retrieval strategies in collaboration (strategy disruption hypothesis; Basden et al., 1997; Marion & Thorley, 2016), thereby reducing both correct memory and false memory. Socially proximate partners have greater cognitive familiarity with each other and tend to adopt complementary and non-conþicted strategies, which reduces the extent of strategy disruption (e.g., Browning et al., 2018). However, other studies have found that social relationship did not affect collaborative memory (e.g., Harris et al., 2013). Inconsistent results may be due to the difference in cognitive familiarity among members. This study excluded the inþuence of prior cognitive familiarity by establishing temporary social relationships among strangers. This reduced the effect of strategy disruption to a certain extent, implying the motivational-based contribution of social identity to the outcome of collaborative recall.

The current study may have implications for the judiciary and other situations with group diversity. For example, a jury member may also belong to other social groups besides his or her jury membership. However, it might be conducive to recall accuracy of the jury by weakening group diversity and highlighting the common social identity, which can be strengthened by triggering of a variety of social cues. The current study also suggests that the desire for information accuracy moderated the change of group recall. Since jury members are responsible for the fate of the accused, and the involvement of responsibility would greatly increase their desire for information accuracy (Nijstad & De Dreu, 2012), the emphasis on jury responsibility can be used in the practice.

Several limitations of this study need to be acknowledged, some of which might offer directions for future research. Our study examined only a global indicator of social motives. The reward distribution for groups or individuals makes members motivated mainly by a sense of cooperation or competition (Park et al., 2015). However, in addition to tangible rewards, individuals may have multiple nontangible rewards and motives in group learning, such as face-saving, praise, and guilt (Matyjek et al., 2020). Our results will be more robust if we examine the possible inþuence of multiple social motives on group memory.

In addition, the current study did not directly demonstrate the correlation between social identity and motives. However, previous studies have found that social identity contributes to both social connection and epistemic certainty (Hogg & Adelman, 2013; Kopietz & Echterhoff, 2014). First, social identity can satisfy social needs, and enhances the cooperative tendency of members from the same group or exacerbates the competitive tendency of members from different groups (e.g., Halevy, 2008). This is consistent with the results of the open-ended question in Experiment 1, where the participants reported their motives in the group recall as cooperation with in-group members or competition with out-group members. Since goal interdependence may be a stronger way to manipulate in-group and out-group identity (Adachi et al., 2016), we used it as manipulation of group identities in Experiment 2. Second, social identity correlates with epistemic needs (Shah et al., 1998), so we examined the role of epistemic motive. After all, this study is a tentative attempt to investigate the inþuence of social identity on collaborative memory, and future research can delve deeper into the change of collaborative memory in the dimensions of multiple group identities such as group relationship, cooperation or epistemic trust.

Conclusion

The present study investigated the effects exercised by social identity and its motivational components on the performance of group recall. Our ýndings suggest that perceived social identity could beneýt group recall by both eliminating the negative effect and producing the positive effect of collaboration. This beneýt might be explained by the pursuit of a shared goal and information certainty by group members. These ýndings ýll a signiýcant gap of previous studies by scrutinizing different forms and motivational factors of social identity, providing insights for better understanding of the social and motivational process underlying collaborative memory. These results also suggest practical applications on increasing collaborative beneýts in certain workplaces or scenarios, such as co-witness discussion, interview panels assessment, and cognitive aging interventions.

Acknowledgements This study was supported by National Natural Science Foundation of China.

Authors' contribution All authors contributed to the study conception and design. Material preparation, data collection and analysis were performed by Xiaoshu Li. The ýrst draft of the manuscript was written by Xiaoshu Li. All authors commented on previous versions of the manuscript. All authors read and approved the ýnal manuscript.

Funding This work was supported by National Natural Science Foundation of China under grant No. 32171050.

Data availability and Code availability The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval This study was approved by the Committee for Protecting Human and Animal Subjects in the School of the Psychological and Cognitive Sciences, Peking University.

Informed consent All participants gave written informed consent before the study.

Con□ict of interest On behalf of all authors, the corresponding author states that there is no conþict of interest.

References

Adachi, P. J. C., Hodson, G., Willoughby, T., Blank, C., & Ha, A. (2016). From outgroups to allied forces: Eꝛect of intergroup cooperation in violent and nonviolent video games on boosting favorable outgroup attitudes. (3), 259–265. https://doi.org/10.1037/xge0000145

Aron, A., Aron, E. N., & Smollan, D. (1992). Inclusion of other in the Self Scale and the structure of interpersonal closeness. (4), 596–612. https://doi.org/10.1037/0022-3514.63.4.596

Barber, S. J., & Mather, M. (2012). Forgetting in context: The eꝛects of age, emotion, and social factors on retrieval-induced forgetting. (6), 874–888. https://doi.org/10.3758/s13421-012-0202-8

Basden, B. H., Basden, D. R., Bryner, S., & Thomas, R. L. (1997). A comparison of group and individual remembering: Does collaboration disrupt retrieval strategies? (5), 1176–1189. https://doi.org/10.1037/0278-7393.23.5.1176

Betts, K. R., & Hinsz, V. B. (2010). Collaborative group memory: Processes, performance, and techniques for improvement. (2), 119–130. https://doi.org/10.1111/j.1751-9004.2009.00252.x

Brewer, M. B. (2001, March). Sydney Symposium in Social Psychology.

Brigham, J. C., & Wasserman, A. W. (1999). The impact of race, racial attitude, and gender on reaction to the criminal trial of O. J. Simpson. (7), 1333–1370. https://doi.org/10.1111/j.1559-1816.1999.tb00143.x

Browning, C. A., Harris, C. B., Van Bergen, P., Barnier, A. J., & Rendell, P. G. (2018). Collaboration and prospective memory: Comparing nominal and collaborative group performance in strangers and couples. (9), 1206–1219. https://doi.org/10.1080/09658211.2018.1433215

Butera, F., & Darnon, C. (2017). Competence assessment, social comparison, and conþict regulation. In A. J. Elliot, C. S. Dweck, & D. S. Yeager (Eds.), (pp. 192–213). The Guilford Press.

De Dreu, C. K. W., Beersma, B., Stroebe, K., & Euwema, M. C. (2006). Motivated information processing, strategic choice, and the quality of negotiated agreement. (6), 927–943. https://doi.org/10.1037/0022-3514.90.6.927

E Enomoto, C. (1999). Public Sympathy for O. J. Simpson: The roles of race, age, gender, income, and Education. (1), 145–161. https://doi.org/10.1111/j.1536-7150.1999.tb03291.x

Ellemers, N., De Gilder, D., & Haslam, S. A. (2004). Motivating individuals and groups at work: A social identity perspective on leadership and group performance. (3), 459–478. https://doi.org/10.5465/AMR.2004.13670967

Gaertner, L., Iuzzini, J., Witt, M. G., & Oriña, M. M. (2006). Us without them: Evidence for an intragroup origin of positive in-group regard. (3), 426–439. https://doi.org/10.1037/0022-3514.90.3.426

Halevy, N. (2008). Team Negotiation: Social, Epistemic, Economic, and Psychological consequences of Subgroup Conþict. (12), 1687–1702. https://doi.org/10.1177/0146167208324102

Han, X., Zhou, S., Fahoum, N., Wu, T., Gao, T., Shamay-Tsoory, S., Gelfand, M. J., Wu, X., & Han, S. (2021). Cognitive and neural bases of decision-making causing civilian casualties during intergroup conþict. (9), 1–12. https://doi.org/10.1038/s41562-021-01064-1

Harris, C. B., Barnier, A. J., & Sutton, J. (2013). Shared encoding and the costs and beneýts of collaborative recall. (1), 183–195. https://doi.org/10.1037/a0028906

Higgins, E. T., Rossignac-Milon, M., & Echterhoꝛ, G. (2021). Shared reality: From sharing-is-believing to merging minds. (2), 103–110. https://doi.org/10.1177/0963721421992027

Hogg, M. A., & Adelman, J. (2013). Uncertainty–identity theory: Extreme groups, radical behavior, and authoritarian leadership. (3), 436–454. https://doi.org/10.1111/josi.12023

Jarosz, A. F., & Wiley, J. (2014). What are the odds? A practical guide to computing and reporting bayes factors. (1), 1–9. https://doi.org/10.7771/1932-6246.1167

Kato, T., & Shu, P. (2016). Competition and social identity in the workplace: Evidence from a Chinese textile ýrm. , 37–50. https://doi.org/10.1016/j.jebo.2016.07.014

Kopietz, R., & Echterhoꝛ, G. (2014). Remembering the 2006 Football World Cup in Germany: Epistemic and social consequences of perceived memory sharedness. (3), 298–313. https://doi.org/10.1177/1750698014530620

Lee, E. S., Park, T. Y., & Koo, B. (2015). Identifying organizational identiýcation as a basis for attitudes and behaviors: A meta-analytic review. (5), 1049–1080. https://doi.org/10.1037/bul0000012

Leicht-Deobald, U., Huettermann, H., Bruch, H., & Lawrence, B. S. (2021). Organizational demographic faultlines: Their impact on collective organizational identiýcation, ýrm performance, and ýrm innovation. (8), 2240–2274. https://doi.org/10.1111/joms.12747

Levine, J. M. (2018). Socially-shared cognition and consensus in small groups. , 52–56. https://doi.org/10.1016/j.copsyc.2017.12.003

Marion, S. B., & Thorley, C. (2016). A Meta-Analytic review of collaborative inhibition and postcollaborative memory: Testing the predictions of the Retrieval Strategy disruption hypothesis. (11), 1141–1164. https://doi.org/10.1037/bul0000071

Markus, H. R., & Kitayama, S. (1991). Culture and the self: Implications for cognition, emotion, and motivation. (2), 224–253. https://doi.org/10.1037/0033-295X.98.2.224

Masson, M. E. J. (2011). A tutorial on a practical bayesian alternative to null-hypothesis signiýcance testing. , 679–690. https://doi.org/10.3758/s13428-010-0049-5

Matyjek, M., Meliss, S., Dziobek, I., & Murayama, K. (2020). A multidimensional view on social and non-social rewards. , 818. https://doi.org/10.3389/fpsyt.2020.00818

Meyer, B., Shemla, M., & Schermuly, C. C. (2011). Social category salience moderates the eꝛect of diversity faultlines on information elaboration. (3), 257–282. https://doi.org/10.1177/1046496411398396

Nijstad, B. A., & De Dreu, C. K. W. (2012). Motivated information processing in organizational teams: Progress, puzzles, and prospects. , 87–111. https://doi.org/10.1016/j.riob.2012.11.004

Nokes-Malach, T. J., Richey, J. E., & Gadgil, S. (2015). When is it better to learn together? Insights from research on collaborative learning. (4), 645–656. https://doi.org/10.1007/s10648-015-9312-8

Nyberg, A. J., Maltarich, M. A., Abdulsalam, D. D., Essman, S. M., & Cragun, O. (2018). Collective pay for performance: A cross-disciplinary review and meta-analysis. (6), 2433–2472. https://doi.org/10.1177/0149206318770732

Oakes, P., & Turner, J. C. (1986). Distinctiveness and the salience of social category memberships: Is there an automatic perceptual bias towards novelty? (4), 325–344. https://doi.org/10.1002/ejsp.2420160403

Otten, S., & Mummendey, A. (2000). Valence - dependent probability of ingroup - favoritism between minimal groups: An integrative view on the positive - negative asymmetry in social discrimination. In D. Capozza & R. Brown (Eds.), (pp. 33–48). Sage. https://doi.org/10.4135/9781446218617.n3

Park, S. H., Son, L. K., & Kim, M. S. (2015). Social Contagion in competitors Versus Cooperators. (3), 305–313. https://doi.org/10.1002/acp.3197

Pepe, N. W., Wang, Q., & Rajaram, S. (2021). Collaborative remembering in ethnically uniform and diverse group settings. (1), 95–103. https://doi.org/10.1016/j.jarmac.2020.08.001

Pugliese, E., Bonaiuto, M., Livi, S., Theodorou, A., & Knippenberg, D. (2023). Team identiýcation more than organizational identiýcation predicts counterproductive work behavior and organizational citizenship behavior and mediates inþuences of communication climate and perceived external prestige. (5), 1–10. https://doi.org/10.1111/jasp.13017

Rajaram, S., & Maswood, R. (2017). Collaborative memory: A selective review of data and theory. In J. H. Byrne (Ed.), (2nd ed., pp. 53–70). Elsevier. https://doi.org/10.1016/B978-0-12-809324-5.21050-X

Ross, M., Spencer, S. J., Blatz, C. W., & Restorick, E. (2008). Collaboration reduces the frequency of false memories in older and younger adults. (1), 85–92. https://doi.org/10.1037/0882-7974.23.1.85

Shah, J. Y., Kruglanski, A. W., & Thompson, E. P. (1998). Membership has its (epistemic) rewards: Need for closure eœects on in-group bias. (2), 383–393. https://doi.org/10.1037/0022-3514.75.2.383

Sidorenkov, A. V., Borokhovski, E. F., & Vorontsov, D. V. (2022). Associations of employeesô identiýcation and citizenship behavior in organization: A systematic review and a meta-analysis. (2), 695–729. https://doi.org/10.1007/s11301-022-00258-9

Singelis, T. M. (1994). The measurement of independent and interdependent self-construals. (5), 580–591. https://doi.org/10.1177/0146167294205014

Sung, Y., Choi, S. M., & Tinkham, S. F. (2012). Brand-Situation Congruity: The roles of Self-Construal and Brand Commitment. (12), 941–955. https://doi.org/10.1002/mar.20576

Tajfel, H., & Turner, J. C. (1986). The social identity theory of intergroup behavior. In S. Worchel, & W. Austin (Eds.), (pp. 7–24). Nelson-Hall.

Van Bavel, J. J., & Pereira, A. (2018). The partisan brain: An identity-based model of political belief. (3), 213–224. https://doi.org/10.1016/j.tics.2018.01.004

Van Knippenberg, D. (2000). Work motivation and performance: A Social Identity Perspective. (3), 357–371. https://doi.org/10.1111/1464-0597.00020

Velez, J. A., Mahood, C., Ewoldsen, D. R., & Moyer-Gusé, E. (2014). Ingroup versus outgroup conþict in the context of violent video game play: The eœect of cooperation on increased helping and decreased aggression. (5), 607–626. https://doi.org/10.1177/0093650212456202

Wagenmakers, E. J., Love, J., Marsman, M., Jamil, T., Ly, A., Verhagen, J., Selker, R., Gronau, Q. F., Dropmann, D., Boutin, B., Meerhoœ, F., Knight, P., Raj, A., van Kesteren, E. J., van Doorn, J., Šmíra, M., Epskamp, S., Etz, A., Matzke, D., & Morey, R. D. (2018). Bayesian inference for psychology. Part II: Example applications with JASP. (1), 58–76. https://doi.org/10.3758/s13423-017-1323-7

Wang, Y., Zhou, L., & Luo, Y. (2008). The pilot establishment and evaluation of Chinese affective words system. (8), 608–612. https://doi.org/10.3321/j.issn:1000-6729.2008.08.014

Weldon, M. S., Blair, C., & Huebsch, P. D. (2000). Group remembering: Does social loaýng underlie collaborative inhibition? (6), 1568–1577. https://doi.org/10.1037/0278-7393.26.6.1568

Wright, D. B., & Klumpp, A. (2004). Collaborative inhibition is due to the product, not the process, of recalling in groups. (6), 1080–1083. https://doi.org/10.3758/BF03196740

Xie, X., Yu, Y., Chen, X., & Chen, X. (2006). The measurement of Cooperative and competitive personality. (1), 116–125.

Yamashiro, J. K., & Hirst, W. (2019). Convergence on collective memories: Central speakers and distributed remembering. (3), 461–481. https://doi.org/10.1037/xge0000656

Yang, H., Liao, Q., & Huang, X. (2008). Minorities remember more: The eœect of social identity salience on group-referent memory. (8), 910–917. https://doi.org/10.1080/09658210802360629