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The Regulatory Function of Self-Esteem:
Testing the Epistemic and Acceptance Signaling Systems

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The authors draw on sociometer theory (e.g., Leary, 2004) and self-verification theory (e.g., Swann, 1997) to propose an expanded model of the regulatory function of self-esteem. The model suggests that people not only possess an acceptance signaling system that indicates whether relational value is high or low but also possess an epistemic signaling system that indicates whether social feedback is consistent or inconsistent with chronic perceived relational value (i.e., global self-esteem). One correlational study and 5 experiments, with diverse operationalizations of social feedback, demonstrated that the epistemic signaling system responds to self-esteem consistent or inconsistent relational-value feedback with increases or deceases in epistemic certainty. Moreover, Studies 3–6 demonstrated that the acceptance and epistemic signaling systems respond uniquely to social feedback. Finally, Studies 5 and 6 provide evidence that the epistemic signaling system is part of a broader self-regulatory system: Self-esteem inconsistent feedback caused cognitive efforts to decrease the discrepancy between self-views and feedback and caused depleted self-regulatory capacity on a subsequent self-control task.

Keywords: self-esteem, sociometer theory, self-verification theory, self-regulation, social feedback

Two roommates, Seamus and Orwell, have both received e-mailed invitations to a party at Holly's house on the weekend. Although Seamus already knew that Holly liked him and was expecting the invitation, his self-confidence is still boosted by her e-mail. As soon as he receives it, Seamus calls his buddies, and they start talking about how they will get to the party and which women will be there. Orwell's reaction to the invitation is a little different. He also experiences a surge of self-confidence in response to the invitation, but those feelings are accompanied by feelings of surprise and confusion: He had always thought that Holly did not like him! Had she perhaps made a mistake with her e-mail list? If Holly knew Orwell better, would she still have invited him?

Seamus's and Orwell's reactions to the invitation were both similar and different. On the one hand, both men felt an increase in self-confidence in response to Holly's party invitation. This shared reaction is consistent with sociometer theory (e.g., Leary, 2004), which suggests that people feel good about themselves when they are accepted and feel bad about themselves when they are rejected. Hence, both roommates felt good about themselves when they received the party invitation because it implied that Holly accepted and valued them. However, Seamus seemed to expect the party invitation, whereas Orwell seemed confused and puzzled. These differing reactions are not predicted by sociometer theory. However, if Seamus has high dispositional self-esteem, whereas Orwell has low dispositional self-esteem, then the roommates' differing reactions are consistent with self-verification theory (e.g., Swann, 1997). This theory suggests that people experience certainty when they receive feedback that is consistent with their self-views and experience uncertainty when they receive feedback that contradicts their self-views. Hence, Seamus felt certain when he received the invitation because it confirmed his high self-esteem, whereas Orwell felt confused by the invitation because it contradicted his low self-esteem.

In the present research, we propose and test an expanded model of the regulatory function of self-esteem that explains why Seamus responds to Holly's invitation with concurrent feelings of pride and surety, whereas Orwell responds to the same social feedback with concurrent feelings of pride and confusion. We suggest that these reactions reflect the simultaneous and parallel functioning of two aspects of a single regulatory system: the self-esteem system. As we detail shortly, consistent with the original sociometer model

of self-esteem (e.g., Leary & Baumeister, 2000), our regulatory model suggests that people possess an *acceptance signaling system* that signals whether acceptance or rejection is imminent via changes in state self-esteem. Yet our model also draws on self-verification theory (e.g., Swann, 1997) to suggest that people possess an *epistemic signaling system* that signals whether social feedback is consistent or inconsistent with one's global self-esteem. In one correlational study and five experiments with diverse methods, we test the functioning of both signaling systems. However, testing the epistemic signaling system is our primary focus. This system is a novel addition to regulatory theories of self-esteem, and, as we explain shortly, testing its function offers a compelling test of the sociometer definition of self-esteem. Moreover, our experiments testing the reaction of the epistemic signaling system to different types of social feedback offer an important addition to the literature on self-certainty and epistemic coherence, which to date has not been focused on demonstrating empirically the causes of state fluctuations in epistemic confusion and certainty. Ultimately, the functioning of these two systems, as well as their interaction, may help to resolve some puzzling questions about the interface between self-esteem and people's social experiences.

The Acceptance Signaling System

To date, sociometer theorizing has focused on the state component of the self-esteem system by proposing a regulatory structure that we call the acceptance signaling system. This system concerns itself with the question, "Am I valued?" and is depicted in Paths A–C in Figure 1 (for a more detailed account, see Leary, 2004). First, people regularly, effortlessly, and often automatically monitor the environment for cues regarding their *relational value*, which is the degree to which they are valued by others (Path A in Figure 1). Such cues may come from the external environment in the form of social feedback or interpersonal experiences, from people's memories of past social experiences, or from their anticipation of future social events. In the example that started this article, Holly's party invitation is social feedback suggesting that Seamus and Orwell have high relational value.

In response to social cues concerning one's relational value, the acceptance signaling system produces an affective signal that indicates whether acceptance or rejection is imminent. If feedback suggests that one's relational value is high (Path B in Figure 1), the signaling system responds with positive affect and increases in state self-esteem. Thus, Holly's party invitation caused both Seamus and Orwell to feel good. In contrast, if feedback suggests that one's relational value is low (i.e., Path C), the signaling system responds with negative affect and decreases in state self-esteem.

The acceptance signaling system focuses almost entirely on state self-esteem. Yet the state component of the self-esteem system is not entirely independent of dispositional self-esteem (Leary, 2004). Dispositional self-esteem is related to state self-esteem, such that lower global self-esteem generally predicts lower state self-worth (e.g., Leary & Baumeister, 2000), and global self-esteem also moderates the reactivity of the acceptance signaling system, such that lower global self-esteem often predicts more extreme fluctuations in state self-esteem in response to social experiences (Kernis, 1993). However, although global self-esteem is implicated in the functioning of the acceptance signaling system,
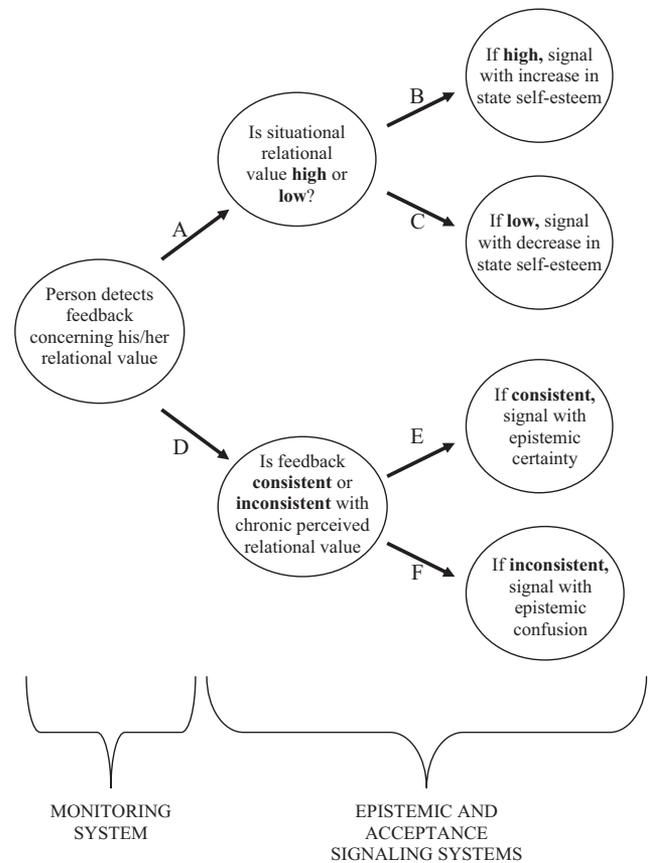

Figure 1. Model depicting the proposed functioning of the acceptance and epistemic signaling systems.

we propose that global self-esteem also plays a unique regulatory role within the epistemic signaling system.

The Epistemic Signaling System

Research suggests that global self-esteem helps people to regulate their social thoughts and behavior. For example, people rely on their global self-esteem to predict future interpersonal outcomes: Individuals with higher self-esteem (HSEs) anticipate acceptance from future relational partners, whereas individuals with lower self-esteem (LSEs) anticipate a more chilly interpersonal reception (Anthony, Wood, & Holmes, 2007; Leary, Tambor, Terdal, & Downs, 1995; Murray, Holmes, & Griffin, 1996; Stinson, Cameron, Wood, Gaucher, & Holmes, 2009). These differing social expectations may explain why Seamus, who has higher self-esteem, is not surprised that Holly invited him to her party, whereas Orwell, who has lower self-esteem, is surprised. In addition, when signs of acceptance are detected in novel social situations, HSEs eagerly seek new social opportunities, whereas LSEs remain hesitant to enter novel social situations unless acceptance is virtually guaranteed (Anthony, Holmes, & Wood, 2007, Study 4; Anthony, Wood, & Holmes, 2007). Hence, Orwell may decide not to go to Holly's party at all because he worries that she will think less of him if she sees how awkward he is in social situations. Moreover, LSEs tend to respond to hurt feelings with avoidance,

whereas HSEs respond with repair (e.g., Murray, 2005). For example, in romantic relationships, on the day following a conflict, HSEs attempt to repair their relationship by seeking closeness with their romantic partner, whereas LSEs attempt to limit their risk of rejection by emotionally distancing from their partner (Murray, Rose, Bellavia, Holmes, & Kusche, 2002).

Given this evidence, it appears that people rely on their chronic perceived relational value—their global self-esteem (Leary & Baumeister, 2000)—to predict future social outcomes and to select interpersonal strategies (see also Cameron, Stinson, Gaetz, & Balchen, in press; Holmes & Wood, 2009). Therefore, we propose that it is important that one's chronic global self-esteem is in touch with social reality. A wildly inaccurate sense of one's social value could lead to painful social mistakes. For example, incorrectly overestimating one's social value could cause one to attempt to initiate relationships with people who are not interested or to trust people who do not have one's best interests at heart. Either one of these possibilities could lead to humiliation, embarrassment, and social pain. In contrast, incorrectly underestimating one's social value is painful and could cause one to overlook social opportunities with interested others or to feel unwarranted insecurities within one's close relationships. Either of these possibilities could lead to depression, anxiety, loneliness, and social isolation. Thus, both overestimating and underestimating one's relational value could have negative consequences. Therefore, we suggest that the self-esteem system includes an epistemic signaling system that signals whether one's global self-esteem is "tuned in" to social reality. More specifically, the epistemic signaling system indicates whether the social feedback that one receives is consistent or inconsistent with one's chronic perceived value as a relational partner.[1]

The epistemic signaling system concerns itself with answering the question, "Is my global self-esteem accurate?" and its proposed functioning is depicted by Paths D–F in Figure 1. An important step in the processing of self-relevant information involves comparing social feedback with one's preexisting self-views (e.g., Eisenstadt & Lieppe, 1994; Jussim, Yen, & Aiello, 1995; Shrauger, 1975; Swann, 1997). Therefore, as with the acceptance signaling system, we propose that the epistemic signaling system is activated when one receives social feedback about one's relational value (Path D in Figure 1). In the epistemic system, this feedback is then compared with one's chronic perceived relational value (i.e., global self-esteem), producing a signal that indicates whether the feedback is consistent or inconsistent with one's chronic self-views. If the feedback is consistent with one's chronic perceived relational value (Path E), the epistemic signaling system produces feelings of authenticity, control, and epistemic certainty. If the feedback is inconsistent (Path F), the epistemic signaling system produces feelings of uncertainty, psychological discomfort, and epistemic confusion. For example, Orwell, who has lower self-esteem, felt unnerved and confused by Holly's party invitation.

In the present research, we test the functioning of the epistemic signaling system by assessing people's feelings of epistemic certainty or confusion in response to feedback that is consistent or inconsistent with their chronic perceived relational value (i.e., their global self-esteem). This design offers a compelling test of the sociometer definition of self-esteem: If feedback that conveys information about one's relational value activates the epistemic

signaling system as a function of its consistency or inconsistency with global self-esteem, then global self-esteem indeed reflects people's chronic perceived relational value. In addition, the functioning of the epistemic signaling system reveals the responsiveness of the global component of the self-esteem system to social feedback by demonstrating that people struggle to make sense of feedback that is inconsistent with their global self-esteem. Hence, although people may not readily change their global self-esteem in response to social feedback, at a more basic level of processing, the global component of the self-esteem system is indeed responsive to people's social experiences.

Furthermore, by directly examining one potentially important cause of epistemic certainty and confusion[2]—the consistency or inconsistency of feedback with one's chronic perceived relational-value—in the present research, we offer an important empirical addition to the literature on self-certainty and epistemic coherence. To date, such research has not been focused on empirically demonstrating the causes of state fluctuations in epistemic confusion and certainty. Instead, researchers have examined the consequences of chronic epistemic certainty and have studied the motivation to maintain epistemic certainty. For example, being generally confident and certain about one's self-views, which we suggest reflects a chronic sense of epistemic certainty, buffers people against self-concept change in the face of self-concept-inconsistent feedback (Swann & Ely, 1984) and predicts that one's interaction partners will develop self-verifying impressions of oneself (Pelham & Swann, 1994). Moreover, research has demonstrated that needs for epistemic coherence and predictability motivate behaviors such as seeking self-verifying feedback, eliciting self-concept-consistent reactions from interaction partners, selec-

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[1] Although we are suggesting that the epistemic signaling system serves the function of keeping global self-esteem in tune with social reality, we are not suggesting that global self-esteem is therefore accurate. Regulatory systems do not always perform their functions successfully. For example, among other functions, the attachment system is theorized to function to ensure that one's attachment figure maintains proximity (e.g., Mikulincer & Shaver, 2003). In reality, some attachment behaviors, like excessive reassurance seeking, can actually push away an attachment figure. We make a parallel argument concerning the functioning of the epistemic signaling system. Although we argue that the system evolved to maintain the accuracy of one's perceived relational value, in reality, global self-esteem can become miscalibrated (e.g., Murray, 2005; Leary, 2004). For example, LSEs often underestimate their loved ones' positive regard, relative to their loved ones' reported regard (Murray et al., 2006). Similarly, Holly's party invitation belies Orwell's belief that he is low in relational value. Such miscalibrations could result from a marked difference between one's relational value as a child and one's relational value as an adult (e.g., if one was an "ugly duckling" as a child and a "swan" as an adult). Alternatively, some people may be overly attentive to rejection cues, and such rejection sensitivity (e.g., Pietrzak, Downey, & Ayduk, 2005) may cause their self-esteem to become unduly low. Whatever the cause of such miscalibrations, the fact that global self-esteem is often out of touch with reality does not preclude the possibility that people possess an epistemic regulatory system that functions to keep self-esteem in sync with reality. We return to this issue in the General Discussion.

[2] Because people possess a strong need for epistemic certainty (e.g., Swann & Schroeder, 1995), people should experience epistemic confusion in response to any type of self-concept-inconsistent feedback. However, we focus on the function of epistemic certainty in the self-esteem system.

tively recalling experiences that verify one's self-views (Swann & Read, 1981), or choosing verifying relationship partners (Swann, Hixon, & de la Ronde, 1992; for a review, see Swann, Rentfrow, & Guinn, 2003). However, just as self-esteem researchers distinguish among the related yet independent constructs of state self-esteem, global self-esteem, and the self-esteem motive (e.g., Baumeister, 1993), we distinguish between our research examining causes of state fluctuations in epistemic certainty and previous research examining consequences of global (i.e., chronic) feelings of epistemic certainty and the motivation to maintain and achieve epistemic certainty. All three aspects of self-esteem—state, trait, and motivations—are important for understanding people's thoughts, feelings, and behaviors. In a parallel fashion, we suggest that demonstrating causes of state fluctuations in epistemic certainty is an essential, and previously unexamined, component of epistemic self-psychology.

Detecting the Epistemic Signal

Previous researchers have characterized epistemic certainty as feelings of authenticity, control, and epistemic confidence, whereas epistemic confusion is reflected by feelings of uncertainty, psychological discomfort, and puzzlement (Swann & Schroeder, 1995). But how does one measure such multifaceted states? We hope to capture the essence of epistemic certainty by using a multidimensional approach. First, we draw on Pelham's (1991) work on self-certainty and Campbell's (1990) work on self-concept clarity to operationalize epistemic certainty in Studies 1 and 4. Pelham suggested that certainty about one's self-views is reflected by self-views that are relatively stable over time, whereas Campbell (Campbell, 1990; Campbell et al., 1996; see also Baumgardner, 1990) suggested that this same characteristic is indicative of a clear self-concept. In our view, both certainty and clarity of self-views are key components of epistemic certainty. Hence, in Studies 1 and 4 we examine whether self-esteem consistent or inconsistent feedback predicts pre- to postfeedback stability of self-views. In addition, in Studies 2, 3, and 6 we adapt Campbell et al.'s (1996) explicit self-concept clarity measure to assess explicit feelings of epistemic certainty in response to relational value feedback. Although this measure was originally intended to assess clarity, we feel that items such as "Right now I have a clear sense of who I am and what I am," and "I am wondering about what kind of person I really am" (Campbell et al., 1996, p. 145) also reflect the broader state of epistemic certainty. Finally, in Study 5, we use a qualitative approach to operationalizing epistemic certainty by coding participants' spontaneous thoughts for signs of epistemic certainty and confusion in response to self-esteem consistent or inconsistent feedback. This method is based on Swann, Stein-Seroussi, and Giesler (1992), who used a thought-listing task to assess participants' reasons for choosing a verifying or nonverifying interaction partner.

The Epistemic Signal and Self-Regulation

In addition to testing the functioning of the epistemic signaling system, we seek evidence that the signal produced by the epistemic system is indeed self-regulatory in nature. We suggest that when the epistemic system signals a discrepancy between one's present perceived relational value and social feedback (i.e., Path C in

Figure 1), this activates self-regulatory efforts aimed at reducing the perceived discrepancy (e.g., Muraven & Baumeister, 2000). Prior research is consistent with this regulatory account, demonstrating that people respond to a perceived discrepancy between self-views and feedback by attempting to reject or refute the inconsistent feedback (Swann & Hill, 1982) or by seeking self-verifying feedback from an additional interaction partner (e.g., Swann, Wenzlaff, & Tafarodi, 1992; Study 2). In our view, these responses reflect regulatory efforts to decrease perceived discrepancies between existing self-views and social feedback. In the present research, we examine another regulatory response to feedback that is inconsistent with one's perceived relational value: Changing one's self-views to be consistent with the feedback (see also Swann & Hill, 1982). Moreover, we seek additional evidence that the epistemic signaling system is regulatory by examining the immediate consequences of inconsistent feedback for people's self-regulatory capacity. Muraven and Baumeister (2000) argued that regulatory efforts draw on people's finite self-regulatory reserves, depleting people's self-regulatory capacities for subsequent tasks. Hence, if the epistemic signaling system is indeed self-regulatory, then when it is activated by self-concept-inconsistent feedback, it will draw on regulatory reserves, and people's subsequent performance on a self-regulatory task should be reduced. More specifically, when people receive feedback about their relational value that is inconsistent with their self-views, their subsequent performance on a self-control task should be depleted relative to people who receive consistent feedback. If our hypothesis is supported and receiving self-esteem inconsistent feedback results in regulatory depletion, this will lend support to our contention that the epistemic signaling system is indeed part of a broader self-regulatory system.

Global Self-Esteem and the Signaling Systems

Although global self-esteem may moderate the strength of the signal produced by the acceptance signaling system, the functioning of this system is still relatively simple: Everyone feels good when they are accepted and bad when they are rejected. However, as Figure 1 implies, global self-esteem moderates the functioning of the epistemic signaling system. If social feedback is consistent with one's chronic perceived relational value then the epistemic signaling system will respond with epistemic certainty. If social feedback is inconsistent with one's chronic perceived relational value then the epistemic signaling system will respond with epistemic confusion. However, the type of feedback that constitutes consistent or inconsistent feedback depends on one's global self-esteem. For LSEs, chronic perceived relational value is moderate or equivocal (e.g., Baumeister, Tice, & Hutton, 1989), whereas for HSEs, chronic perceived relational value is very high. Hence, LSEs' and HSEs' epistemic signaling systems will respond very differently to feedback conveying relatively low levels or relatively high levels of relational value.

Generally, social feedback is fairly positive because people are typically accepting of others (e.g., Taylor & Brown, 1988; Swann, 1987). For example, parents, friends, and romantic partners all hold unrealistically positive views of their loved one's traits (Murray et al., 2006) and undoubtedly convey those positive opinions in their everyday interactions. Moreover, social norms discourage people from providing direct negative feedback to others (e.g.,

Blumberg, 1972; Tesser & Rosen, 1975). Hence, because people are loath to convey negative social feedback, relatively low levels of acceptance are probably represented by ambiguous or unclear feedback rather than outright rejection. For example, feedback conveying relatively low levels of relational value may include little eye contact, little smiling, or exclusion from a conversation (e.g., Swann, 1987). Such an ambiguous or chilly social reception is consistent with LSEs' interpersonal doubts but is inconsistent with HSEs' social confidence. Hence, feedback that conveys relatively low levels of relational value will cause LSEs' epistemic signaling system to signal accuracy via epistemic certainty, whereas HSEs' epistemic signaling system will signal inaccuracy via epistemic confusion. In contrast, feedback that conveys relatively high relational value is inconsistent with LSEs' chronic perceived relational value but is consistent with HSEs' chronic perceived relational value. Hence, such feedback will cause LSEs' epistemic signaling system to signal inaccuracy via epistemic confusion, whereas HSEs' epistemic signaling system will signal accuracy via epistemic certainty.[3]

Overview of Studies

We present the results of one correlational and five experimental studies in which we test our predictions about the functioning of the acceptance and epistemic signaling systems. The studies use diverse operationalizations of relational-value feedback—recalling positive and negative feedback (Studies 1 and 2), a novel interaction partner's behavior (Studies 3 and 4), feedback from a romantic partner (Study 5), and feedback on a bogus personality test (Study 6)—to test the functioning of the epistemic signaling system. In Studies 5 and 6, we also test whether the epistemic signaling system is part of a larger regulatory system by examining whether inconsistent relational-value feedback provokes efforts to decrease differences between self-views and feedback via self-concept change (Study 5) and whether such feedback causes self-regulatory depletion (Study 6). In addition to testing the functioning of the epistemic signaling system, in Studies 3–6 we examine the acceptance signaling system by measuring changes in mood and state self-esteem in response to feedback conveying varying levels of relational value. Hence, Studies 3 through 6 allow us to determine whether the acceptance and epistemic signaling systems provide parallel and unique feedback about the interface between the self and one's social experiences.

Studies 1 and 2: Does the Epistemic Signaling System Respond to Recalling Positive and Negative Feedback?

One way that people provide feedback about one's relational value is through direct commentary about one's traits. In the present studies, we test the functioning of the epistemic signaling system by asking participants to recall a recent compliment or a recent criticism (i.e., high relational value feedback and low relational value feedback, respectively; Study 1) or to recall a time when they received feedback that they were much higher, or much lower, on certain traits than they typically believe (i.e., high relational value feedback and low relational value feedback, respectively; Study 2). In Study 1, we assessed the response of the epistemic signaling system to the recall task with an indirect measure of epistemic certainty: The congruence between global

self-ratings and situation-specific self-ratings. Campbell (1990) inferred that the less one's self-ratings in a specific situation deviate from one's general self-ratings, the greater one's self-concept clarity. Similarly, Pelham (1991) suggested that greater stability of one's self-views over time (and presumably across situations) indicates a more certain self-concept. In Study 2, we use an explicit self-report measure of self-concept clarity as our indicator of epistemic certainty (e.g., "Right now I have a clear sense of who I am and what I am"; Campbell et al., 1996, p. 145). In both studies, we predict that HSEs will have greater epistemic certainty after recalling feedback that is high in relational value than after recalling feedback that is low in relational value, whereas LSEs will show the opposite pattern.

Study 1: Method, Results, and Discussion

Participants. Forty-six Caucasian female undergraduate students at the University of Waterloo (M_{age} = 19.71 years, SD = 1.60) participated and received partial course credit or two chocolate bars and an $8 gift certificate to a popular coffee shop in appreciation for their time.

Procedure. Participants were invited to take part in a study that examined people's ability to recall interpersonal feedback about their traits. This study had two parts: an online premeasure and a lab session.

Approximately 1 week before their lab session, participants completed an online questionnaire that included Rosenberg's (1965) Self-Esteem Scale. In addition, participants rated themselves on 10 trait adjectives, seven of which were positive (*physically attractive*, *popular*, *socially skilled*, *responsive & supportive*, *honest*, *kind & understanding*, and *confident*), and three of which were negative (*boring*, *obnoxious*, and *rude*). Participants indicated how well each trait adjective described them "in general," using a 7-point scale (1 = *not at all descriptive of me*, 4 = *moderately descriptive of me*, 7 = *extremely descriptive of me*).

Participants were invited to individual lab sessions about 1 week later. The researcher told the participant, "This first part of the study asks you to describe as many details as possible about a recent time when you received feedback about your traits or characteristics from someone else." After these instructions, the researcher gave the participant an envelope that contained additional written instructions that constituted the experimental manipulation. Because a different researcher prepared these envelopes, the researcher at the lab session was blind to the participant's randomly assigned experimental condition.

In the envelope was a sheet that first briefly reiterated the instructions that the participant received from the researcher. Participants in the *criticism recall condition* were instructed to recall and write about the most recent time when someone criticized their traits. Participants in the *compliment recall condition* were in-

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[3] Theoretically, both LSEs and HSEs experience epistemic confusion at very low levels of relational value because such feedback is inconsistent with both LSEs' equivocal sense of their relational value and with HSEs' highly positive sense of their relational value. However, in the present research we examine normative levels of acceptance by examining social feedback that conveys moderate relational value and high relational value. In the future, researchers should examine the response of the epistemic signaling system to outright rejection.

structed to recall and write about the most recent time when someone complimented their traits. More specifically, participants were instructed to write about who gave them the feedback, what happened immediately before and after they received the feedback, and what were some of the thoughts and feelings that they had at the time.

After writing about their interpersonal feedback experience, participants completed the dependent measures. First, participants rated themselves on the same 10 trait adjectives on which they had rated themselves in the online premeasure, but this time they indicated how well each trait described them "right now" rather than in general. By comparing these situation specific self-ratings with the global self-ratings that participants provided in the online premeasure, we could create an index of epistemic certainty that represented absolute change in self-views in response to the recall task. According to Campbell (1990), greater change in self-views in response to situational cues (e.g., recalling feedback) indicates poorer self-concept clarity, and according to Pelham (1991), people with uncertain self-concepts show greater changes in their self-views over time.

In addition, participants indicated how accepted they felt after receiving the feedback that they described by indicating their agreement with five statements (i.e., "When I received the feedback that I just described, I felt really valued and accepted," "The feedback that I described made me wonder if that person liked me or not," "After I received the feedback that I described, I worried whether other people really care for me or not," "I felt like the person who gave me the feedback didn't like me at all," and "This feedback increased my confidence that new people I meet will like me and care about me"), each of which had a 5-point response format (1 = *strongly disagree*, 5 = *strongly agree*). Negative items were reverse-coded, and then all five items were averaged to create a reliable perceived relational value index (α = .90).

Results and discussion.   To examine whether participants recalled social feedback that conveyed relatively low levels or high levels of relational value, we conducted hierarchical regression in which self-esteem (M = 6.83, SD = 1.10; mean centered), feedback recall condition (dummy coded; criticism = 0, compliment = 1), and the interaction between the variables were used to predict participants' perceived relational value (M = 3.80, SD = 0.99). Results revealed a very large main effect of condition (β = .72), $t(45)$ = 6.89, p < .001, such that all participants, regardless of self-esteem, thought that the compliment conveyed higher relational value than did the criticism (Ms = 4.46 and 3.08, respectively). No other effects emerged. Hence, it appears that we successfully manipulated the level of relational value conveyed by the feedback that participants recalled.

To create an index of epistemic certainty, first we calculated the absolute deviation between participants' general self-ratings (i.e., self-ratings on the online premeasure) and specific self-ratings (i.e., self-ratings immediately following the recall task) for each of the 10 trait-adjectives that we assessed. We then averaged these scores to create an index reflecting participants' average absolute deviation between general and specific self-ratings. On this index, higher scores indicated poorer epistemic certainty. Thus, for ease of interpretation and comparison of results across studies in this article, we reverse-scored participants' average absolute deviations to create an index of epistemic certainty on which higher scores indicated greater certainty.

To examine whether self-esteem moderated the effect of recall condition on participants' epistemic certainty, we conducted hierarchical regression in which self-esteem (mean centered), feedback recall condition (dummy coded; criticism = 0, compliment = 1), and the interaction between the variables were used to predict participants' reverse-scored average absolute deviation scores (M = 0.62, SD = 0.24). Results revealed the predicted interaction between self-esteem and recall condition (β = .57), $t(45)$ = 2.12, p = .040.[4] This interaction is depicted in Figure 2. HSEs reported greater reverse-scored average absolute deviations in the compliment condition than in the criticism condition (β = .39), $t(45)$ = 2.64, p = .011, suggesting that HSEs had greater epistemic certainty after recalling a compliment than after recalling a criticism. In contrast, LSEs reported smaller reverse-scored average absolute deviations in the compliment condition than in the criticism condition (β = −.30), $t(45)$ = −2.00, p = .049, suggesting that LSEs had poorer epistemic certainty after recalling a compliment than after recalling a criticism.

These results demonstrate experimentally that one's self-esteem moderates the influence of social feedback on changes in epistemic certainty, suggesting that one's chronic perceived relational value moderates the reaction of the epistemic signaling system to relational-value feedback. In Study 2, we seek to replicate these results conceptually using yet another operationalization of social feedback and using an explicit measure of epistemic certainty.

Study 2: Method, Results, and Discussion

Participants.   Eighteen Caucasian undergraduate students participated (88% female, 12% male; M_{age} = 23.77 years, SD = 8.66). In appreciation for their time, participants received partial course credit.

Procedure.   The procedure and materials for the present study were almost identical to Study 1. However, the nature of the recall task differed: To limit between-person variation in the type of interpersonal feedback recalled, participants were instructed to recall a time when they received feedback about one of two domains of socially desirable traits: (a) physical attractiveness, popularity, or social skills or (b) kindness, supportiveness, or honesty (for additional information about these trait domains and their social import, see Anthony, Holmes, & Wood, 2007; see also Stinson, Wood, & Doxey, 2008). Trait domain was counterbalanced across experimental condition. The experimental manipulation in the present study concerned the type of feedback that participants were instructed to recall. Participants in the positive feedback condition were told to recall the most recent time when someone gave them feedback that they were more physically attractive, popular, or socially skilled (or kind, supportive, or honest) than they typically think that they are. In the negative feedback condition, participants were told to recall the most recent time when someone gave them feedback that they were less physically attractive, popular, or socially skilled (or kind, supportive, or honest) than they typically think that they are. Participants were randomly assigned to feedback condition with the stipulation

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[4] These results were similar when we weighted the positive and negative traits equally in the calculation of participants' reverse-scored average absolute deviation scores (β = −.58), $t(45)$ = −2.18, p = .035.
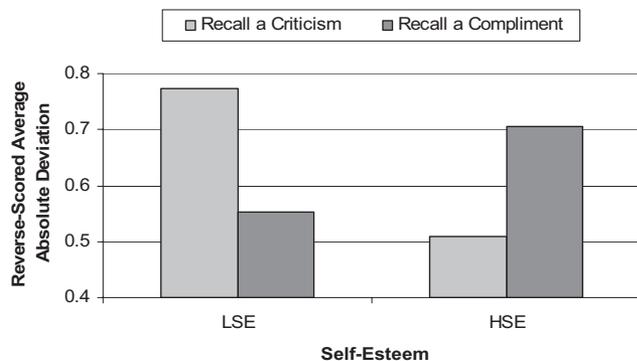
Figure 2. Reverse-scored average absolute difference between global and specific self-views as a function of self-esteem and feedback recall condition (criticism vs. compliment) in Study 1. Self-esteem was plotted for values one standard deviation below the mean (LSE; $M_{self-esteem} = 5.71$) and one standard deviation above the mean (HSEs; $M_{self-esteem} = 7.91$). Higher scores indicate smaller changes in self-views in response to the experimental manipulation, which suggests greater self-concept clarity. LSE = individuals with lower self-esteem; HSE = individuals with higher self-esteem.

that men and women were equally distributed across the two experimental conditions.

After recalling their interpersonal feedback experience, participants completed a final questionnaire that included the dependent measures. Participants first completed an adapted version of Campbell et al.'s (1996) Self-Concept Clarity Scale. This scale was originally designed to measure people's self-reported self-concept clarity, with items such as, "I have a clear sense of who I am and what I am," and "Even if I wanted to, I don't think I could tell someone what I'm really like" (Campbell et al., 1996, p. 145). In our view, the items in the scale also reflect feelings of epistemic certainty. To increase the likelihood that the measure would be sensitive to situational feedback, we adapted the scale so that it measured state self-concept clarity (e.g., "Right now I have a clear sense of who I am and what I am"). Participants responded using a 5-point scale (1 = *not at all*, 5 = *extremely*). Negative items were reverse scored, and then all 12 items were averaged to create a reliable index of State Self-Concept Clarity ($\alpha = .89$), which was our index of epistemic certainty in the present study. In addition, participants indicated the level of relational value conveyed by the feedback that they described by indicating their agreement with the same five statements that were used in Study 1 ($\alpha = .90$).

Results and discussion. Preliminary analyses indicated that gender and trait domain did not moderate the results that we describe. Hence, these variables were not included in the analyses that follow.

To examine whether participants recalled social feedback that conveyed relatively low levels or high levels of relational value, we conducted a hierarchical regression in which self-esteem ($M = 6.75$, $SD = 1.26$; mean centered), feedback recall condition (dummy coded; negative = 0, positive = 1), and the interaction between the variables were used to predict participants' perceived relational value ($M = 3.49$, $SD = 0.79$). Results revealed a main effect of self-esteem ($\beta = .42$), $t(17) = 2.26$, $p = .040$, such that HSEs generally thought that the feedback conveyed higher rela-

tional value than LSEs. A large main effect of recall condition, however, indicated that our manipulation was successful ($\beta = .51$), $t(17) = 2.77$, $p = .015$. All participants, regardless of self-esteem, felt that the positive feedback conveyed higher relational value ($M = 3.87$) than did the negative feedback ($M = 2.16$).

To examine whether self-esteem moderated the effect of recall condition on epistemic certainty ($M = 3.49$, $SD = 0.79$), we conducted hierarchical regression in which self-esteem (mean centered), feedback recall condition (dummy coded; negative = 0, positive = 1), and the interaction between the variables were used to predict participants' epistemic certainty. Results revealed a main effect of self-esteem ($\beta = .87$), $t(17) = 6.52$, $p < .001$, such that HSEs reported greater epistemic certainty did than LSEs and the predicted interaction between self-esteem and recall condition ($\beta = .37$), $t(17) = 2.88$, $p = .013$. This interaction is depicted in Figure 3. LSEs reported poorer epistemic certainty in the positive feedback recall condition than in the negative feedback recall condition ($\beta = -.32$), $t(16) = -2.95$, $p = .009$, whereas HSEs reported greater epistemic certainty in the positive feedback recall condition than in the negative feedback recall condition ($\beta = .36$), $t(16) = 3.31$, $p = .004$. Hence, the present study offers a conceptual replication of the results of Study 1 with a different experimental manipulation and an explicit measure of epistemic certainty.

Study 3: Do the Epistemic and Acceptance Signaling Systems Respond to Indirect Acceptance Feedback From a Confederate?

In Studies 1 and 2, we examined the response of the epistemic signaling system to recalling direct social feedback. In the present study and in Study 4, we examine whether self-esteem moderates the response of the epistemic signaling system to indirect, or behavioral, social feedback. First, we use an experimental method to manipulate the indirect acceptance feedback that participants receive from an interaction partner. Participants interacted with a confederate who was trained either to behave in a highly accepting and warm manner or to behave in a relatively equivocal and cold
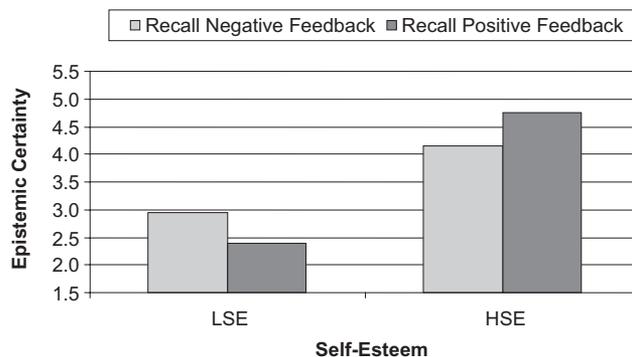

Figure 3. Self-concept clarity as a function of self-esteem and feedback recall condition (negative vs. positive) in Study 2. Self-esteem was plotted for values one standard deviation below the mean (LSE; $M_{self-esteem} = 5.48$) and one standard deviation above the mean (HSEs; $M_{self-esteem} = 8.00$). LSE = individuals with lower self-esteem; HSE = individuals with higher self-esteem.

manner. We anticipate that HSEs' epistemic signaling system will respond with greater epistemic certainty after interacting with the warm confederate than after interacting with the cold confederate, whereas LSEs' epistemic signaling system will respond with poorer epistemic certainty after interacting with the warm confederate than after interacting with the cold confederate. We used the same explicit measure of epistemic certainty that we used in Study 2 to assess the response of the epistemic signaling system. In addition, for the first time we also assessed the response of the acceptance signaling system to indirect acceptance feedback with measures of state self-esteem and affect. Hence, we are able to test our hypothesis that the acceptance and epistemic signaling systems provide distinct feedback about one's social experiences.

Method

Participants. Forty-five female Caucasian undergraduate students participated (M_{age} = 20.21 years, SD = 2.55). In appreciation for their time, participants received either partial course credit or two chocolate bars and an $8 gift certificate to a popular coffee shop.

Procedure. Participants were invited to take part in a study about Communication Styles and the Media. They were informed that participation involved watching a short excerpt from a documentary and then discussing the documentary (and other topics) with a second female participant during an interaction task. In fact, the second participant was a trained confederate, and the confederate's behavior during the interaction task constituted the indirect acceptance feedback manipulation.

At the start of the lab session, the researcher met each participant and the confederate in a designated waiting area in the psychology department. The participant was taken to a lab room and asked to wait while the researcher took the confederate to a second lab room. When the researcher returned, she asked the participant to complete a background information survey. The background information survey included Rosenberg's (1965) Self-Esteem Scale and filler scales that assessed the participant's media preferences, hobbies, and health behaviors. Next, the participant watched an 8-min excerpt from a documentary about the coffee industry in Ethiopia, ostensibly so that she could discuss the movie with the confederate during the interaction task.

After watching the video, the researcher brought the confederate to the participant's lab room. The researcher then gave the participant and the confederate their instructions for the interaction task:

> [Participant], you were randomly assigned to be the communicator, so that means that you will give your opinions about each of the questions on this sheet of paper, and [Confederate], you were randomly assigned to be the listener, which means that you are supposed to ask [Participant] the questions and then listen to her answers.

In actuality, the participant was always assigned the role of communicator, and the confederate was always assigned the role of listener. The confederate's behavior during this interaction task was the independent variable. The interaction task is described in detail shortly.

Following the interaction task, the researcher took the confederate to another room and then asked the participant to complete one final questionnaire. This questionnaire contained the dependent variables in the study. First, participants reported their explicit perceived acceptance in the situation with six items (i.e., "The listener probably likes me," "The listener probably wants to meet me again," "The listener probably enjoyed the interaction with me," "The listener is probably willing to spend time with me," "The listener probably wants to have another interaction with me," and "The listener probably finds me _____ interesting"), wherein the first five items had one 7-point response format (1= *strongly disagree*, 7 = *strongly agree*), and the last item had a different 7-point response format (1= *not at all*, 7 = *extremely*). These items were averaged to form a reliable index of global perceptions of acceptance (α = .92). Next, participants indicated the frequency with which the confederate exhibited four behaviors that indicate acceptance (i.e., smiling, eye contact, laughing, agreeing with something the participant said) and three behaviors that indicate rejection (i.e., looking downward, sighing, frowning), using a 5-point scale (1 = *not at all*, 3 = *some of the time*, 5 = *most of the time*). Next, participants completed McFarland and Ross's (1982) measure of state self-esteem. On this measure, participants rated themselves on 12 self-related affect words (e.g., *proud*, *confident*, *ashamed*, *incompetent*), using a 9-point scale (1 = *not at all*, 9 = *extremely*; α = .90). Finally, participants completed the adapted state version of Campbell et al.'s (1996) clarity scale, as described in Study 2 (α = .90). After completing this final set of measures, participants were thoroughly debriefed and allowed to leave. In particular, participants in the cold confederate condition were assured that their interaction partner was a confederate who was trained to act in a cold manner, and thus did not actually dislike the participant.

Participants interacted with one of two female confederates, both of whom were trained to behave in either a cold or a warm manner. Participants were randomly assigned to the confederate and acceptance conditions, and the researcher who ran the experimental session was blind to the confederate's assigned condition. In the warm confederate condition, the confederates were instructed to behave in a warm and attentive manner and to make the participant feel comfortable. They sat so that their body was angled toward the participant, leaned toward the participant, smiled, maintained eye-contact, and nodded while listening to her speak. In addition, the warm confederate was given scripted lines to insert in the interaction task that conveyed agreement with what the participant was saying. In the cold confederate condition, the confederate was instructed to act distracted, uninterested, and eager to end the interaction. She sat with her legs crossed away from the participant, leaned away from her, made little or no eye contact, avoided smiling, and looked at her nails or around the room while the participant was speaking. In addition, the cold confederate simply asked the assigned questions and made no additional commentary.

Results and Discussion

Prior to the debriefing, two participants (one in the warm confederate condition and one in the cold confederate condition), indicated that they doubted that the confederate was actually another participant. Therefore, we excluded these participants' data from the analyses that follow.

Manipulation check. First, we conducted a series of one-way analyses of variance (ANOVAs) in which condition was used to predict global perceptions of acceptance and each of the specific acceptance and rejection cues. The results of these tests can be seen in Table 1. These results were not moderated by self-esteem, and the effects were the same for both confederates. As intended, participants in the warm confederate condition perceived more global liking and thought that the confederate exhibited more specific acceptance cues and fewer specific rejection cues than did participants in the cold confederate condition. Thus, it appears that we successfully manipulated the social feedback that participants perceived.

Does self-esteem moderate the reaction of the epistemic signaling system to social feedback? To examine whether self-esteem ($M = 7.35$, $SD = 1.12$) moderated the effect of indirect acceptance feedback on epistemic certainty ($M = 3.49$, $SD = 0.79$), we conducted hierarchical regression in which self-esteem (mean centered), acceptance feedback condition (dummy coded; cold confederate = 0, warm confederate = 1), and the interaction between the variables were used to predict participants' epistemic certainty. Results revealed a main effect of self-esteem ($ß = .5)9$, $t(44) = 4.71$, $p < .001$, which was qualified by the predicted interaction between self-esteem and acceptance feedback condition ($ß = .50$), $t(44) = 3.03$, $p = .004$. This interaction is depicted in Figure 4.[5] As predicted, HSEs reported greater epistemic certainty after interacting with the warm confederate than after interacting with the cold confederate ($ß = .52$), $t(44) = 4.30$, $p < .001$, whereas LSEs had greater epistemic certainty in the cold confederate condition than in the warm confederate condition ($ß = -.36$), $t(44) = -2.99$, $p = .006$.

Does the acceptance signaling system respond to social feedback differently than does the epistemic signaling system? To examine whether state self-esteem responded to the indirect acceptance cues that participants received from the confederate, we conducted hierarchical regression in which self-esteem (mean centered), acceptance feedback condition (dummy coded; cold confederate = 0, warm confederate = 1), and the interaction between
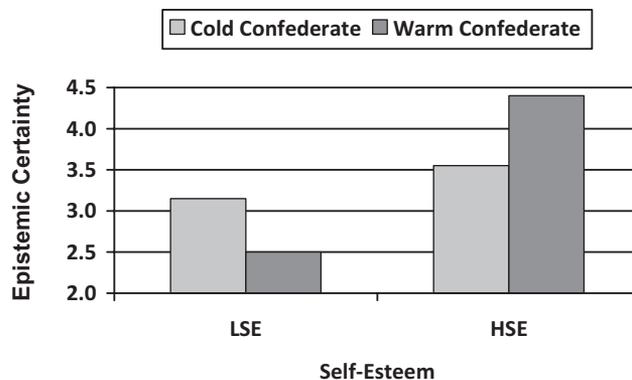
Table 1
Global Perception of Acceptance and Perception of Specific Acceptance and Rejection Cues as a Function of Confederate Acceptance Condition In Study 3

	Condition		
Variable	Cold	Warm	$F(1, 44)$
Global perception of acceptance	3.20	5.04	63.82**
Specific acceptance cues			
Smile	1.37	4.09	213.57**
Make eye contact with you	2.25	3.86	30.52**
Laugh	1.04	3.09	112.95**
Agree with something you said	1.33	3.77	85.39**
Specific rejection cues			
Look downwards	3.12	1.90	10.60*
Sigh	1.29	1.00	3.92†
Frown	1.83	1.09	6.45*

Note. For global perceptions of acceptance and specific acceptance feedback, higher scores indicate greater acceptance. For specific rejection feedback, higher scores indicate less acceptance.
† $p = .054$. * $p < .05$. ** $p < .001$.

Figure 4. Self-concept clarity as a function of self-esteem and confederate acceptance condition (cold vs. warm) in Study 3. Self-esteem was plotted for values of one standard deviation below (LSE, $M_{\text{self-esteem}} = 5.16$) and one standard deviation above (HSE, $M_{\text{self-esteem}} = 8.47$) the population mean. LSE = individuals with lower self-esteem; HSE = individuals with higher self-esteem.

the variables were used to predict participants' state self-esteem. Results revealed a main effect of self-esteem ($ß = .51$), $t(44) = 4.13$, $p < .001$, such that LSEs reported lower state self-esteem than did HSEs. However, a main effect of experimental condition ($ß = .37$), $t(44) = 3.04$, $p = .004$, indicated that everyone, regardless of self-esteem, reported higher state self-esteem after interacting with the warm confederate ($M = 7.22$, $SD = 0.95$) than after interacting with the cold confederate ($M = 6.40$, $SD = 1.13$). Thus, it appears that the acceptance signaling system responded to fluctuations in acceptance in the same manner for everyone.

In addition, participants' epistemic certainty was positively correlated with state self-esteem ($r = .49$, $p = .001$; when shared variance with global self-esteem was controlled, $r = .35$, $p = .025$). These results suggest that epistemic certainty and state self-esteem are related, but distinct, constructs. Moreover, controlling for state self-esteem in the regression testing the functioning of the epistemic signaling system did not alter the results depicted in Figure 4 (i.e., Self-Esteem × Condition interaction: $ß = .45$), $t(44) = 2.62$, $p = .012$, and controlling for participants' epistemic certainty in the regression testing the functioning of the acceptance signaling system did not alter the results described above (i.e.,

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[5] Self-esteem scores in the present study ($M = 7.35$) had a higher mean than did the population from which the sample was drawn ($M_{\text{population}} = 6.49$) $t(1905) = 3.41$, $p < .001$, and from the previous samples reported in this article: Self-esteem in Study 3 differed from self-esteem in Study 1 ($M = 6.83$), $t(90) = 2.07$, $p = .042$, and Study 2 ($M = 6.75$), $t(72) = 2.73$, $p = .026$. Hence, with Aiken and West's (1991) standard centering technique, low self-esteem in Study 3 was a score of 6.23, which is average self-esteem rather than truly low self-esteem relative to population norms. Therefore, in the simple-effects that follow we recentered self-esteem at one standard deviation above and below the mean of the population from which the sample was drawn. The range of self-esteem in this sample of participants was 4.90–8.90, and numerous participants had self-esteem scores at or around the predicted values for LSEs and HSEs graphed in Figure 4. When centered with Aiken and West's method, the simple effect for HSEs was significant ($ß = .52$), $t(44) = 4.30$, $p < .001$, whereas the simple effect for LSEs was not ($ß = .08$), $t(44) = -0.65$, ns.

main effect of condition on state self-esteem: ß = .32), $t(44)$ = 2.61, p = .012. The present results support our contention that the epistemic and acceptance signaling systems provide distinct feedback about one's social experiences.

Study 4: Do the Acceptance and Epistemic Signaling Systems Respond to Naturally Occurring Indirect Acceptance Feedback?

Once again, we examine whether self-esteem moderates the response of the epistemic signaling system to indirect social feedback. Pairs of unacquainted participants engaged in a videotaped getting-to-know-you task. Later, objective observers rated the indirect social acceptance feedback that each participant received from his or her interaction partner during the interaction. As in Study 1, we assessed the response of the epistemic signaling system with an unobtrusive measure of epistemic certainty: the congruence between general and situation-specific self-ratings. Moreover, as in Study 3, we assessed participants' state self-esteem following the interaction to test whether the acceptance signaling system functions differently than does the epistemic signaling system.

Method

Participants.   Sixty-eight (52% female, 48% male) Caucasian undergraduate students scoring in the top third (HSE; n = 35; M = 7.88, SD = 0.49) and bottom third (LSE; n = 33; M = 4.76, SD = 0.95) of the distribution of scores on Rosenberg's (1965) Self-Esteem Scale participated as partial fulfillment of a course requirement. Participant ages ranged from 17 years to 23 years (M = 18.76, SD = 1.81).

Procedure.   The present study consisted of two phases. Participants first completed an online questionnaire and then participated in a lab session a few weeks later.

Pretest measures.   Prior to their in-lab session, participants completed an online questionnaire in which they rated themselves on 13 target trait-adjectives "relative to other people," using a 100-point scale (0 = *lower than the rest of the population*, 50 = *average for this characteristic*, 100 = *higher than the rest of the population*). This questionnaire included 10 sets of positive trait adjectives (*physically attractive*, *popular*, *socially skilled*, *responsive & supportive*, *honest*, *kind & understanding*, *warm*, *intelligent*, *assertive*, and *confident*), and three negative trait adjectives (*boring*, *obnoxious*, and *rude*).

Lab session.   Following Campbell's (1990) method, participants were assigned a partner with either the same level or the opposite level of self-esteem, with the stipulation that cell sizes were kept equal during the course of the study. Consequently, three types of pairs were created: HSE/HSE, HSE/LSE, and LSE/LSE. Research assistants were instructed to confirm that participants did not know each other before beginning the study. Because another research assistant randomly assigned participant pairings, the researcher running the session was blind to participants' self-esteem. Pairs of participants completed a two-part, videotaped interaction task that gave them the opportunity to rate their situation-specific self-concepts. First, participants completed a getting-to-know-you task based on a subset of items from Sedikides, Campbell, Reeder, and Elliot's (1999) Relationship

Closeness Induction. The selected questions allowed participants to become acquainted without disclosing overly personal information. After completing the getting-to-know-you task, pairs of participants were given approximately 10 min to complete a "desert survival" problem-solving task together, in which they had to select from a list those items that were most necessary for surviving in the desert after a plane crash (Oakman, Gifford, & Chlebowsky, 2003).

Postinteraction measures.   When the interaction task was finished, participants were separated to complete the final questionnaire. Participants first completed a modified version of the PANAS (Watson, Clark, & Tellegen, 1988), wherein participants were asked to indicate how well a list of emotion words described how they felt at that moment, using 5-point scales (1 = *not at all or very slightly*; 3 = *moderately*, 5 = *very or extremely*). This version of the PANAS was modified to include additional items assessing state self-esteem: *worthless*, *inadequate*, *humiliated*, *successful*, and *confident*. Next, participants indicated how well a list of trait-adjectives described their behavior during the interaction, using a 7-point scale (1 = *not at all* and 7 = *extremely well*). Participants rated themselves on the same 13 traits that were assessed in the premeasure.

Coding indirect acceptance feedback.   Four coders watched 30-s "slices" of the taped interactions and rated each participant's behavior on four variables: *warm*, *friendly*, *enjoys interaction*, and *likes interaction partner*. Coders rated how well each dimension described the participants' behavior, using a 7-point scale (1 = *not at all* and 7 = *extremely*). Because pairs of participants were interacting with one another, for each taped interaction, we instructed two coders to rate the behavior of the participant sitting on the right side of the screen, and the other two coders rated the behavior of the participant on the left side of the screen. Acceptance-feedback ratings were assessed at two time points during the interaction: the first 30 s of the getting-to-know-you task and the final 30 s of the getting-to-know-you task. Coders who rated the participants sitting on the right side of the screen during the first time point rated the participants sitting on the left at the second time point, and coders rating participants on the left side of the screen at the first time point rated participants on the right side of the screen at the second time point. Hence, each participant's accepting behavior was rated at two points in time, and different pairs of coders rated the participant's behavior at each point in time.

Results and Discussion

Preliminary analyses indicated that gender, type of pair (i.e., HSE/HSE, LSE/LSE, or LSE/HSE), and trait valence (i.e., positive or negative) did not moderate the results that we describe shortly, so these factors were not included in the analyses that we report.

Index of indirect acceptance feedback.   The intraclass correlations between pairs of coders revealed that interrater agreement was adequate at both time points and for all four variables (i.e., *warm* r_I = .84 and r_I = .76 at Time 1 and Time 2, respectively; *friendly* r_I = .84 and r_I = .80; *enjoys interaction* r_I = .84 and r_I = .68; *likes interaction partner*, r_I = .86 and r_I = .69), so we averaged ratings of each variable across coders for each point in time. The resulting four mean ratings were then averaged at each point in time to create highly reliable overall acceptance feedback

scores for each participant at each point in time ($\alpha = .96$ at Time 1, and $\alpha = .94$ at Time 2). These scores were highly reliable over time ($\alpha = .77$), so we averaged indirect acceptance at Time 1 and Time 2 for each participant.[6] This score reflected the amount of indirect acceptance that each participant conveyed to their interaction partner. However, we were interested in determining the amount of acceptance that each participant received from his or her interaction partner. Therefore, we created a variable for each participant that consisted of the participant's interaction partner's overall acceptance feedback score, and this variable represented the indirect acceptance feedback that each participant received from his or her interaction partner during the interaction task, as rated by objective observers.

Index of epistemic certainty. We first transformed specific self-concept scores (i.e., self-ratings of participants' behavior in the interaction) to a 100-point scale so that they had the same metric as the general scale (i.e., self-ratings during the online pretest). We then calculated the absolute deviation between participants' general and specific self-ratings for each of the 13 trait-adjectives that we assessed and then averaged the scores to create an index of average absolute deviation between general and specific self-ratings. On this index, higher scores indicated poorer epistemic certainty. Thus, for ease of interpretation, we reverse-scored participants' average absolute deviations to create an index of epistemic certainty on which higher scores indicated certainty ($M = 16.51$, $SD = 5.09$).

Indices of affect and state self-esteem. Affect and state self-esteem were assessed with the modified version of the PANAS (Watson et al., 1988). Because we were interested in assessing feelings of self-worth separately from affect, we did not include *proud* in our calculation of positive affect (PA), and we did not include the terms *guilty* and *ashamed* in our calculation of negative affect (NA). The remaining PA terms were averaged to form a reliable PA index ($\alpha = .90$), and the remaining NA terms were averaged to form a reliable NA index ($\alpha = .86$). To assess state self-esteem, we averaged responses for "*proud*," "*successful*," and "*confident*" with the reverse-scored responses for "guilty," "ashamed," "worthless," "inadequate," and "humiliated" to form a reliable state self-esteem index ($\alpha = .72$).

Testing nonindependence. Because pairs of participants interacted with one another in this study, it was possible that dyad members' scores on the dependent variables would be nonindependent (i.e., more similar to one another than were two scores of participants who were not in the same dyad; Kenny, Kashy, & Cook, 2006). If dyad scores on the dependent variable were nonindependent then it would be appropriate to use dyadic data analysis to test our hypotheses. In contrast, if the dyad members' scores were independent then the data could be analyzed at the level of the individual using our usual regression approach. Because the members of the dyads in this study were indistinguishable from one another, the appropriate test of nonindependence was the intraclass correlation (Kenny et al., 2006). Data were organized into a pairwise data set in which person (dyad members were randomly assigned the label of "actor" or "partner") was nested within dyad. We then used multilevel modeling to calculate the partial intraclass correlation between actor and partner scores on each of the dependent variables. These partial correlations indexed the level of nonindependence on the dependent variables when the effects of the independent variables (i.e., actor self-

esteem and received cues) were controlled (for a detailed account of this method, see Kenny et al., 2006).

We found that none of these partial intraclass correlations reached a level at which nonindependence was suggested (i.e., a conservative alpha level of $p < .200$, Kenny et al., 2006). Actor and partner scores on the measure of epistemic certainty were indeed independent, as evidenced by a small and nonsignificant intraclass correlation coefficient ($r_I = .15$, $F(29, 30) = 1.35$, $p = .42$. Moreover, state self-esteem was independent ($r_I = .06$, $F(29, 30) = 1.13$, $p = .74$, as were PA ($r_I = .01$, *ns*) and NA ($r_I = .17$), $F(29, 30) = 1.40$, $p = .36$. Therefore, we analyzed the data at the level of the individual in the analyses that follow.

Does self-esteem moderate the reaction of the epistemic signaling system to social feedback? To test our hypothesis, in regression, we used self-esteem (dummy coded; LSE = 0, HSE = 1), indirect acceptance feedback (mean centered; $M = 4.71$; $SD = 0.98$), and the interaction between the variables as predictors of participants' reverse-scored average absolute difference between general and specific self-ratings. To control for any shared variance between dyad members on the predictor variables, we also included each participant's partner's self-esteem (dummy-coded) and participants' own indirect acceptance cues in each of the regressions we conducted. Results revealed a main effect of self-esteem ($\beta = .32$), $t(67) = 2.70$, $p = .003$, but this effect was qualified once again by the predicted interaction between self-esteem and acceptance feedback ($\beta = .33$), $t(67) = 1.97$, $p = .051$.[7] This interaction is graphed in Figure 5. For LSEs, the reverse-scored absolute deviation between general and specific self-ratings tended to be smaller when indirect acceptance was relatively high and greater when indirect acceptance was relatively low ($\beta = -.33$), $t(67) = -1.74$, $p = .086$, whereas for HSEs the reverse-scored absolute deviation between general and specific self-ratings tended to be greater when indirect acceptance was relatively high and smaller when indirect acceptance was relatively low ($\beta = .13$), *ns*. Although these particular contrasts were not significant, at relatively low levels of indirect acceptance, HSEs and LSEs exhibited similar levels of reverse-scored absolute deviations between general and specific self-ratings ($\beta = .15$), $t < 1$, whereas at relatively high levels of indirect acceptance, HSEs displayed much greater levels of reverse-scored absolute deviations than LSEs ($\beta = .61$), $t(67) = 3.58$, $p = .001$. Consistent with our hypothesis, these results suggest that the indirect acceptance cues conveyed by the interaction partners affected participants' epistemic certainty as a function of their self-esteem. These results were not moderated by the type of dyad that the participant was in (i.e., HSE/HSE, HSE/LSE, or LSE/LSE), and controlling for type of dyad did not alter the results depicted in Figure 5. It is important that the participants' own levels of accepting behavior did not moderate the results or directly relate to participants' epistemic certainty. Hence, our results were not strictly an "in the head" phenomenon, which would have been the case if participants' self-awareness of their own warm or cold behavior influenced their

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[6] Results were similar at both points in time, so we used the combined scores in the analysis that we report.

[7] These results were similar when we weighted the positive and negative traits equally in the calculation of participants' reverse-scored average absolute deviation scores ($\beta = .35$), $t(67) = 2.04$, $p = .046$.
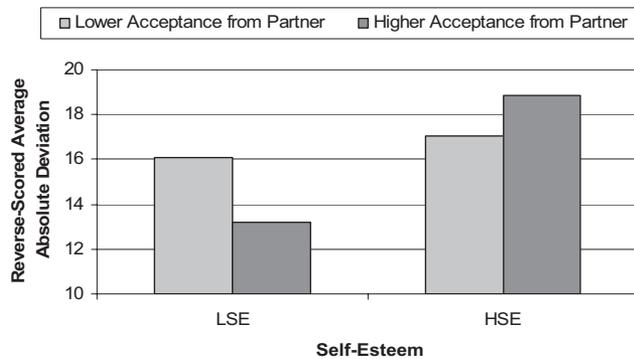
Figure 5. Reverse-scored average absolute difference between global and specific self-views as a function of self-esteem and accepting behaviors from interaction partners in Study 4. Acceptance from partner was graphed for values one standard deviation above and below the mean. Higher scores indicate greater self-concept clarity. LSE = individuals with lower self-esteem; HSE = individuals with higher self-esteem.

epistemic certainty. Rather, participants' epistemic certainty was a reflection of their objectively rated social experiences.

Does the acceptance signaling system respond to social feedback differently than does the epistemic signaling system? To examine whether the acceptance signaling system responded to the indirect acceptance cues that participants received from their interaction partner, in a series of three regressions we used global self-esteem (dummy coded), indirect acceptance feedback (mean centered), and the interaction between the variables to predict PA, NA, and state self-esteem. Once again, to control for any shared variance between dyad members on the predictor variables, we also included each participant's partner's self-esteem (dummy-coded) and the participants' own indirect acceptance cues in each of the regressions we conducted. Results revealed that indirect acceptance feedback was positively associated with PA, (ß = .25), $t(67) = 2.10$, $p = .040$, and this effect was not moderated by global self-esteem ($t < 1$). Indirect acceptance was not related to state self-esteem (ß = .18), $t(67) = 1.63$, $p = .103$, or NA ($t < 1$). Thus, as in Study 3, it appears that the acceptance signaling system responded to indirect acceptance feedback such that everybody, regardless of global self-esteem, felt better when they received higher levels of acceptance feedback than when they received lower levels of acceptance feedback.

Moreover, participants' reverse-scored absolute deviations between general and specific self-ratings were positively correlated with state self-esteem ($r = .29$, $p = .018$) and with PA ($r = .23$, $p = .057$). The moderate size of these correlations suggests that epistemic certainty, state self-esteem, and PA are related but distinct constructs. Moreover, replicating the results of Study 3, controlling for PA and state self-esteem in the regression testing the functioning of the epistemic signaling system did not significantly alter the results depicted in Figure 5 (i.e., Self-Esteem × Indirect Acceptance interaction; ß = .32), $t(67) = 1.88$, $p = .061$, and controlling for participants' epistemic certainty in the regressions testing the functioning of the acceptance signaling system did not significantly alter the results described previously (i.e., main effect of Indirect Acceptance on PA: ß = .26), $t(67) = 2.20$, $p = .031$. Taken together with the results of Study 3, these results

suggest that the epistemic and acceptance signaling systems provide distinct feedback about one's social experiences.

Study 5: Does Self-Esteem Necessarily Moderate the Functioning of the Epistemic Signaling System?

Studies 1 through 4 tested the functioning of the epistemic signaling system by providing all participants with the same type of feedback, which was either relatively high or low in conveyed relational value. This method meant that self-esteem and the signal provided by the epistemic system were necessarily confounded: Positive feedback always resulted in epistemic confusion for LSEs and certainty for HSEs, whereas the opposite was true for moderate or equivocal feedback. But is the functioning of the epistemic system necessarily dependent on one's global self-esteem? In the present study, we seek to answer this question by determining whether sufficiently inconsistent positive relational-value feedback can also cause HSEs to experience epistemic confusion. Hence, participants received false feedback ostensibly from their romantic partner that suggests one of two things: Either the partner holds a view of the participants' socially valued traits that is identical to the participants' own views or the partner holds a view of the participants' socially valued traits that is much more positive than the participants' own views (i.e., two points higher on a 9-point scale). Hence, all participants, regardless of self-esteem, received either feedback that was consistent with their perceived relational value or received feedback that was inconsistent with, and more positive than, their perceived relational value.

In such circumstances, we expect that everyone, regardless of self-esteem, will experience epistemic certainty in response to the consistent feedback and will experience epistemic confusion in response to the inconsistent feedback. We tested this hypothesis using a new measure of epistemic certainty: Immediately after receiving the relational-value feedback from their romantic partner, participants were asked to list their thoughts about the feedback, and we coded these thoughts for evidence of epistemic confusion or epistemic certainty (cf. Swann, Stein-Seroussi, & Geisler, 1992). Moreover, as in Studies 3 and 4, we assessed the functioning of participants' acceptance signaling system by measuring participants' feelings of self-worth in response to the feedback. Once again, we predict that all participants, regardless of self-esteem, will feel better after receiving the inconsistent positive feedback than after receiving the consistent feedback, and this response of the acceptance signaling system will be independent of the response of the epistemic signaling system (as evidenced in the thought-listing task).

In addition to testing these hypotheses, we examine the consequences of receiving inconsistent feedback for participants' own self-views. A common response to such feedback is to reject or refute the feedback (Swann & Hill, 1982). However, because romantic partners are such reliable and important sources of relational value feedback, we suspect that participants in the present study will not be quick to reject or negate the positive inconsistent feedback that their romantic partners provide. Instead, we predict that participants in the inconsistent feedback condition will attempt to reconcile the inconsistency between their own self-views and their partners' more positive self-views by shifting their self-views to better align with their partners' positive opinions (e.g., Swann & Predmore, 1985). Hence, we expect that compared

with the consistent feedback condition, participants in the inconsistent feedback condition will report more positive views of their socially valued traits.

Method

Participants.   Fifty-two heterosexual romantic couples participated in the present study (M_{age} = 19.31 years, SD = 2.15; ethnicity data were not available for participants in this study). The majority of participants were exclusively dating (87%), with the remaining participants reporting that they were engaged (4%), casually dating (4%), or living together (5%). Participants had been dating for an average of 17.40 months (SD = 13.61). One member of each couple was recruited from the introductory psychology participant pool at the University of Waterloo, and this participant recruited his or her romantic partner to also participate. Participants from the pool received partial course credit, whereas partners received $10 in appreciation for their time.

Procedure.   When couples arrived at the lab, the research assistant informed them that the purpose of the study was to develop a new personality measure, The Interpersonal Personality Inventory. Supposedly, this new measure would improve on current measures because it would not only assess the target individual's own views of his or her traits but it would also ask close friends or loved ones to provide their opinions of the target individual's traits.

After receiving this information, members of the couple were taken to separate rooms to complete their participation. From this point on, both members of the couple received identical instructions and were assigned to the same experimental condition. Therefore, in the present study, the term *participants* refers to everyone who completed the study, regardless of whether they were recruited directly from the psychology participant pool or were recruited by their romantic partner (we address the issue of potential nonindependence in this sample shortly).

In their individual lab room, the participants first completed a survey that assessed their self-esteem using Rosenberg's (1965) self-esteem inventory. Participants then rated themselves and their partner on 28 traits using 9-point scales (1 = *not at all characteristic of me*, 9 = *completely characteristic of me*). Because we wanted to provide positive self-concept-inconsistent feedback in one of the experimental conditions, all of the traits were positive and covered a wide-range of socially desirable qualities (e.g., *affectionate*, *considerate*, *passionate*, *talented*, and *warm*). Participants also rated the importance of each trait to their own self-concept, again using a 9-point scale (1 = *not at all important*, 9 = *very important*). Finally, participants' rated their perception of how their partner would rate them on the same traits (i.e., their reflected appraisal), again using a 9-point scale (1 = *not at all characteristic of me*, 9 = *completely characteristic of me*).

Next, participants completed some filler scales while the experimenter left the room and supposedly compared the participants' self-ratings with the romantic partners' ratings of the participants. Participants were informed that on the basis of this comparison process, the researcher would provide them with feedback from their romantic partner about one randomly selected trait. This feedback constituted the experimental manipulation. While out of the room, the experimenter looked at the participants' first questionnaire and selected the participants' lowest self-rated trait to be

the subject of the feedback. In cases in which two traits were rated equally low, the researcher randomly selected one trait. Participants' lowest self-rated trait was selected because it allowed ample room to provide positive self-concept-inconsistent feedback to both higher and lower self-esteem individuals without ceiling effects. Because all of the traits were positive and socially desired, scores on these lowest-rated traits were moderate (M = 3.93, SD = 1.97), corresponding to a self-rating between *somewhat characteristic of me* and *moderately characteristic of me* on the rating scale. Once the target trait had been selected, the researcher wrote the name of the trait in red ink on the top of the participants' final questionnaire package. For participants in the consistent feedback condition, the experimenter also wrote a large equal sign, and when she handed the questionnaire to the participants, the researcher said, "Well, it looks like your partner rated you exactly how you rated yourself." For participants in the *inconsistent feedback condition*, the experimenter also wrote a large +2 next to the trait, and when she handed the questionnaire to the participants, the researcher said, "Well, it looks like your partner rated you two points higher than you rated yourself."

After this feedback, participants completed a questionnaire that assessed their "reactions to the feedback from [their] partner." First, participants completed a thought-listing task in which they were instructed to write down as quickly as possible, in point form, any thoughts they currently had about themselves in response to receiving the feedback. Following the thought listing task, participants completed closed-ended questions that further explored their thoughts about the feedback. Participants first reported their cognitive reactions to the feedback (e.g., Shrauger, 1975; Swann & Hill, 1982) by indicating how accurate they perceived the feedback to be (1= *not at all accurate*, 5 = *completely accurate*), how insightful they perceived their partner to be (1 = *not at all insightful*, 5 = *completely insightful*), and how much their partner understood them on the trait in question (1 = *not at all*, 5 = *totally*). The latter two items were combined to create a reliable index of *partner perceptiveness* (α = .76).

Next, participants rated their affective reactions to the feedback by reporting how the feedback made them feel about themselves (1 = *I felt really bad about myself*, 5 = *I felt really good about myself*). Participants then reported their self-rating on the trait on which they received feedback. This assessment had a different scale than was used in the premeasure to limit anchoring effects from the first self-rating task. Participants reported their agreement with three statements that indicated moderate self-ratings on the trait: "I am a bit less _____ than average," "I am moderately _____," and "I am a bit more _____ than average." Ratings had a three point scale (−1 = disagree, +1 = agree). The first of these items was reverse-scored, and then all three items were summed to create a single score indicating participants' degree of *moderately positive trait views* (α = .80).

Finally, participants completed a manipulation check in which they wrote down the trait on which they received feedback and then circled one of three options that best reflected the feedback they received: "My partner rated me exactly as I rated myself on this trait," "My partner rated me higher on this trait than I rated myself," or "My partner rated me lower on this trait than I rated myself."

After completing this questionnaire, participants were debriefed concerning the true purposes of the study, a process that included

a probe for suspicion, and were given their payment or credit and allowed to leave.

Coding participants' thought listings.   We coded participants' thought listings for signs of epistemic certainty and confusion. Because participants listed their thoughts in point form, we considered each point to be a separate thought. Participants listed between one and 14 thoughts, with the modal number of thoughts being three (23%). The vast majority of participants listed fewer than five thoughts (77%), with very few participants listing six (8%), seven (5%), or more (10%) thoughts. Hence, we limited our coding to the first five thoughts that participants listed.

Two independent coders who were blind to participants' experimental condition and self-esteem rated each of the first five thoughts that participants listed on two dimensions: epistemic confusion and epistemic certainty. A priori, epistemic confusion was thought to be reflected by doubts and questions about one's self-views and efforts to make sense of the feedback. Hence, thoughts indicating epistemic confusion suggested that the participant was confused by the feedback (e.g., "Doesn't make sense?!"), that the feedback caused the participant to question his or her self-views (e.g., "Am I right?" "Or maybe I am wrong about myself in the way I perceive myself?" or "Maybe I am too hard on myself?"), or that the feedback caused the participant to question how he or she was perceived by others (e.g., "Why would she think that?" or "Maybe there is something I never saw?"). Such thoughts were overwhelmingly phrased in the form of a question. In contrast, epistemic certainty was defined as certainty about one's self-views, and feelings of rightness about the feedback. Hence, thoughts indicating epistemic certainty suggested that the participants thought the feedback made sense (e.g., "Makes sense," "Typical," or "I expected it") or that the feedback verified the participants' self-views (e.g., "Joy at knowing what I think about myself is true").

Coders used a binary system to code each dimension, such that each thought was given a score of 0 if it did not reflect the dimension and a score of 1 if it did reflect the dimension. After each coder completed her independent assessment, the two coders met to discuss any discrepancies. Disagreement occurred on less than 1% of the approximately 1,000 codes (i.e., five thoughts for over 100 participants and two trait dimensions), and these discrepancies were easily resolved in favor of one or the other's opinion. The number of thoughts reflecting epistemic certainty and the number of thoughts reflecting epistemic confusion were then summed, so that each participant had a single score reflecting each dimension.

Results and Discussion

Three participants were excluded because they did not report on the manipulation check that the feedback matched their assigned condition (1 man and 1 woman in self-concept-consistent condition and 1 woman in the self-concept-inconsistent condition). No participants expressed suspicion.

Preliminary regression analyses indicated that the results that follow were not moderated by gender, and as predicted, self-esteem did not moderate or explain any of the results that follow. It is important to note that preliminary analyses also indicated that the results were not moderated or explained by participants' ratings of the importance of the trait on which they received feedback

or by participants' preexisting notions of how their romantic partner viewed them on the trait on which they received feedback.

Testing nonindependence.   In this study, members of each romantic dyad did not actually interact with one another, so experimental linkage was not a possible cause of nonindependence in the dependent variables (Kenny et al., 2006). However, dyad members' scores on the dependent measures could have been nonindependent due to voluntary linkage resulting from their preexisting romantic relationships. Hence, as in Study 4, we first tested whether scores on each of the dependent variables were independent. In this case, the dyad members were distinguishable as either participants recruited directly though the student participant pool (student participants) or romantic partners recruited by the student participants (referred participants). With such a design, the appropriate measure of nonindependence is a simple correlation between student and referred participants' scores on each of the dependent measures. After organizing the data into a dyadic structure, we found that none of these correlations reached a level at which nonindependence was suggested (i.e., a conservative alpha level of $p < .200$, Kenny et al., 2006; accuracy $r = .12$, $p = .387$; partner perceptiveness $r = .00$, ns; number of confused thoughts $r = -.09$, $p = .522$; number of certain thoughts $r = -.06$, $p = .666$; state self-worth $r = .04$, $p = .774$; and attitude change $r = .15$, $p = .279$). Therefore, the analyses that follow were conducted at the level of the individual.

Does the epistemic signaling system respond to social feedback?   First we conducted two-way ANOVAs in which feedback condition (consistent vs. inconsistent) was entered as a factor, self-esteem was entered as a covariate, and accuracy of feedback or partner perceptiveness were the dependent variables. Consistent with previous research demonstrating people's cognitive reactions to self-concept-consistent feedback (e.g., Swann, 1997), participants indeed reported that the consistent feedback was more accurate than was the inconsistent feedback (Ms = 3.98 and 3.55, respectively; SDs = 0.67 and 0.72, respectively), $F(1, 98) = 12.52$, $p = .001$, and that their partner was more perceptive in the consistent feedback condition than in the inconsistent feedback condition (Ms = 4.08 and 3.66, respectively; SDs = 0.75 and 0.81, respectively), $F(1, 98) = 11.19$, $p = .001$. Self-esteem was also directly related to both variables, such that across conditions, LSEs thought the feedback was less accurate, $F(1, 98) = 5.41$, $p = .022$, and that their partners were less perceptive, $F(1, 98) = 7.93$, $p = .006$.

Next, we examined whether the activation of the epistemic signaling system was evident in participants' thoughts immediately following receipt of the feedback. We predicted that participants would express greater epistemic confusion in the inconsistent condition than consistent condition but would express greater epistemic certainty in the consistent condition than inconsistent condition. We conducted a repeated-measures ANOVA in which nature of the epistemic signal (number of confusion thoughts vs. number of certainty thoughts) was the repeated measure, feedback condition (consistent vs. inconsistent) was the between-subjects factor, and self-esteem was the covariate. Results revealed the anticipated interaction between epistemic signal and condition, $F(1, 98) = 21.12$, $p < .001$. This interaction is depicted in Figure 6. Participants in the inconsistent feedback condition expressed more epistemic confusion than did participants in the consistent feedback condition (Ms = 0.44 and 0.09, respectively; SDs = 0.66 and 0.35, respec-
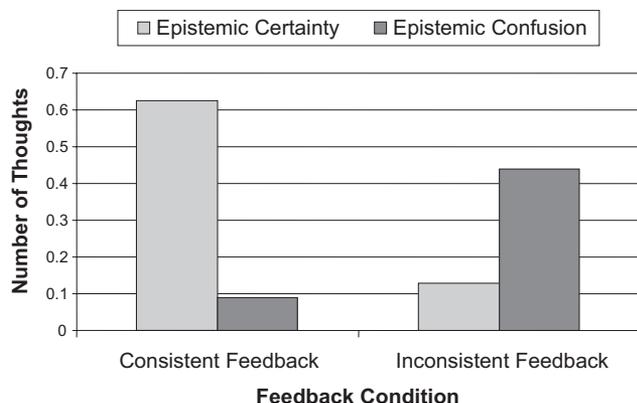
Figure 6. Number of thoughts listed by participants that were coded as reflecting epistemic certainty or epistemic confusion as a function of feedback condition (consistent vs. inconsistent) in Study 5.

tively), $F(1, 98) = 10.27$, $p = .002$, whereas participants in the consistent feedback condition expressed more epistemic certainty than did participants in the inconsistent feedback condition ($Ms = 0.61$ and 0.13, respectively; $SDs = 0.78$ and 0.34, respectively), $F(1, 98) = 13.28$, $p < .001$. Moreover, within the consistent feedback condition, participants expressed more epistemic certainty than confusion, $F(1, 98) = 18.99$, $p < .001$, and within the inconsistent feedback condition, participants showed the opposite pattern, $F(1, 98) = 4.31$, $p = .044$. These effects were unchanged when we controlled for the total number of thoughts that participants listed.

These results support our contention that the epistemic signaling system is activated when people receive relational-value feedback and that they experience epistemic certainty when that feedback is consistent with their self-views but experience confusion when it is inconsistent (i.e., Paths E and F in Figure 1). It is important to note that because feedback was idiosyncratically tailored to participants' own self-views, all participants, regardless of self-esteem, experienced epistemic confusion when they received feedback suggesting that they had a higher relational value than they previously thought. This result suggests that the response of the epistemic system to feedback is not totally dependent on one's global self-esteem, as may have been suggested by the results of Studies 1–4. In those previous studies, only LSEs responded to high relational value feedback with epistemic confusion whereas HSEs responded with epistemic certainty. In the present study, we demonstrated that HSEs can indeed experience epistemic confusion in response to positive relational-value feedback if that feedback is sufficiently inconsistent with their present self-views to activate the epistemic signaling system.

Does the acceptance signaling system respond to social feedback differently than does the epistemic signaling system? Activation of the acceptance signaling system was assessed with the item, "Does the feedback you have just received make you feel good or bad about yourself?" which reflected participants' state feelings of self-worth. We conducted a two-way ANOVA in which feedback condition (consistent vs. inconsistent) was entered as a factor and self-esteem was entered as a covariate, and state feelings of self-worth were the dependent variable. A main effect of self-

esteem indicated that LSEs reported lower state feelings of self-worth than did HSEs, $F(1, 98) = 4.08$, $p = .046$. Moreover, consistent with the results of Study 3, participants felt better about themselves after they received the highly positive inconsistent feedback than after they received the consistent feedback ($Ms = 4.09$ and 3.57, respectively; $SDs = 0.79$ and 0.87, respectively), $F(1, 98) = 7.63$, $p = .006$, presumably because the former feedback conveyed that the participants had a high relational value (at least higher than the participants' own perceptions). Unlike in previous studies, state feelings of self-worth were not correlated with either thoughts of epistemic certainty or confusion ($rs < .18$, $ps > .09$). Moreover, controlling for participants' feelings of state self-worth did not alter the interaction results depicted in Figure 6, $F(1, 98) = 21.12$, $p < .001$, and controlling for epistemic certainty and confusion did not alter the condition effect on state feelings of self-worth described previously, $F(1, 98) = 7.61$, $p = .007$. Thus, in the present study, the acceptance signaling system and the epistemic signaling system provided unique feedback: Compared with self-concept-consistent feedback, receiving feedback that conveyed a higher relational value than participants' current self-views caused participants to experience concurrent and independent feelings of confusion and heightened self-worth.

Does receiving inconsistent feedback predict self-concept change? Receiving feedback that is inconsistent with one's chronic perceived relational value creates a state of self-concept confusion that we propose will cause people's self-concepts to be particularly susceptible to change. In the present study, after participants received the feedback about their relational value from their romantic partner, they rated their agreement with three moderately positive trait statements (i.e., rating the self a little above average). We predict that participants who received the inconsistent feedback will shift their self-views to reflect the feedback they received, such that their self-views will be more positive than participants in the consistent feedback condition.

To test this hypothesis, we conducted an ANOVA in which feedback condition (consistent vs. inconsistent) was the between-subjects factor, self-esteem was the covariate, and agreement with the moderately positive trait-statements was the dependent variable. Results revealed that feedback condition indeed affected participants' willingness to endorse moderately positive self-statements, $F(1, 98) = 10.63$, $p = .002$, such that participants in the inconsistent feedback condition were more willing to endorse moderately positive self-statements than were participants in the consistent feedback condition, ($Ms = 0.44$ and -0.80, respectively; $SDs = 1.57$ and 1.74, respectively). These results suggest that although participants found the inconsistent feedback to be less accurate than the consistent feedback, those who received inconsistent feedback shifted their perception of their possession of socially desired traits to reflect their romantic partners' more positive view.

Moreover, although participants' state self-worth was related to their willingness to claim to possess the traits in question, $F(1, 98) = 9.14$, $p = .003$, such that participants who felt better about themselves also rated themselves more positively, this effect of the affective signaling system was independent of the condition effect described above. Specifically, including state feelings of self-worth as a covariate in the ANOVA predicting endorsement of moderately positive self-views did not alter the condition effect described above, $F(1, 98) = 6.23$, $p = .014$. Once again, this result

suggests that the affective signaling system and epistemic signaling system may have been exerting independent effects on participants' self-views, a possibility that is consistent with our contention that these two signaling systems provide unique information about the interface between the self and one's social world.

Study 6: Does Self-Concept-Inconsistent Feedback Predict Self-Regulatory Depletion?

Studies 1 though 5 demonstrated that when people receive feedback that is inconsistent with their chronic perceived relational value (i.e., global self-esteem), such feedback activates the epistemic signaling system. Recall that we proposed that when the epistemic system signals a discrepancy between one's present perceived relational value and social feedback (i.e., Path F in Figure 1), this activates regulatory efforts aimed at reducing the discrepancy between the level of relational value conveyed by the social feedback and one's chronic perceived relational value.

People's thought listings in Study 5 provided some evidence that such regulatory efforts indeed are provoked by inconsistent feedback: Compared with participants who received consistent feedback, positive inconsistent feedback caused participants to adopt more positive self-views. This shift suggests that these participants may have been actively trying to reduce the discrepancy between their self-views and the social feedback by changing their self-views to better match their partner's positive feedback.

Although the results of Study 5 suggest that inconsistent feedback provokes self-regulation, in the present study we look for additional evidence by examining the immediate consequences of inconsistent feedback for people's self-regulatory capacity. If inconsistent feedback activates self-regulation, then when participants in the present study receive feedback about their relational value that is inconsistent with their self-esteem—when HSEs receive moderate relational value feedback and when LSEs receive high relational value feedback—such participants' subsequent performance on a self-control task should be depleted relative to participants who received self-esteem consistent feedback. We index participants' post-feedback capacity for self-control using a handgrip task: The longer participants hold the handgrip, the greater their reserves of self-control (e.g., Ciarocco, Sommer, & Baumeister, 2001; Muraven, Tice, & Baumeister, 1998).

Method

Participants. Sixty-three female, Caucasian undergraduates (M_{age} = 19.26 years, SD = 1.77) from the introductory psychology participant pool at the University of Waterloo participated in this study in exchange for partial course credit.

Procedure. Participants were invited to a lab study about Personality Styles. Immediately upon arriving at the lab, participants completed a preliminary survey that included Rosenberg's (1965) Self-Esteem Scale and filler scales assessing participants' health behaviors and television watching preferences. Next, participants completed a bogus personality test on the computer that they were told "has been shown to predict a number of traits and behaviors with over 90% accuracy." The bogus personality test consisted of 50 statements about one's preferences and behaviors, and the participants had to indicate whether each statement was true of false for them. For example, the test included statements

like, "I would rather be outdoors than indoors," "I have a dog," "When I see a penny on the ground, I pick it up," and "I would look through my left eye to take a photograph."

When participants completed the test, the computer displayed the supposed name of the participants' personality type: Maranta. Participants circled this type on a piece of paper. Then, the researcher told participants that she was able to provide them with some of their personality test results. She told participants that the test

> assesses six different dimensions of personality. Because of copyright restrictions, we can't provide you with feedback on your results from all six dimensions . . . But the software package we're using does give you results on one of the six dimensions for free!

Then the researcher gave participants an official looking document with a cover sheet labeled, "Harvard-Ashby Personality Inventory," followed by "Personality Type Preview: Social Value." The contents of this document constituted the experimental manipulation. Because of the cover sheet on the feedback, the researcher was blind to the participants' experimental conditions.

For participants in the *moderate relational value condition*, the feedback indicated that the participants' personality type is liked by only select groups of people, that other people sometimes seek out their personality type as friends, teammates, and relationship partners, and that their personality type is perceived to be moderately interesting and engaging conversationalists. The document also cited some of the research that supported these assertions:

> In one laboratory study examining face-to-face social interactions among strangers, some people reported that Marantas were easy to get along with, but others found them difficult to interact with. Partners generally reported moderate levels of liking for Marantas and an equivocal desire to get to know them better. Partners also reported somewhat enjoying their interaction with Marantas and found Marantas to be slightly interesting and engaging.

For participants in the *high relational value condition*, the feedback indicated that the participants' personality type is well liked by diverse groups of people, that other people commonly seek out their personality type as friends, teammates, and relationship partners, and that their personality type is perceived to be interesting and engaging conversationalists. The document also cited some of the research that supported these assertions:

> In one laboratory study examining face-to-face social interactions among strangers, people reported finding Marantas extremely easy to get along with. Partners reported high levels of liking for Marantas and a strong desire to get to know them better. Partners also reported really enjoying their interaction with Marantas and finding Marantas to be interesting and engaging.

To support the cover story, in both conditions the document also included information about how the participant could purchase their full personality report.

Next, the participants completed extremely brief measures assessing state self-esteem and self-concept clarity. The state self-esteem measure was adapted from McFarland and Ross's (1982) measure; participants were asked to rate how they felt at that moment using eight adjectives and a 5-point scale (1 = *not at all*, 5 = *very/extremely*): proud, ashamed, worthless, inadequate, successful, confident, competent, and unattractive. Negative items

were reverse-scored and then items were averaged to create a reliable index of state self-esteem ($\alpha = .70$). Participants also rated their agreement with four items adapted from Campbell et al. (1996), using a 5-point scale (1 = *strongly disagree*, 5 = *strongly agree*): "Right now I have one opinion of myself, and tomorrow I might have a different opinion," "I am wondering about what kind of person I really am," "Right now I feel that I am not really the person that I appear to be," and "If I were asked to describe my personality right now, my description might end up being different from what it was a few days ago" (p. 146). These items were averaged to create a reliable index of epistemic confusion ($\alpha = .78$).

Next, participants completed a hand-grip task intended to measure their self-regulatory capacity. Participants squeezed the hand-grip in their dominant hand for as long as they could, and the researcher timed participants' performance. To ensure that the researcher used the same endpoint for the task for all participants, a marble was placed between the handles on the handgrip; when sufficient force was not applied, the marble fell to the ground, marking the end of the task. Following this, participants completed a final questionnaire that included manipulation check questions: "How positive was the information you received about your personality type?" "To what degree are people with your personality type accepted by others?" "How much do other people like your personality type?" "How negative was the information you received about your personality type?" and "To what degree are people with your personality type rejected by others?" All questions used a 7-point response scale (1 = *not at all*, 7 = *extremely*). The former three items were averaged to form a reliable index of perceived acceptance ($\alpha = .94$), and the latter two items were averaged to form a reliable index of perceived rejection ($\alpha = .84$). After completing this questionnaire, participants were thoroughly debriefed as to the true purposes of the study and were allowed to leave.

Results and Discussion

Two participants were excluded from the analyses that follow because they reported significant suspicion about the study during the debriefing (one higher self-esteem participant in the moderate relational value condition and one lower self-esteem participant in the high relational value condition). In all of the analyses that follow, we used regression in which mean-centered self-esteem ($M = 7.36$, $SD = 0.90$), dummy-coded condition (0 = moderate relational value, 1 = high relational value), and the interaction between the variables were used to predict the dependent measures.

Manipulation check. We first used the aforementioned regression to predict perceived acceptance ($M = 5.57$, $SD = 1.12$) and perceived rejection ($M = 2.29$, $SD = 0.94$). As intended, compared with participants in the moderate relational value condition, participants in the high relational value condition perceived that their personality type was more accepted by others ($Ms = 6.49$ and 4.71, respectively; $SDs = 0.44$ and 0.85, respectively; $\beta = .80$), $t(58) = 10.25$, $p < .001$, and compared with participants in the high relational value condition, participants in the moderate relational value condition perceived that their personality type was more rejected by others ($Ms = 2.91$ and 1.62, respectively; $SDs = 0.81$ and 0.56, respectively; $\beta = -.68$), $t(58) = -7.17$, $p < .001$. It is important to note that self-esteem did not influence percep-

tions of the feedback on either variable, nor did self-esteem moderate perceptions of the feedback ($ts < 1$).

Do the epistemic and acceptance signaling systems respond to social feedback? A main effect of self-esteem in the regression predicting epistemic confusion ($M = 2.70$, $SD = 0.88$) suggested that LSEs expressed greater confusion than did HSEs ($\beta = -.59$), $t(58) = -5.61$, $p < .001$. However, as in Studies 1–5, a Self-Esteem × Condition interaction also emerged ($\beta = -.43$), $t(58) = -2.57$, $p = .013$. LSEs reported greater epistemic confusion in the high relational value condition than in the moderate relational value condition ($M_{estimated} = 3.39$ and 2.89; $\beta = -.29$), $t(58) = -2.46$, $p = .006$, whereas HSEs reported greater epistemic confusion in the moderate relational value condition than in the high relational value condition ($M_{estimated} = 2.45$ and 2.00; $\beta = -.26$), $t(44) = 2.36$, $p = .014$. These results again suggest that participants' epistemic signaling systems respond to relational-value feedback in the manner depicted in Figure 1.

Similar analyses predicting state self-esteem ($M = 3.96$, $SD = 0.37$) revealed a main effect of self-esteem ($\beta = .56$), $t(58) = 5.39$, $p < .001$, such that HSEs reported higher state self-esteem than did LSEs, and the anticipated main effect of condition ($\beta = .23$), $t(58) = 2.21$, $p = .031$. As in Studies 3 and 5, everyone, regardless of their self-esteem, felt better after receiving the high relational value feedback than after receiving the moderate relational value feedback ($Ms = 4.04$ and 3.88, respectively; $SDs = 0.30$ and 0.41, respectively). As in the previous studies, epistemic confusion and state self-esteem were moderately correlated ($r = -.36$, $p = .004$). However, controlling for state self-esteem in the regression predicting epistemic confusion did not alter the previously reported interaction between self-esteem and condition ($\beta = -.47$), $t(58) = -2.77$, $p = .008$, and controlling for epistemic confusion in the regression predicting state self-esteem did not alter the previously reported main effect of condition ($\beta = .23$), $t(58) = 2.20$, $p = .032$. Hence, as is Studies 3 and 5, the present results again suggest that the functioning of the epistemic signaling system and the acceptance signaling system are independent.

Does self-concept-inconsistent feedback deplete regulatory capacity? We tested participants' postfeedback reserves of self-control by asking them to hold a handgrip for as long as they possibly could. Results of the usual regression predicting the number of seconds that participants held the handgrip ($M = 76.23$, $SD = 62.28$) revealed the anticipated interaction between self-esteem and condition ($\beta = .42$), $t(58) = 2.02$, $p = .048$.[8] This interaction is depicted in Figure 7. Consistent with our predictions, LSEs in the moderate relational value feedback condition held the handgrip for much longer than did LSEs in the high relational value feedback condition ($\beta = -.30$), $t(58) = 2.34$, $p = .021$, whereas HSEs in the high relational feedback condition held the handgrip for longer than did HSEs in the moderate relational value feedback condition ($\beta = .24$), $t(58) = 1.87$, $p = .063$. These results suggest that receiving self-esteem inconsistent feedback depleted self-regulatory capacity, presumably because people were trying to cognitively reconcile the feedback with their existing self-concept.

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[8] Because two different researchers conducted this study and each used a different handgrip, we controlled for the researcher running the experimental session in these analyses.
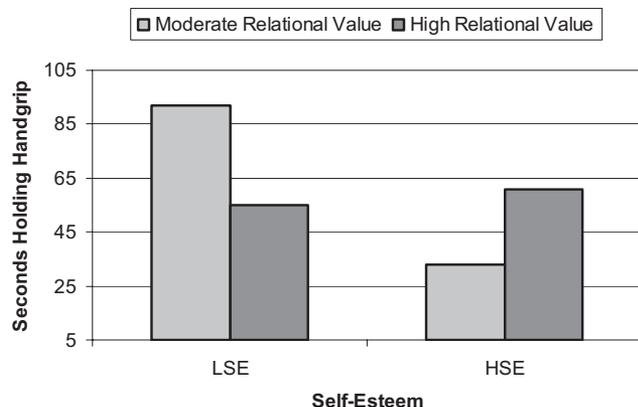
Figure 7. Length of time that participants held the handgrip as a function of self-esteem and feedback condition (moderate relational value vs. high relational value) in Study 6. Self-esteem was plotted for values one standard deviation below the mean (LSE; $M_{\text{self-esteem}} = 6.46$), and one standard deviation above the mean (HSEs; $M_{\text{self-esteem}} = 8.26$). Lower scores suggest self-regulatory depletion. LSE = individuals with lower self-esteem; HSE = individuals with higher self-esteem.

General Discussion

In the present research, we drew on sociometer theory (e.g., Leary & Baumeister, 2000) and self-verification theory (e.g., Swann, 1997) to propose an expanded model of the regulatory function of self-esteem. In six studies, we tested our hypothesis that people possess not only an acceptance signaling system that signals whether acceptance or rejection is imminent but also an epistemic signaling system that signals whether social feedback is consistent or inconsistent with global self-esteem. We proposed that although the functioning of the acceptance signaling system is relatively simple—everyone feels good when they are accepted and bad when they are rejected—the functioning of the epistemic signaling system is more complex because the nature of the signal depends on global self-esteem. LSEs' epistemic signaling system responds to relatively low levels of acceptance with epistemic certainty and responds to relatively high levels of acceptance with epistemic confusion, whereas HSEs' epistemic signaling system responds to relatively low levels of acceptance with epistemic confusion and responds to relatively high levels of acceptance with epistemic certainty.

We conducted meta-analyses of the results of the six studies that we presented that tested whether self-esteem moderates the signal produced by the epistemic system. Consistent with our predictions, across the six studies, LSEs reported greater epistemic certainty when feedback conveyed relatively low relational value and poorer epistemic certainty when feedback conveyed relatively high relational value ($d = -0.72$, $Z = -5.29$, $p < .001$). In contrast, HSEs reported greater epistemic certainty when feedback conveyed relatively high relational value and poorer epistemic certainty when feedback conveyed relatively low relational value ($d = 0.88$, $Z = 6.17$, $p < .001$).[9] In addition, meta-analysis of the results of Studies 3–6 replicated previous sociometer research (e.g., Leary, Haupt, Strausser, & Chokel, 1998; Leary et al., 1995) by demonstrating the functioning of the acceptance signaling system in response to a diverse range of types of relational-value feedback:

People felt better when they were accepted than when they were rejected ($d = 0.65$, $Z = 2.34$, $p = .010$). It is important to note that the results of Studies 3–6 also demonstrated that the responses of the acceptance and epistemic signaling systems are distinct, suggesting that these two signaling systems offer unique feedback about one's social experiences.

In addition to testing the functioning of the acceptance and epistemic signaling systems, Studies 5 and 6 tested the hypothesis that the epistemic signaling system is part of a larger self-regulatory system. We suggest that receiving feedback that is inconsistent with one's chronic relational value activates self-regulatory efforts aimed at reducing the discrepancy between feedback and self-views. Positive self-concept-inconsistent feedback in Study 5 caused participants to adopt more positive self-views, perhaps in an effort to reduce the discrepancy between existing self-views and the social feedback. Study 6 provided additional evidence that the epistemic system is regulatory. When participants received feedback that was inconsistent with their chronic perceived relational value (i.e., high relational-value feedback for LSEs and low relational-value feedback for HSEs) they showed evidence of self-regulatory depletion on a subsequent self-control task. This result suggests that activation of the epistemic system consumes self-regulatory capacity, which in turn suggests that the epistemic signaling system is indeed a self-regulatory system.

Implications of These Results

Sociometer theory. Our results expand previous accounts of the regulatory function of self-esteem (e.g., Leary, 2004) by proposing and testing an epistemic signaling system that highlights the regulatory role of global self-esteem.

Previous sociometer research and the results of our Studies 3, 5, and 6 suggest that state self-esteem is part of an acceptance signaling system, providing real-time feedback concerning the quality of one's social bonds: Increases or decreases in state self-esteem and affect reflect one's perceived value as a relational partner, with decreases in state self-esteem alerting the individual that his or her social bonds are in jeopardy (e.g., Leary, 2004; Leary et al., 1995; Leary & Baumeister, 2000). Presumably, these affective signals aid self-regulation by motivating social behaviors (e.g., Leary, 2004). If relational value is high, the positive affective signal may motivate people to approach a desired social situation or target, whereas if relational value is low, the aversive affective signal may motivate people to either work to repair the damaged relationship or, if repair is not possible or is too risky, to avoid the relationship and thus avoid the hurt feelings that it prompts (e.g., Murray, Holmes, & Collins, 2006).

In our new framework, global self-esteem is linked to the epistemic signaling system; global self-esteem represents the benchmark against which feedback about one's relational value is measured. Changes in epistemic certainty in response to social feedback may aid social functioning by acting as an early warning system, signaling whether one's chronic perceived relational value is consistent with social reality. If social feedback matches one's

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[9] This meta-analysis included the nonsignificant simple effect from Study 3. Results of meta-analyses for only the experimental studies are as follows: For LSEs, $d = -0.72$, $Z = -3.29$, $p < .001$; for HSEs, $d = 1.08$, $Z = 5.75$, $p < .001$.

chronic perceived relational value, increases in epistemic certainty signal that global self-esteem accurately reflects one's relational value. High self-concept clarity, which we suggest is a facet of epistemic certainty, is associated with low levels of anxiety and self-conscious emotions (Campbell et al., 1996). Furthermore, when people are clear about their self-concepts they are not motivated to seek additional information about the self (e.g., Stapel & Tesser, 1991). Thus, when one receives feedback about one's relational value that is consistent with one's global self-esteem, the resulting feelings of epistemic certainty may serve to affirm the status quo and demotivate self-relevant information seeking.

In contrast, if acceptance feedback contradicts one's global self-esteem, the resulting decrease in epistemic certainty may signal that one's global self-esteem does not accurately reflect one's actual relational value. Poor self-concept clarity is associated with anxiety and self-conscious emotions (Campbell et al., 1996), and confusion about one's self-concept causes people to become highly motivated to seek out additional information about the self (e.g., Stapel & Tesser, 1991; Swann, 1987). Thus, epistemic confusion may create an uncomfortable psychological state that motivates people to seek additional social feedback to ensure that their global self-esteem is correctly calibrated. Hence, we suggest that changes in epistemic certainty in response to social feedback about one's relational value may play an important functional role, helping to keep one's global self-esteem tuned in to social reality.

The preceding discussion focuses on the implications of the independent functioning of the acceptance and epistemic signaling systems. Yet, these two systems operate in parallel and provide concurrent feedback about the nature of people's social experiences. This means that in response to social feedback conveying high relational value, such as Holly's party invitation, someone with higher self-esteem like Seamus experiences concurrent feelings of pride and epistemic certainty, whereas someone with lower self-esteem like Orwell experiences concurrent feelings of pride and epistemic confusion. In contrast, if both men had been excluded from Holly's party, which would constitute social feedback conveying low relational value, Seamus would have experienced concurrent feeling of shame and confusion, whereas Orwell would have experienced concurrent feelings of shame and epistemic certainty.

These differing combined reactions to social feedback may serve to maintain the stability of global self-esteem. For LSEs, high state self-esteem is accompanied by feelings of confusion, whereas low state self-esteem is accompanied by feelings of certainty. Thus, not only does the epistemic system suggest to LSEs that the high relational-value social feedback is somehow wrong but it may also suggest that feeling good about oneself is wrong, thereby confirming LSEs' poor self-regard. The opposite will happen for HSEs: Feeling low in state self-esteem is accompanied by confusion, whereas feeling high in state self-esteem is accompanied by feeling certain, suggesting that feeling good about oneself is correct.

Self-verification theory. To our knowledge, the present research is the first to provide empirical evidence that receiving self-concept-inconsistent social feedback indeed causes state increases in epistemic confusion. To date, self-verification research has not directly examined the causes of epistemic confidence and confusion per se but instead has examined the consequences of high or low self-certainty (i.e., epistemic certainty or confusion)

and the motivation to maintain epistemic certainty (for a review, see Swann et al., 2003). Given that epistemic confusion is proposed to motivate people's behavioral responses to feedback (Swann, 1997; Swann & Schroeder, 1995), the present research offers an important empirical validation of the processes thought to underlie self-verifying behavior.

By integrating ideas from self-verification theory with ideas from sociometer theory, our research also suggests an answer to a question that has long troubled self-psychologists: If LSEs' social bonds are as objectively positive as HSEs' (e.g., Murray et al., 2006), why do LSEs have low chronic perceived regard? The preceding discussion concerning the interaction between the acceptance and epistemic signaling systems suggests one reason why this may be the case; LSEs' concurrent feelings of epistemic confusion and high state self-esteem in response to positive social feedback may undermine the validity of that feedback. But self-verification theory provides another compelling reason why LSEs' perceived regard may not change in response to positive social experiences: Epistemic confusion feels uncomfortable. Such discomfort may well explain why LSEs' anxiety rises when they experience a success (Wood, Heimpel, Newby-Clark, & Ross, 2005) and why, when they feel unusually happy, LSEs may try to dampen their positive feelings (Wood, Heimpel, & Michela, 2003).

Epistemic discomfort may thus explain why, when people receive social feedback that contradicts their self-concept, they are motivated to reduce their epistemic confusion and reestablish certainty (Swann & Schroeder, 1995). One technique to accomplish this goal is to seek feedback that verifies one's typical self-views. Indeed, self-concept uncertainty causes people to seek self-relevant social feedback (Stapel & Tesser, 1991), and in most cases, they seek social feedback that verifies their existing self-views (for a review, see Swann et al., 2003). For HSEs, seeking self-verifying feedback means seeking feedback that conveys high acceptance, which supports their positive self-views and bolsters their higher self-esteem. For LSEs, seeking self-verifying feedback means seeking feedback that conveys moderate to low acceptance, which supports their equivocal self-views and reinforces their lower self-esteem. Hence, LSEs' motivation to maintain epistemic consistency may render them immune to the potentially positive influence of social feedback that conveys high levels of acceptance.

The preceding discussion poses a troubling question for our model: If people respond to the epistemic signaling system's warnings by seeking self-verifying feedback then how does the epistemic signaling system keep self-esteem in touch with social reality? In our view, seeking self-verifying feedback is probably the safest response to epistemic confusion. People's existing self-views reflect years of experience, so people should not change them willy-nilly. In the short term, people probably should respond to epistemic warning signals by erring on the side of caution and seeking feedback that verifies their typical self-views. What happens, though, when feedback that is inconsistent with one's self-concept becomes more frequent, especially over a long term? Suppose that a boy with low self-esteem becomes a young adult who receives frequent romantic attention from women. Such attention could cause him to experience greater and greater epistemic confusion. If his self-concept is thus unclear and uncertain,

how does he seek self-verifying feedback? What type of feedback would verify an uncertain self-concept?

In such circumstances, the most effective way to relieve the psychological discomfort caused by low self-concept clarity may be to change one's self-view to draw it in line with the social feedback. Thus, our young man's self-views about his attractiveness might begin to change to become consistent with the positive feedback he constantly receives from women. By changing his self-concept, his epistemic certainty will increase because now the positive attention he receives from women is self-concept consistent rather than inconsistent. Thus, we suggest that seeking self-verifying feedback—either by creating one's social environment or through biased information processing (Swann et al., 2003)—is not the only method by which one can reestablish epistemic certainty. In the face of repeated, unavoidable self-concept-inconsistent feedback, one may change one's self-views. Indeed, we observed some preliminary evidence for this process in Study 5, in which participants changed their self-views to be more consistent with their romantic partners' positive evaluations.

If epistemic confusion is the first step on the road to self-concept change then it is possible that LSEs' chronically higher levels of epistemic confusion (i.e., chronically lower levels of self-concept clarity; Campbell et al., 1996) could actually have psychological benefits in certain circumstances. Research shows that when LSEs are loved by a partner who sees more virtue in them than they see in themselves, their self-esteem increases over the course of a year (e.g., Murray, Holmes, & Griffin, 1996). We suggest that the epistemic signaling system may play a role in this happy result. LSEs with a partner who views them very positively would receive strong acceptance feedback on a daily basis, and this feedback would contradict their typical social doubts. LSEs' epistemic signaling system would send a constant warning in the form of epistemic confusion that self-esteem might be inaccurate. Over time, it would become more and more difficult for LSEs with a very accepting partner to verify their poor estimation of their relational value. Hence, LSEs may deal with this epistemic discomfort by eventually changing their social self-concept to match their loved one's highly positive evaluations, resulting in more positive appraisals of their attributes and, ultimately, higher self-esteem.

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