

## TARGET EFFECTS

# MEMORY FOR EYE GAZE: ACCURACY, BIAS, AND THE ROLE OF FACIAL EMOTION

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Memory for behavior is functionally important, yet memory for many *details* of behavior decays quickly. The authors argue that the eye gaze, unlike some other details, is critical to understanding behavior and thus people should remember eye-gaze direction. The authors thus present the first data on eye-gaze memory. They also expected a self-enhancement memory bias favoring attributions to direct eye-gaze. Consistent with self-enhancement, the authors expected the direct-gaze memory advantage to be diminished for angry faces. Participants viewed faces that varied on eye gaze (direct, averted) and expression (angry, happy, neutral). Memory was tested via a forced-choice recognition test containing two versions of each face (varying in only direct- or averted gaze). Participants accurately remembered eye-gaze direction, although accuracy was higher for direct gaze. As expected, the direct-gaze memory advantage was diminished for angry faces. The authors discuss these results in the context of integrating research on social vision with extant models of person memory.

A long history of research in social cognition demonstrates both accuracy and bias in memory for others' behavior (Hamilton, Katz, & Leier, 1980; Klein & Loftus, 1990; Loftus, 1979; Sherman & Hamilton, 1994; Yuille & Cutshall, 1989). For example, in research utilizing written descriptions of behavior, accurate memory is fostered by the distinctiveness of the behavior and familiarity or interdependence with the person performing the behavior (Graesser, Woll, Kowalski, & Smith, 1980; Hamilton et al., 1980; Howard & Rothbart, 1980). In similar paradigms, biased

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memory for others' behavior is fostered by consistency motives, stereotypes, and postevent suggestions (Klein & Loftus, 1990; Loftus, 1979; Ross, 1989; Sherman & Hamilton, 1994). Despite this large literature, memory for nonverbal elements of behavior remains relatively unexplored (but see D'Argembeau & Van der Linden, 2004, 2007). Nonverbal behaviors, such as eye gaze and facial expressions, provide cues to others' mental states (cf. Ambady & Weisbuch, 2010) and may therefore be important for social perceivers to accurately remember when they encounter those minds again. In the current research, we examine memory for a nonverbal cue of particular importance to social perceivers: eye gaze.

### **SOCIAL MEMORY: CAN PEOPLE REMEMBER OTHERS' EYE GAZE?**

Social perceivers use eye gaze as a cue to others' behavioral intentions (e.g., Adams & Kleck, 2003), and this process is of sufficient importance that the perception and interpretation of eye gaze appears to be necessary for normative social development (Baron-Cohen, Leslie, & Frith, 1985; Baron-Cohen, Wheelwright, Hill, Raste, & Plumb, 2001). Despite the clear functional importance of eye-gaze perception, *eye-gaze memory* is yet to be explored.

To understand why eye-gaze memory might be important, it is useful to understand why more general person memory is important. Person memory enables people to adjust their interpersonal behavior and decisions on the basis of what they have learned about specific individuals (Klein, Cosmides, Tooby, & Chance, 2002). Consistent with broader models of human memory (e.g., Tulving, 1972), person memory includes knowledge about specific individuals, such as their personality and relationship to oneself (*semantic memory*), but also detailed memories of their behavior (here, *behavioral memory*). Semantic and behavioral memory may seem redundant, but there is evidence that they have complementary functions, such that semantic memory is useful for general decisions or those involving well-known individuals whereas behavioral memory is useful for context-specific decisions or those involving recently met individuals (cf. Klein et al., 2002).

Behavioral memories typically include details about time and place, but the capacity of such memory is not infinite. Perceptual details of an event quickly decay in memory, limiting behavioral memory (Loftus, 1996; Loftus & Palmer, 1974). Consequently, salient or functionally important features of the behavior are more likely to be remembered than other features. In this respect, eye gaze is an especially intriguing element of behavior in that it subsumes a small portion of perceivers' visual fields, yet also provides just the sort of important contextually specific detail absent in general semantic memory. For example, the inclusion of eye gaze in a behavioral memory would enable data-driven inferences about the purpose and target of that behavior. That is, gaze direction reveals intention and the target of the gazer's behavior, including (at times) oneself (Adams & Kleck, 2003; Baron-Cohen, Jolliffe, Mortimore, & Robertson, 1997; Baron-Cohen et al., 2001). Consequently, memory for eye-gaze direction would support the function of behavioral memory by providing data about the intention and target of a gazer's behavior. More broadly, memory for eye gaze provides the type of data that makes behavioral memory useful—context-bound details that are adaptively important but typically unavailable in semantic memory. For this reason, we expected people to have the ability to remember eye-gaze direction.

## SOCIAL MEMORY: INFLUENCES ON EYE GAZE MEMORY

The distinction between direct gaze (eye contact) and averted gaze is especially important for most perceivers, in that it distinguishes between behavior directed toward the self and behavior directed elsewhere (Kleinke, 1986). Given that direct gaze clearly emphasizes the self as the target of behavior, even signaling inclusion (Wirth, Sacco, Hugenberg, & Williams, 2010), eye-gaze memory may be saturated with self-oriented biases. In the context of behavior relevant to the self, self-enhancement motives are especially likely to play an important role by biasing memories to favor the self (Kwang & Swann, 2010; Sanitioso & Wlodarski, 2004; Sedikides & Green, 2000). Indeed, research on memory for facial *identity* demonstrates greater accuracy for faces exhibiting direct eye gaze than for faces exhibiting averted eye gaze (Hood, Macrae, Cole-Davies, & Dias, 2003; Mason, Hood, & Macrae, 2004). Consistent with this evidence, we hypothesized that memory for eye gaze would be better for direct than for averted eye gaze and that this effect would reflect, in part, self-enhancement.

To examine the role of self-enhancement, we leveraged the inherent ambiguity of eye gaze (Kleinke, 1986) and used contextual cues to adjust the self-relevant meaning of gaze. Under conditions in which direct eye gaze does *not* signal inclusion, we expected a diminished or eliminated memory advantage for direct eye gaze. Specifically, we manipulated whether faces exhibited angry, neutral, or happy expressions. If enhanced memory for direct gaze is due in part to self-enhancement, that memory bias should be greatly reduced or eliminated when direct gaze no longer indicates inclusion, as for faces exhibiting a threatening (angry) expression (neutral direct gaze appears to signal inclusion; Wirth et al., 2010). In this context, direct eye gaze should no longer be indicative of inclusion, and attributing direct gaze to such faces would not satisfy self-enhancement motives in the same way that a neutral or happy face would.

We also measured narcissism as a proxy for individual differences in self-enhancement. Narcissistic individuals should thus show (a) an especially strong direct-gaze memory advantage and (b) an especially large reduction in a direct-gaze memory advantage with angry faces.

## THE CURRENT RESEARCH: HYPOTHESES AND DESIGN

In summary, we had four predictions. First, we expected people to exhibit above-chance memory for eye gaze (H1). Specifically, we expected people to remember whether an individual face previously exhibited direct or averted eye gaze. Second, we expected memory for direct eye gaze to be better than memory for averted eye gaze (*direct-gaze memory advantage*; H2). Third, consistent with self-enhancement, we expected the direct-gaze memory advantage to be reduced or eliminated for angry faces (H3). Fourth, consistent with self-enhancement, we expected narcissistic individuals to exhibit (a) an especially large direct-gaze memory advantage and (b) an especially large reduction in this advantage in the context of anger. To test these hypotheses, we measured memory for eye gaze with a 3 (emotion: anger, joy,

neutral)  $\times$  2 (gaze: direct, averted) repeated-measures design and included narcissism as a continuous between-subjects moderator.

## METHOD

### PARTICIPANTS AND SETTING

Participants were recruited and paid via Mechanical Turk (see Buhrmester, Kwang, & Gosling, 2011), and the experiment was conducted online via Qualtrics® software. The original sample of 182 participants (in the United States) was reduced to 156 (94 female) because of Qualtrics technical issues in presenting images ( $n = 19$ ), no variance in participant responses ( $n = 4$ ), completing the experiment twice ( $n = 2$ ), and incomplete data ( $n = 1$ ). The sample included a variety of ages (range = 18–63; quartiles = 22, 28, 37) and ethnicities (126 White, 10 Black, 10 Asian, 9 mixed-race, and 1 Latino). There were no age differences in memory.

### MATERIALS

*“Study” Images.* Twenty-four models (12 female) were selected from the NimStim collection of empirically standardized facial images (Tottenham et al., 2009), including four Asian models and one Latino model (all others were White). Angry, happy, and neutral images were selected for each model. Because the NimStim database includes models exhibiting direct eye gaze, we generated right-averted-gaze images with photo-editing software (see Figure 1). Six sets of images were created for counterbalancing purposes. Each set included eight angry, eight happy, and eight neutral images, half of which were male and half of which were averted gaze. The six counterbalancing conditions ensured that each model was shown once within each emotion-gaze category (anger-direct, anger-averted, joy-direct, etc.).

*“Test” Images.* The memory test included 24 items. Each item included two facial images of the same model exhibiting the same emotion displayed at “study.” The two images differed only with respect to eye gaze, which was either direct or right-averted—hence, each item included the correct “study” image and a foil. The direct-gaze image always appeared on the participant’s right to ensure that the averted-gaze face never “looked at” the direct-gaze face. Participants were asked which of the two faces they saw during the first study phase.

*Narcissistic Personality Inventory.* The Narcissistic Personality Inventory (NPI-16; Ames, Rose, & Anderson, 2006) is an index of nonclinical narcissistic thought and behavior. As noted by Ames and colleagues (2006), responses to the NPI-16 are closely associated with self-enhancement. Each of the 16 items asks respondents to select one of two statements that best describe themselves. A sample pair of statements included “I really like to be the center of attention” and “It makes me uncomfortable to be the center of attention.” This scale has adequate reliability (e.g.,  $\alpha = .72$ ; Ames et al., 2006), and scores can range from low (0) to high (16) levels of narcissism.



FIGURE 1. Example of images used. Both images depict a female with a neutral facial expression. The image on the left has direct gaze and the image on the right has right-averted gaze.

## PROCEDURE

Participants were randomly assigned to one of the six counterbalancing conditions and told that they would be completing a face memory study in which they would first see 24 faces, presented for 5 s each, and later take a memory test about those faces. Participants were then shown each of the 24 faces in a random order (determined separately for each participant by Qualtrics software).<sup>1</sup> After this study phase, a distraction phase was included in which participants completed questionnaires not central to the current investigation. After these surveys, participants then (in order) completed the memory test, the NPI, and demographic questions, and were debriefed and paid.

## RESULTS

### H1: CAN PEOPLE REMEMBER EYE GAZE?

This is the first published empirical study (of which we are aware) that has examined memory for eye gaze. We therefore report a very simple statistic: the overall proportion correct. Average overall accuracy was 63%. A single-sample *t* test revealed that this rate was significantly greater than chance (which was 50%),  $t(155) = 16.83, p < .001$ . Hence, people can remember the direction of others' eye gaze.

### H2: IS MEMORY FOR DIRECT GAZE BETTER THAN MEMORY FOR AVERTED GAZE?

To examine the relative influences of facial emotion and gaze direction on eye-gaze memory, we conducted a 3 (facial emotion)  $\times$  2 (gaze direction) repeated-measures

1. 1 Experimenter error in two of the counterbalancing conditions required us to eliminate one of the test items in both conditions. Specifically, in both of these conditions, one of the male happy faces was presented as "neutral" at test. Hence, for participants in these counterbalancing two conditions there was one less happy image ( $n = 7$ , rather than 8) on which to conduct analyses.

ANOVA on percentage correct. A significant main effect of gaze direction indicated that memory for direct gaze ( $M = 75.1\%$ ) was better than memory for averted gaze ( $M = 50.9\%$ ),  $F(1, 155) = 85.73, p < .001$ . Conversely, there was no significant main effect of facial emotion ( $p = .36$ ). This finding appears to support H2. This ANOVA is further explained below.

### H3: IS THE DIRECT-GAZE MEMORY ADVANTAGE REDUCED FOR ANGRY FACES?

The direct-gaze memory advantage (consistent with H2) was qualified by a significant interaction between facial emotion and gaze direction,  $F(2, 310) = 12.25, p < .001$ . To explain this interaction, we examined if, as hypothesized, memory for direct gaze was worse for angry faces than for neutral or happy faces. Memory for direct gaze was worse for faces exhibiting anger ( $M = 69\%$ ) than for faces exhibiting happiness ( $M = 76\%$ ),  $t(155) = 2.91, p = .004$ , or neutral emotion ( $M = 79\%$ ),  $t(155) = 3.77, p < .001$  (memory for direct gaze did not differ between happy and neutral faces,  $p = .24$ ). We next examined if memory for averted gaze was *better* for angry faces than for neutral or happy faces. Memory for averted gaze was *better* for faces exhibiting anger ( $M = 56\%$ ) than for faces exhibiting happiness ( $M = 47\%$ ),  $t(155) = 3.41, p = .001$ , or neutral emotion ( $M = 49\%$ ),  $t(155) = 2.72, p = .007$  (memory for averted gaze did not differ between happy and neutral faces,  $p = .44$ ). Thus, people were *less* likely to remember direct gaze on angry faces and *more* likely to remember averted gaze on angry faces, consistent with self-enhancement.

We sought to examine the extent to which the direct-gaze advantage and its reduction were due specifically to memory *bias*. To isolate bias from accuracy we conducted signal detection (SDT) analyses, using *Criterion C* as our index of bias, with scores below 0 indicating a direct-gaze memory bias ( $d'$  indexed accuracy).<sup>2</sup>  $C$  was significantly different from chance for all three emotions ( $t_{\text{anger}} = 3.95, t_{\text{happy}} = 8.53, t_{\text{neutral}} = 8.77$ ; all  $ps < .001$ ), indicating a clear direct-gaze memory bias.<sup>3</sup> Consistent with self-enhancement, however, this bias was reduced in the context of facial anger. Specifically, a repeated-measures ANOVA with emotion as a fixed factor revealed a significant effect on  $C$ ,  $F(2, 310) = 12.31, p < .001$ . Participants were less likely to exhibit a direct-gaze memory *bias* on angry faces ( $MC = -.12$ ) than on happy faces ( $MC = -.27$ ),  $t(155) = 4.10, p < .001$ , or neutral faces ( $MC = -.28$ ),  $t(155) = 2.70, p < .001$ .

2. "Hits" and "false alarms," respectively, were defined as correctly or incorrectly indicating that a face had exhibited direct eye gaze *at study*. Accuracy was computed as  $d' = z(\text{hits}) - z(\text{false alarms})$ . The value  $d'$  cannot be calculated when hits or false alarms = 0, so proportions of hits and false alarms were transformed into Bayesian proportions, where  $s = \text{successes}$  and  $f = \text{failures}$ ,  $P(s) = (s + 1)/(s + f + 2)$ .  $S$  is equal to either the number of hits or false alarms and  $s + f$  is equal to the total possible trials for that type of face. Thus, *Criterion C* (henceforth,  $C$ ) =  $-.5 * [z(\text{hits}) + z(\text{false alarms})]$ . Hence, response bias for direct gaze in the current analysis results in *lower* scores.

3. A repeated-measures ANOVA with emotion as a fixed factor did not reveal a significant effect on  $d'$ ,  $F(2, 310) = 1.44, p = .23$ .

#### H4: DO NARCISSISTS EXHIBIT AN ESPECIALLY STRONG DIRECT-GAZE MEMORY ADVANTAGE?

To examine the relationship between narcissism and the direct-gaze memory advantage, difference scores for direct-gaze versus averted-gaze memory were created (high scores indicate a greater direct-gaze memory advantage). Contrary to our predictions, there was no reliable relationship between narcissism and the direct-gaze memory advantage,  $r(154) = -.09, p = .25$ .

#### H5: DO NARCISSISTS EXHIBIT AN ESPECIALLY STRONG REDUCTION IN THE DIRECT-GAZE MEMORY ADVANTAGE FOR ANGRY FACES?

We also calculated difference scores for each of the three facial emotion conditions. Narcissism was unrelated to the direct-gaze memory advantage for happy faces,  $r(154) = .02, p = .85$ , or neutral faces,  $r(154) = -.08, p = .31$ . However, the direct-gaze memory advantage was marginally reduced for individuals scoring higher on the NPI,  $r(154) = -.15, p = .06$ . Thus, although narcissists do not exhibit an especially large direct-gaze memory advantage, they appear to be reluctant to make direct-gaze memory attributions for angry faces, consistent with hypotheses.

## DISCUSSION

The current study provides the first evidence that people are capable of remembering the direction of others' eye gaze. Specifically, several minutes after exposure to a variety of faces, perceivers were able to accurately identify who had previously looked at them and who had looked away. The current study also provides the first evidence that people exhibit a direct-gaze memory bias. We anticipated this effect and hypothesized that self-enhancement motives might be responsible. Experimental evidence mostly supported this explanation, such that the direct-gaze memory advantage was substantially reduced for angry faces. This reduction was strongest among people especially prone to self-enhancement (narcissistic individuals).

### SELF-MOTIVES IN SOCIAL VISION

Self-enhancement motives are known to be involved in judgments of other people, including attention to, interpretation of, and memory for social feedback (e.g., Sanitioso & Wlodarski, 2004; Sedikides & Green, 2000). More generally, there is a substantial literature on self-oriented motives (self-enhancement, self-consistency; e.g., Crocker & Park, 2004; Kitayama, Markus, Matsumoto, & Norasakkunkit, 1997; Swann & Ely, 1984) that has only rarely been applied to social vision. The current work provides initial evidence that perceptual memory in the social domain is subject to self-enhancement motives, but there may be circumstances in which self-consistency or self-accuracy motives bias perceptual memory. The cur-

rent work may provide a springboard for hypotheses regarding self-motives in social-perceptual memory.

### ACCURACY IN EYE GAZE MEMORY

The current research highlights the utility of examining the role of nonverbal expressions in behavioral memory. Research utilizing written descriptions of behavior or videos of overt behaviors (e.g., punching, stealing) has yielded a great deal of scientific knowledge regarding the organization, likelihood, and consequences of behavioral memory (Babey, Queller, & Klein, 1998; Hamilton, Driscoll, & Worth, 1989; Hamilton et al., 1980; Hastie & Park, 1986; Klein & Loftus, 1990; Loftus, 1979; Sherman & Hamilton, 1994; Yuille & Cutshall, 1989). Yet the advent of social vision research adds new questions to the behavioral memory literature, including questions about the role of social-perceptual processes and the nonverbal cues most likely to be remembered. The discovery in the current article implies, at least, that eye-gaze memory may play an influential role in behavioral memory more broadly.

### LIMITATIONS

Online studies provide samples that are more representative with respect to socioeconomic status and age than are typical college samples, and this sampling advantage motivated our choice of venue for a study that might provide the first evidence for a memory phenomenon. Yet despite evidence for the validity of online studies (cf. Buhrmeister et al., 2011) and despite checks on attention during experimental tasks, online memory studies may underestimate accuracy and overestimate bias if participants are distracted. For this reason, the current findings should be replicated within a laboratory environment. Additionally, there is some ambiguity regarding the nature of eye-gaze memory in the task we utilized. Future studies may clarify whether people encoded the direction of attention (i.e., self or not-self) exhibited by the face or eye-gaze direction per se.

### CONCLUSION

The eyes represent a relatively small area of a face. Nonetheless, people appear to be capable of remembering eye-gaze direction on particular faces—even when presented with more than 20 faces in 2 minutes and even when asked for their memory after several minutes of effortful distraction. These findings point to the importance of integrating traditional models of behavioral memory with emerging evidence for the importance of viewing nonverbal behavior in observers' social cognitions.



## REFERENCES

- Adams, R. B. Jr., & Kleck, R. E. (2003). Perceived gaze direction and the processing of facial displays of emotion. *Psychological Science, 14*, 644–647.
- Ambady, N., & Weisbuch, M. (2010). Nonverbal behavior. In S. T. Fiske, D. T. Gilbert, & G. Lindzey (Eds.), *Handbook of social psychology* (pp. 464–497). Hoboken, NJ: Wiley.
- Ames, D. R., Rose, P., & Anderson, C. P. (2006). The NPI-16 as a short measure of narcissism. *Journal of Research in Personality, 40*, 440–450.
- Babey, S. H., Queller, S., & Klein, S. B. (1998). The role of expectancy violating behaviors in the representation of trait knowledge: A summary-plus-exception model of social memory. *Social Cognition, 16*, 287–339.
- Baron-Cohen, S., Jolliffe, T., Mortimore, C., & Robertson, M. (1997). Another advanced test of theory of mind: Evidence from very high functioning adults with autism or Asperger syndrome. *Journal of Child Psychology and Psychiatry, 38*, 813–822.
- Baron-Cohen, S., Leslie, A. M., & Frith, U. (1985). Does the autistic child have a “theory of mind”? *Cognition, 21*, 37–46.
- Baron-Cohen, S., Wheelwright, S., Hill, J., Raste, Y., & Plumb, I. (2001). The “reading the mind in the eyes” test revised version: A study with normal adults, and adults with Asperger syndrome or high-functioning autism. *Journal of Child Psychology and Psychiatry, 42*, 241–251.
- Buhrmester, M., Kwang, T., & Gosling, S. D. (2011). Amazon’s Mechanical Turk: A new source of inexpensive, yet high-quality, data? *Perspectives on Psychological Science, 6*, 3–5.
- Crocker, J., & Park, L. E. (2004). The costly pursuit of self-esteem. *Psychological Bulletin, 130*, 392–414.
- D’Argembeau, A., & Van der Linden, M. (2004). Identity but not expression memory for unfamiliar faces is affected by aging. *Memory, 12*, 644–654.
- D’Argembeau, A., & Van der Linden, M. (2007). Facial expressions of emotion influence memory for facial identity in an automatic way. *Emotion, 7*, 507–515.
- Graesser, A. C., Woll, S. B., Kowalski, D. J., & Smith, D. A. (1980). Memory for typical and atypical actions in scripted activities. *Journal of Experimental Psychology: Human Learning and Memory, 6*, 503–515.
- Hamilton, D. L., Driscoll, D. M., & Worth, L. T. (1989). Cognitive organization of impressions: Effects of incongruity in complex representations. *Journal of Personality and Social Psychology, 57*, 925–939. OI
- Hamilton, D. L., Katz, L. B., & Leier, V. O. (1980). Cognitive representation of personality impressions: Organizational processes in first impression formation. *Journal of Personality and Social Psychology, 39*, 1050–1063.
- Hastie, R., & Park, B. (1986). The relationship between memory and judgment depends on whether the judgment task is memory-based or on-line. *Psychological Review, 93*, 258–268.
- Hood, B. M., Macrae, C. N., Cole Davies, V., & Dias, M. (2003). Eye remember you: The effects of gaze direction on face recognition in children and adults. *Developmental Science, 6*, 67–71.
- Howard, J. W., & Rothbart, M. (1980). Social categorization and memory for in-group and out-group behavior. *Journal of Personality and Social Psychology, 38*, 301–310.
- Kitayama, S., Markus, H. R., Matsumoto, H., & Norasakkunkit, V. (1997). Individual and collective processes in the construction of the self: Self-enhancement in the United States and self-criticism in Japan. *Journal of Personality and Social Psychology, 72*, 1245–1267.
- Klein, S. B., Cosmides, L., Tooby, J., & Chance, S. (2002). Decisions and the evolution of memory: Multiple systems, multiple functions. *Psychological Review, 109*, 306–329.
- Klein, S. B., & Loftus, J. (1990). Rethinking the role of organization in person memory: An independent trace storage model. *Journal of Personality and Social Psychology, 59*(3), 400–410.
- Kleinke, C. L. (1986). Gaze and eye contact: A research review. *Psychological Bulletin, 100*, 78–100.
- Kwang, T., & Swann, W. B., Jr. (2010). Do people embrace praise even when they feel

- unworthy? A review of critical tests of self-enhancement versus self-verification. *Personality and Social Psychology Review*, 14, 263–280.
- Loftus, E. F. (1979). The malleability of human memory: Information introduced after we view an incident can transform memory. *American Scientist*, 67, 312–320.
- Loftus, E. F. (1996). *Eyewitness testimony*. Cambridge, MA: Harvard University Press.
- Loftus, E. F., & Palmer, J. C. (1974). Reconstruction of automobile destruction: An example of the interaction between language and memory. *Journal of Verbal Learning and Verbal Behavior*, 13, 585–589.
- Mason, M., Hood, B., & Macrae, C. N. (2004). Look into my eyes: Gaze direction and person memory. *Memory*, 12, 637–643.
- Ross, M. (1989). Relation of implicit theories to the construction of personal histories. *Psychological Review*, 96, 341–357.
- Sanitioso, R. B., & Wlodarski, R. (2004). In search of information that confirms a desired self-perception: Motivated processing of social feedback and choice of social interactions. *Personality and Social Psychology Bulletin*, 30, 412–422.
- Sedikides, C., & Green, J. D. (2000). On the self-protective nature of inconsistency-negativity management: Using the person memory paradigm to examine self-referent memory. *Journal of Personality and Social Psychology*, 79, 906–922.
- Sherman, J. W., & Hamilton, D. L. (1994). On the formation of interitem associative links in person memory. *Journal of Experimental Social Psychology*, 30, 203–217.
- Swann, W. B., & Ely, R. J. (1984). A battle of wills: Self-verification versus behavioral confirmation. *Journal of Personality and Social Psychology*, 46, 1287–1302.
- Tottenham, N., Tanaka, J. W., Leon, A. C., McCarry, T., Nurse, M., Hare, T. A., ... Nelson, C. (2009). The Nimstim set of facial expressions: Judgments from untrained research participants. *Psychiatry Research*, 168, 242–249.
- Tulving, E. (1972). Episodic and semantic memory. In E. Tulving & W. Donaldson (Eds.), *Organization of memory* (pp. 381–403). New York: Academic Press.
- Wirth, J. H., Sacco, D. F., Hugenberg, K., & Williams, K. D. (2010). Eye gaze as relational evaluation: Averted eye gaze leads to feelings of ostracism and relational devaluation. *Personality and Social Psychology Bulletin*, 36, 869–882.
- Yuille, J. C., & Cutshall, J. L. (1986). A case study of eyewitness memory of a crime. *Journal of Applied Psychology*, 71, 291–301.