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Reports

Motivated social memory: Belonging needs moderate the own-group bias in face recognition

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ABSTRACT

The current research examines why people have superior recognition memory for own-group members compared to other-group members. In two studies, we provide evidence for one motivational mechanism underlying own-group bias—social belonging needs. In Study 1, participants assigned to a minimal group had superior memory for own-group compared to other-group faces, replicating previous research on the own-group bias. This pattern was moderated by participants' need to belong: participants who reported a higher (versus lower) need to belong showed greater own-group memory bias. In Study 2, participants who were socially excluded had superior memory for own-university compared to other-university faces than participants who were selected to work alone by a computer. Together, these studies suggest that chronic belonging needs and social exclusion motivate own-group bias. (124 words)

Introduction

People are better at remembering members of their own race than another race, an effect termed the own-race bias (ORB; also known as the cross-race effect or same-race bias; Brigham & Malpass, 1985; Malpass & Kravitz, 1969; Meissner & Brigham, 2001; Ng & Lindsay, 1994). Misidentifying people from another race can have harmful implications, including wrongful convictions based on eyewitness testimony (Brigham & Ready, 1985). Researchers have demonstrated this bias across a wide variety of paradigms and groups, including experimentally-created minimal groups, suggesting that own-group bias persists even when group distinctions are newly learned and exposure to own-group and other-group members is equivalent and brief (Bernstein, Young, & Hugenberg, 2007; Van Bavel, Packer, & Cunningham, 2008). Although there is extensive research on the contributions of perceptual expertise and social categorization to this bias, there has been very little research on the specific goals that motivate people to differentially encode own-group versus other-group members as individuals. In the current paper, we present two studies examining social belonging needs, one possible motivational mechanism underlying own-group memory bias.

Theoretical models of own-group bias

Two dominant models have been proposed to account for own-race (or own-group) memory bias (see Hugenberg, Young, Bernstein, & Sacco, 2010 for a recent review). For the past forty years, *perceptual expertise* has been widely accepted as the primary psychological mechanism underlying own-race bias (Malpass & Kravitz, 1969). According to this perspective, people become expert at distinguishing the physiognomic features of own-race faces because people tend to have extensive contact with members of their own-race relative to members of other races (Malpass & Kravitz, 1969; Sangrigoli, Pallier, Argenti, Ventureyra, & de Schonen, 2005; Valentine & Endo, 1992). The evidence for expertise has been mixed (Ng & Lindsay, 1994): although some studies have found a correlation between own-race expertise/contact and own-race bias (Sangrigoli et al., 2005), interracial contact accounts for only 2% of the total variance in own-race bias (Meissner & Brigham, 2001).

More recently, *social categorization* has been proposed to account for own-race bias (Hugenberg & Sacco, 2008; Levin, 1996; Sporer, 2001). According to this perspective, when people see a face, they immediately categorize the target as an in-group or out-group member, which subsequently influences the depth and type of processing engaged: own-race faces are processed as individuals and other-race faces as members of a social category (Sporer, 2001). The mere categorizing of faces as in-group or out-group members is sufficient to create an own-group bias in face memory—even when the social categories are completely arbitrary (Bernstein

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et al., 2007). Several studies have also shown that cognitive factors that enhance social categorization, such as stereotypic context (Shriver, Young, Hugenberg, Bernstein, & Lanter, 2008) and category salience (Hehman, Maniab, & Gaertner, 2010; Rule, Garrett, & Ambady, 2010), moderate own-group bias. The current research examines the possibility that motivational factors may also influence own-group bias.

As noted above, there is considerable research on the role of perceptual expertise and social categorization on own-group bias, but relatively little research examining whether goals motivate people to differentially encode own-group members as individuals. According to the *Categorization-Individuation Model* (CIM), however, own-race and own-group bias are influenced by perceptual expertise, social categorization, *and* motivated individuation (Hugenberg et al., 2010). Consistent with the CIM, recent research has shown that it is possible to attenuate the own-race bias by telling perceivers about the bias before encoding and instructing them either to individuate other-race faces (Hugenberg, Miller, & Claypool, 2007), or to pay attention to how they categorize biracial faces (Pauker et al., 2009). Nevertheless, it remains unclear whether these manipulations altered perceivers' goals (e.g., to successfully complete the memory task, comply with the experimenter, avoid appearing biased, etc.) or simply the means by which they pursued their pre-existing goals (Nuttin, 1980). The current research directly examines the role of motivation proposed by the CIM using a well established social motivation: social belonging needs (Baumeister & Leary, 1995; Maslow, 1968). Specifically, we examine whether social belonging needs increase bias in recognition memory for own-group relative to other-group faces.

Social belonging needs

Humans are social animals and form groups in virtually every culture (Brown, 1991). Social groups help fulfill a wide variety of psychological needs and help us cope with stressors (Correll & Park, 2005; Taylor et al., 2000). As a consequence, status and belonging needs are central to human well-being and may be secondary only to fundamental physical survival needs, such as food and shelter (Baumeister & Leary, 1995). Threatening these core social needs in the form of social exclusion or ostracism is a remarkably effective brand of punishment (Williams, 2007), and leads to psychological stress and numerous physiological maladies, including cardiovascular disease and immune system dysfunction (see Cacioppo & Hawkley, 2009). Given the adaptive nature of living in social groups and the dire consequences of expulsion, individuals are motivated to encode information relevant to belonging needs (Brewer & Caporael, 1995). As a consequence, we reasoned that people might be motivated to attend to and encode own-group members relatively more than other-group members, because own-group members afford an opportunity to fulfill belonging needs (Gibson, 1977).

Just as physical hunger directs attention toward and biases memory for food over nonfood cues (Atkinson & McClelland, 1948), the need to belong directs attention toward and biases memory for social over nonsocial cues (see Gardner, Pickett, & Brewer, 2000). For example, participants who were rejected in an ostensible computer chat room later had superior memory for social (versus non-social) events they read in a diary (Gardner et al., 2000; see also Pickett, Gardner, & Knowles, 2004). We sought to extend this work by showing that chronic need to belong or contextual social exclusion would motivate attention toward and memory for certain social cues over others, namely increased relative memory for own-group versus other-group members.

If people are socially motivated to belong, and a social category affords the opportunity for social affiliation (e.g., one's own-group), then people may experience differential motivation to individuate and encode faces that belong to that social category (Van Bavel & Cunningham, 2011b). This motivational approach to the own-group bias recalls classic models of social cognition and person perception in which perceivers individuate motivationally relevant targets (Brewer, 1988; Fiske & Neuberg, 1990). It is therefore likely that various social motives influence social memory, leading to the individuation of own-group or other-group members under different circumstances (e.g., Ruscher & Fiske, 1990; Ruscher, Fiske, Miki, & Van Manen, 1991). In the current research, we examine whether belonging needs act as one such motivating factor. We propose that participants with higher chronic belonging needs or participants who have been socially excluded will be motivated to differentially encode own-group compared to other-group members, thus revealing a motivational mechanism underlying own-group memory bias.

Overview

In two studies, we sought to replicate previous research showing an own-group memory bias – defined as greater memory for own-group relative to other-group members – with minimal and real groups, and to establish social belonging needs as a motivational mechanism to account for this bias. We predicted that people with a high need to belong would show greater own-group bias. We examined the role of motivation both with minimal groups, to ensure that previous expertise with own-group and other-group faces was equivalent and could not account for any observed effects, and with real groups, to investigate the role of this social motive in the context of pre-existing social identities. Additionally, we tested this motivational account using both chronic, trait-related individual differences in the need to belong, and experimentally heightened, state-related experiences of social exclusion designed to increase contextual belonging needs.

In Study 1, participants were assigned to a team either before or after studying own-group and other-group faces (Young, Bernstein, & Hugenberg, 2010). Participants also completed individual difference measures of need to belong, loneliness, and self-esteem. Including these three measures also allowed us to distinguish the motivational effects of the need to belong from a mere absence of social contact (i.e., loneliness) and self-esteem. *Sociometer Theory* argues that self-esteem acts as an index of the successful fulfillment of belonging needs (Leary & Baumeister, 2000), and including a measure of self-esteem allowed us to determine whether the relationship between the need to belong and own-group bias could be explained by self-esteem. In Study 2, we manipulated social exclusion by having people or a computer ostensibly exclude participants from a group task. Research suggests that social exclusion may motivate people to repair and maintain connections to others (Cacioppo & Hawkley, 2009). In both studies, we predicted that belonging needs would enhance relative memory for members of social categories who afford the richest opportunity for affiliation – own-group members – over members of other social categories.

Study 1: chronic need to belong predicts own-group memory bias

Study 1 sought to replicate the own-group bias in face recognition within a minimal group paradigm (Tajfel, Billig, Bundy, & Flament, 1971), and to establish whether belonging needs might predict the own-group bias. To this end, we assigned participants to a minimal group either before or after learning the members of both teams. We also asked participants to complete individual difference measures of need to belong, loneliness and self-esteem. In addition, we examined whether the need to belong would exert a stronger influence on own-group bias during learning or recognition (Young et al., 2010). We hypothesized that individual differences in the need to belong would predict the own-group memory bias.

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Method

Participants

One hundred and one undergraduate students (31 males) at The Ohio State University (mean age = 18.5) completed the study in exchange for partial course credit. None of the reported results were moderated by participant gender and it is not discussed further.

Procedure

After giving consent to participate, participants were randomly assigned to either the "blue team" or the "red team," and were instructed that they would be a part of this team for the duration of the study (Bernstein et al., 2007; Van Bavel & Cunningham, 2009; Van Bavel et al., 2008). Participants also completed a learning task in which they studied facial photographs of members of both teams, either before or after learning their team membership (encoding condition vs. retrieval condition). Participants then completed a series of individual difference questionnaires, followed by a recognition memory task that included "old" own-group or other-group faces that had been presented during the learning task, and "new" faces that were presumably own-group or other-group members on the basis of their blue or red background color, but had not been presented before. There were an equal number of old and new faces. Critically, face images were fully counterbalanced so that a given face was an own-group member for approximately half of participants, and another-group member for the other half. As such, no visual characteristics of specific faces varied with group assignment: only the experimental manipulation of group membership could account for differences in memory across participants.

Learning task

Participants were instructed that they would view faces of members of both the blue and red teams, and that they should remember the faces to the best of their ability. A total of 40 faces were presented: 20 members of the blue team and 20 members of the red team. Both teams were gender balanced, all target faces were White, and faces were presented in random order. Participants viewed the faces one at a time for 2 s each. Photos were placed on red and blue backgrounds to provide a visual cue to team membership, and to enable computation of both hit rates and false alarm rates as used in signal detection theory.

Individual differences

Participants completed measures of their need to belong (Leary, Kelly, Cottrell, & Schreindorfer, 2007), loneliness (Russell, 1996), and self-esteem (Robins, Hendin, & Trzesniewski, 2001) in counterbalanced order. The Need to Belong Scale (Leary et al., 2007) measures individual trait differences in belonging needs ($\alpha = .78$). Participants were asked to indicate the extent to which they agreed with a series of 10 statements on a 5-point Likert scale (1 = *strongly disagree* to 5 = *strongly agree*). The scale included items such as "I do not like being alone." Participants also completed the UCLA Loneliness Scale (Russell, 1996) which measures subjective feelings of being alone, but not the extent to which people need to belong ($\alpha = .86$). Participants were asked to indicate how often they experienced a series of 10 statements on a 4-point Likert Scale (1 = *often*, 2 = *sometimes*, 3 = *rarely*, 4 = *never*). Statements included items such as "How often do you feel completely alone?" Items were presented in random order in both scales. The Need to Belong scale was not correlated with the UCLA Loneliness Scale ($r = -.06$, $p = .54$), suggesting that they measured distinct constructs. The self-esteem scale consisted of one item from the Rosenberg Self Esteem Scale, "I have a high self-esteem," which has been shown to have strong convergent validity with the other items in the full version of the scale (Robins et al., 2001). Participants indicated their agreement with this item on a 6-point Likert Scale (1 = *strongly disagree* to 6 = *strongly agree*).

Memory task

After completing the individual differences scales, participants were tested on 80 different faces, balanced between old and new faces, and balanced between faces on blue and red backgrounds that indicated team membership. The blue and red backgrounds were displayed during the memory task to enable computation of both "hit rates" (participants' ability to correctly state that a face had been presented during the learning task, for both own-group and other-group faces) and also "false alarm" rates (participants' tendency to incorrectly state that a *new* face had been presented during the learning task, for both faces on red and blue backgrounds) as used in signal detection theory (e.g., Meissner & Brigham, 2001). Faces were presented in random order. For each face, participants were asked, "Did you see this face during the learning phase?" and could respond "Yes" or "No."

Response scoring

All responses were scored according to the discriminability index (*d*') scoring algorithm used in the signal detection framework (Vokey & Read, 1992), which provides a sensitivity score based on both the proportion of correctly identified "hits," and the proportion of "false alarms" (e.g., Meissner & Brigham, 2001). The discriminability index was used to examine memory. Furthermore, to examine the extent to which participants had relatively superior memory for own-group versus other-group faces, *d*' for other-group faces was subtracted from d' for own-group faces to create a composite sensitivity score indicative of preferential own-group over other-group memory (*d*' scores, hits and false alarm rates for own-group and other-group faces can be found in Table 1).

Results

To assess whether individual differences in the need to belong were associated with own-group bias, we conducted a 2 (group assignment: encoding, retrieval) × continuous (need to belong) multiple regression analysis on memory for own-group over other-group faces (*d*'). We dummy-coded group assignment (encoding = 0, retrieval = 1), mean-centered need to belong, and computed an interaction term between these variables (Aiken & West, 1991). Consistent with our central hypothesis, participants who report a higher need to belong had relatively superior memory for own-group compared to other-group members, $\beta = .36$, $t(97) = 2.57$, $p = .01$.[1] Participants did show greater own-group memory bias in the encoding versus retrieval condition, $\beta = -.40$, $t(97) = -3.22$, $p = .02$. Across encoding and retrieval conditions, need to belong was not significantly correlated with memory for own-group ($r = .08$, $p = .45$) or other-group ($r = -.18$, $p = .07$)[2] faces, suggesting that the overall effect of need to belong on memory was not unique to own-group or other-group faces, but the *relative* difference between own-group and other-group faces (i.e., own-group bias).

[1] This interaction was not moderated by target gender and it is not discussed further.

[2] In the encoding condition, need to belong was not correlated with own-group memory (*d*') ($r = .13$, $p = .35$) but was negatively correlated with other-group memory (*d*') ($r = -.35$, $p = .01$), indicating that for these participants, need to belong may be related to worse encoding of other-group faces. In the retrieval condition, need to belong was not correlated with own-group ($r = .07$, $p = .63$) or other-group ($r = -.13$, $p = .36$) memory.

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Table 1
Mean discriminability (*d'*), hit rates (*H*) and false alarm rates (*FA*) by condition and group membership in Study 1. Standard deviations in parentheses.

Condition	Own-group	Other-group
Encoding	*d'* = 1.05 (*SD* = .50)	*d'* = .79 (*SD* = .43)
	H = .78 (*SD* = .13)	*H* = .71 (*SD* = .14)
	FA = .29 (*SD* = .15)	*FA* = .33 (*SD* = .16)
Retrieval	*d'* = .93 (*SD* = .38)	*d'* = 1.00 (*SD* = .48)
	H = .75 (*SD* = .12)	*H* = .78 (*SD* = .12)
	FA = .31 (*SD* = .17)	*FA* = .32 (*SD* = .20)

We also examined the correlation between own-group bias and need to belong separately for participants in the encoding versus retrieval conditions. Interestingly, the need to belong was significantly correlated with own-group bias in the encoding condition ($r = .37$, $p < .01$) but not the retrieval condition ($r = .14$, $p = .34$) (see Fig. 1).[3] However, the relationship between the need to belong and own-group bias was not significantly different in the encoding versus retrieval condition ($p = .24$). Taken together, these results suggest that need to belong may motivate superior memory for own-group relative to other-group faces and may exert this influence when group membership is determined before encoding.

To determine whether the motivational aspect of the need to belong could be distinguished from loneliness, we conducted a 2 (group assignment: encoding, retrieval) × loneliness (continuous, mean-centered) multiple regression analysis on memory for own-group over other-group faces. As predicted, loneliness did not predict superior memory for own-group over other-group members, $\beta = .11$, $t(97) = .71$, $p = .48$, and this null effect did not differ between the encoding and retrieval conditions, $\beta = -.19$, $t(97) = -1.27$, $p = .21$. The need to belong also exerted a significant main effect on own-group memory bias when adjusting for loneliness ($\beta = .24$, $t(97) = 2.47$, $p = .02$). In sum, individual differences in loneliness did not exert the same effect as the need to belong.

We also sought to determine whether the effects of need to belong could be differentiated from any effects of self-esteem on own-group bias. Consistent with Sociometer Theory (Leary & Baumeister, 2000), there was a negative correlation between need to belong and self-esteem ($r = .21$, $p = .01$). To further explore this relation, we re-ran the group assignment (encoding, retrieval) × need to belong (continuous) multiple regression analysis on own-group bias, adjusting for mean-centered self-esteem and the interactions with self-esteem. The reported main effect of need to belong remained significant, $\beta = .34$, $t(97) = 2.24$, $p = .03$, as did the effect of encoding versus retrieval, $\beta = -.25$, $t(97) = -2.45$, $p = .02$. There were no observed main effects or interactions with self-esteem (all p's > .22). These results suggest that the relationship between the need to belong and own-group bias was independent of self-esteem.

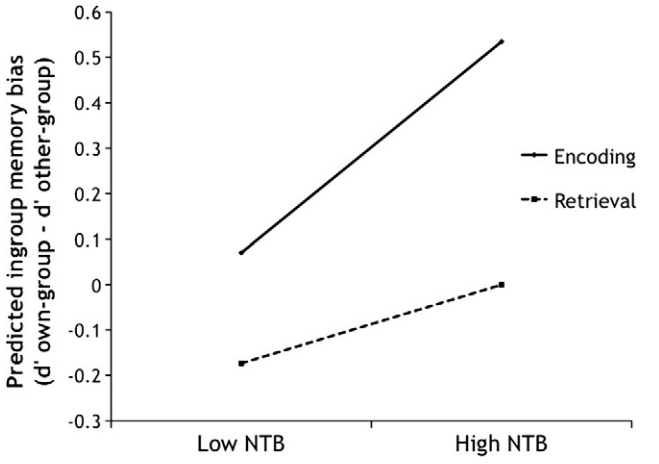

Fig. 1. The effect of timing of group assignment (at encoding, at retrieval) and trait Need to Belong (−1 or +1 standard deviation) on own-group memory bias (a difference score of $d'_{\text{own-group}} - d'_{\text{other-group}}$).

Discussion

The results of Study 1 replicated previous findings of own-group bias and provided evidence that social motives are associated with own-group bias. Specifically, trait belonging needs may operate as a motivating factor in how people preferentially encode and recognize own-group versus other-group faces. Interestingly, while individual differences in need to belong predicted the extent to which participants had preferential memory for own-group over other-group faces, loneliness was not a significant predictor of this bias, nor was loneliness correlated with need to belong. It is possible that this difference reflects an important distinction between loneliness and the motivational implications that may or may not accompany this state. The dissociation between these measures, as well as self-esteem, bolsters our hypothesis that the motivational aspect of need to belong may be a psychological mechanism moderating own-group bias. We examined whether social exclusion would exacerbate own-group bias in the following study.

Study 2: social exclusion enhances own-group memory bias

The purpose of Study 2 was to examine whether social exclusion can increase own-group bias—even in the context of pre-existing social identities. Specifically, we tested whether social exclusion, as opposed to a non-social form of exclusion in which participants are assigned to work alone due to a computer error, would create superior memory for own-group versus other-group faces. Previous research using this paradigm has shown that participants who are socially excluded report a greater need to belong than participants who are merely assigned to work alone (Pickett et al., 2004, Study 1). Moreover, the distinction between being socially excluded versus assigned to work alone is similar to the distinction between the need to belong and loneliness (Study 1), in that working alone may be unpleasant, but does not directly affect participants belonging needs. Importantly, participants in the "alone" condition were not explicitly "rejected" by the computer, but rather were notified that they had been randomly selected to complete the task alone due to a computer error. This distinction is important because previous research has shown that rejection can be painful to participants even when they are rejected by a computerized partner (Zadro, Williams, &

[3] To assess whether the own-group memory bias was moderated by the timing of group assignment, we conducted a 2 (target group membership: own-group, other-group) × 2 (group assignment: encoding, retrieval) mixed-model analysis on recognition memory for faces. Although participants had better memory for own-group (*d'* = .99) versus other-group (*d'* = .89) faces, this difference was not significant ($p = .14$). However, replicating previous research (Young et al., 2010), a target group membership by group assignment interaction ($p = .01$), indicated that participants assigned to a group prior to encoding had more biased recognition memory for own-group over other-group faces. As predicted, this recognition advantage for own-group ($M = 1.05$, $SD = .50$) versus other-group ($M = .79$, $SD = .43$) faces was significant for participants assigned to a group prior to encoding ($p < .01$), but not for participants assigned to a group at retrieval ($p = .44$). Because past studies have typically assigned participants to groups prior to a learning task, this finding replicates both the general finding of own-group memory bias and the specific finding that this bias occurs primarily at encoding, and further suggests that motivation to remember may moderate this effect. In addition, the effect of group assignment at encoding versus retrieval was significant among participants who were high on the need to belong (one standard deviation above; $p < .01$), but not among participants low in the need to belong (one standard deviation below; $p = .14$).

Richardson, 2004). We also sought to conceptually replicate and extend results from Study 1 beyond the minimal groups paradigm, and instead showed participants ostensible members of real groups (university affiliations). We predicted that participants who were socially excluded would show greater own-group memory bias than participants who were assigned to work alone due to a computer error.

Method

Participants

One hundred and nine male undergraduate students at The Ohio State University participated in exchange for partial course credit (mean age = 18.9). Ten participants were excluded from analysis for failing to correctly complete the partner selection task or indicating accurate suspicion of the hypothesis, leaving 99 participants for analysis.

Procedure

Participants gave consent to participate, and received instructions that they would be matched with a partner to complete a task virtually with students from other Ohio universities. Participants completed short profiles of themselves that would ostensibly be used in the partner choosing task, including their first name, hometown, and a personal interest or fact. Participants then viewed profiles of three fictional students and indicated whom they would like to work with and learned that participants at other Ohio universities would do the same. Ultimately, all participants were told they would complete the task alone. However, participants were told either that the computer had randomly selected them to work alone due to a computer error (alone condition), or that nobody else had chosen them as a partner (social exclusion condition). Participants then completed a learning task, a filler questionnaire, and a memory task as in Study 1. Different from Study 1, we used real groups and included individuals of different races in both groups. All participants were members of The Ohio State University; the University of Toronto was used as the other group. We used universities that were not rivals, because threatening out-groups can heighten attention and memory (Ackerman et al., 2006).

Learning task

The learning task was very similar to that in Study 1. Participants were asked to learn 40 faces from two different universities: 20 from The Ohio State University (own-group, presented on a red background) and 20 from the University of Toronto (other-group, presented on a blue background). Teams were mixed-race instead of mixed-gender (all faces were male), and faces were fully counterbalanced across conditions.

Memory task

The memory task was identical to Study 1. Participants viewed a total of 80 faces, half "old" and half "new," and reported whether they had seen each face during the prior "learning phase." As in Study 1, all responses were scored according to the discriminability index (d').

Results

Study 2 was designed to test whether experimentally manipulating social belonging needs would increase own-group memory bias. To assess whether belonging needs increase own-group memory bias, we conducted a 2 (group membership: own-group, other-group) × 2 (condition: social exclusion, alone) mixed-model ANOVA on memory for faces. We predicted that social exclusion, as opposed to working alone due to a computer error, would lead participants to better recognize own-group compared to other-group faces.

Replicating Study 1, there was a significant main effect of group membership, such that participants had superior memory (d') for own-group ($M = .86$, $SD = .49$) over other-group ($M = .76$, $SD = .41$) faces, $F(1, 97) = 4.40$, $p = .04$, $\eta^2 = .04$. There was no main effect of condition on overall memory, $F(1,97) = .12$, $p = .73$, $\eta^2 = .00$. As predicted, a significant group membership by condition interaction, $F(1, 97) = 4.23$, $p = .04$, $\eta^2 = .04$, indicated that social exclusion was associated with greater own-group memory bias than working alone due to a computer error (see Fig. 2).[4] Simple effects tests demonstrated that superior memory for own-group ($M = .90$, $SD = .47$) over other-group ($M = .70$, $SD = .39$) faces was significant among participants who were socially rejected, $t(48) = 2.85$, $p = .01$, $d = .41$, but not among participants who completed the task alone due to a computer error, $t(49) = .03$, $p = .98$, $d = .00$, who had similar memory for own-group ($M = .83$, $SD = .51$) and other-group ($M = .83$, $SD = .43$) faces (Table 2 for hit and false alarm rates). Consistent with Study 1, recognition memory for own-group ($p = .48$) and other-group ($p = .14$) faces did not vary across conditions, suggesting that the effect of social exclusion on recognition memory was not unique to own-group or other-group faces, but the relative difference between own-group and other-group faces (i.e., own-group bias). It is also worth noting that the bias in this study seems to be driven by false alarms (see Table 2). In summary, participants who were socially excluded had superior memory for own-group over other-group faces, while participants who merely worked alone due to a non-social reason did not show the same bias.

As in Study 1, we also wanted to differentiate effects of belonging needs from effects of self-esteem. Adjusting for mean-centered self-esteem and the interactions with self-esteem showed that the main effect of condition remained marginally significant, $F(1, 97) = 3.08$, $p = .08$, $\eta^2 = .03$. There were no observed main effects or interactions with self-esteem (p's > .41). These results suggest that the relationship between the need to belong and own-group bias was largely independent of self-esteem.

Discussion

The results of Study 2 are consistent with the hypothesis that belonging needs motivate people to differentially encode and recognize own-group compared to other-group members. This replicates and extends the results of Study 1 by suggesting that both chronic and contextual belonging needs may increase own-group memory bias. Surprisingly, we did not find evidence of own-group bias in the alone condition. One possibility is that participants may have focused more attention on the relatively higher status out-group (the University of Toronto is consistently ranked higher than The Ohio State University on a number of international reputation ratings; e.g., Academic Ranking of World Universities, 2009), attenuating the standard pattern of own-group bias. More importantly, own-group bias was relatively greater in the social exclusion condition. This pattern of results suggests that even participants without chronically high belonging needs may nonetheless be relatively more motivated to encode own-group members than other-group members after being socially excluded.

General discussion

We sought to examine whether social motivation may help to explain why people exhibit own-group bias (Hugenberg et al., 2010; Van Bavel & Cunningham, 2011b). In Study 1, participants with higher chronic trait measures of need to belong showed stronger

[4] Consistent with previous research (Van Bavel et al., 2008, 2011), this interaction was not moderated by target race ($p = .21$). However, there was an interesting interaction between race and group membership ($p < .01$) such that the own-race bias was attenuated among own-group versus other-group faces. This pattern of results suggests that group membership reduced the standard pattern of racial bias (Hehman et al., 2010; Van Bavel & Cunningham, 2009).

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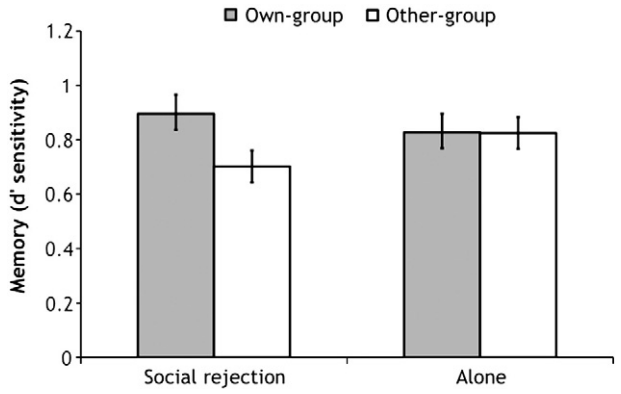

Fig. 2. The effect of social versus non-social exclusion on own-group and other-group recognition memory (*d'*). Error bars represent standard errors.

own-group memory bias, especially when they were assigned to a minimal group before encoding faces. Study 2 provided evidence that a social exclusion manipulation may motivate own-group bias—even in the context of pre-existing social identities. In two studies, we provided evidence that social belonging needs act as one potential motivational mechanism underlying recognition bias in favor of one's own-group.

More work is needed to specify the attentional mechanisms involved in the relationship between social belonging needs and own-group bias (see Van Bavel, Packer, & Cunningham, 2011 for a related discussion). The current studies present evidence that belonging needs heighten the relative preference for own-group versus other-group memory, but perhaps there are cases in which belonging needs change the criteria with which we evaluate own-group and other-group faces. Future studies should address the relationship between motivation and attention in social memory (Van Bavel & Cunningham, 2011a).

These studies suggest that social identities may serve our personal motivations by encoding people who may be relatively more likely to fulfill our needs, resulting in a relative own-group bias in memory. Indeed, we only found the effect of group membership and need to belong at encoding (not retrieval). We also measured (Study 1) and manipulated (Study 2, "alone" condition) loneliness, to distinguish the motivational effects of social belonging needs from a mere absence of social contact, and measured self-esteem in both studies, to differentiate between social belonging needs and self-esteem. Consistent with our predictions, the need to belong – and neither the mere absence of social contact, nor low self-esteem – was associated with own-group bias. Taken together, these studies help establish social belonging needs as a motivational mechanism in the own-group memory bias.

Based on results of the current studies, we propose an extension to the "social snacking" model of social exclusion (Gardner, Pickett, Jefferis, & Knowles, 2005; Gardner et al., 2000). According to the model, people who experience social exclusion seek to remedy their belonging needs by engaging in social affiliation (Gardner et al., 2000; Gardner et al., 2005). For example, participants who were socially rejected had superior memory for social compared to non-social stimuli (Gardner et al., 2000). Our findings suggest that social snacking may be selective, such that salient group memberships may guide the pursuit of our social goals. Own-group members may represent the ripest opportunity for people to affiliate with others and fulfill their belonging needs, relative to other-group members. Likewise, strengthening one's identity with a group can help to fulfill belonging needs (Knowles & Gardner, 2008). Although own-group members may afford the opportunity for people to fulfill a broad variety of goals (e.g., need to belong, need for distinctiveness, self-enhancement needs, etc.)(Brewer, 1991), other-group members may also afford the opportunity to fulfill certain goals. As such, self- or motivational-relevance might be a better descriptor of the proximal mechanism guiding social memory (Van Bavel & Cunningham, 2011b).

Table 2
Mean discriminability (*d'*), hit rates (*H*) and false alarm rates (*FA*) by condition and group membership in Study 2. Standard deviations in parentheses.

Condition	Own-group	Other-group
Social exclusion	d' = .90 (SD = .47)	d' = .70 (SD = .39)
	H = .73 (SD = .16)	H = .71 (SD = .12)
	FA = .30 (SD = .12)	FA = .35 (SD = .12)
Alone	d' = .83 (SD = .51)	d' = .83 (SD = .43)
	H = .72 (SD = .18)	H = .74 (SD = .15)
	FA = .33 (SD = .16)	FA = .35 (SD = .18)

Conclusion

This paper provides evidence that social motivation drives the own-group memory bias. Although there has been virtually no research on the specific goals that motivate people to differentially encode own-group members as individuals, we provide evidence of one such goal: the need to belong. These findings are consistent with recent theorizing about the role of motivation in own-race and own-group bias (Hugenberg et al., 2010; Van Bavel & Cunningham, 2011b). More generally, our research suggests that social motives interact with social categories – even minimal groups – to dynamically shape attention and memory.

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