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Abstract

Three experiments tested whether and when exposure to counterstereotypic ingroup members enhances women's implicit leadership self-concept. Participants read about professional women leaders framed as similar to versus different from most women (Experiment 1) or having the same versus different collegiate background as participants (Experiment 3). Experiment 2 manipulated similarity by giving false feedback about participants' similarity to women leaders. In all cases, seeing women leaders reduced implicit self-stereotyping relative to controls but only when they were portrayed as similar to one's ingroup (Experiment 1) and oneself (Experiments 2-3). Leaders portrayed as dissimilar either had no effect on self-beliefs (Experiment 1 and 3) or increased implicit self-stereotyping (Experiment 2). Dissimilar leaders also deflated participants' career goals and explicit leadership beliefs (Experiment 3). Finally, implicit self-beliefs became less stereotypic regardless of whether women believed the similarity feedback, but explicit self-beliefs changed only when they believed the feedback to be true (Experiment 2).

Keywords

self-concept, self-stereotypes, gender, implicit, role models

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As culturally shared generalizations, stereotypes are chronically accessible to most people immersed in a given society (for a review, see Deaux & LaFrance, 1998). Although the effect of stereotypes on perceivers' judgments of *outgroups* has been a central topic in social psychology for more than 50 years, the effect of stereotypes on individuals' *self-concept*, behavior, and life decisions has had a shorter history, gaining empirical traction much later (for a review, see Swim & Stangor, 1998). In the case of gender stereotypes and the self-concept, several programs of research have investigated how gender stereotypes affect women's self-beliefs, behavior, and academic and professional choices. For example, numerous studies have found that when women's alleged weakness in mathematics and science is made salient, stereotype threat undermines math performance, decreases self-efficacy, promotes disengagement from math-oriented majors and careers, and elicits stereotypically feminine self-beliefs (Aronson, Quinn, & Spencer, 1998; Aronson & Steele, 2005; Davies, Spencer, & Steele, 2005; Inzlicht & Ben-Zeev, 2000; Pronin, Steele, & Ross, 2004). Other studies have found that gender stereotypes and status-legitimizing ideologies that accompany

them deflate women's self-evaluations and professional entitlement in terms of the salaries they feel justified asking, perceived legitimacy of their job status, and career advancement (Bylsma & Major, 1994; Crosby, 1984; Jost, Banaji, & Nosek, 2004; Major, 1994).

Past investigations have mostly focused on the *negative effects* of stereotypes on women's self-concept, decisions, and actions. With a handful of exceptions (Asgari, Dasgupta, & Gilbert Cote, 2010; Davies et al., 2005; Haines & Kray 2005; Hoyt & Blascovich, 2007; Marx, Stapel, & Muller, 2005; McIntyre, Paulson, & Lord, 2003; Parks-Stamm, Heilman, & Hearn, 2008; Rudman & Phelan, 2010), few studies have identified factors that can promote *positive counterstereotypic* self-conceptions. Even among studies that do exist, the results are decidedly mixed: Some studies

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have identified strategies that successfully promote counterstereotypic self-conceptions via exposure to successful ingroup members (Asgari et al., 2010; Davies et al., 2005; Haines & Kray, 2005; Marx et al., 2005; McIntyre et al., 2003) and other studies have found that these strategies backfire—provoking upward comparison threat and increasing self-stereotyping (Parks-Stamm et al., 2008; Rudman & Phelan, 2010).

To make sense of these mixed findings, we turned to the broader social comparison literature, which suggests that people's self-evaluations assimilate to comparison targets when they are primed with a collective mind-set (think "we") but contrast away from comparison targets when primed with an individualistic mind-set (think "me"; Brewer & Gardner, 1996; Stapel & Koomen, 2001). Collective mind-sets become activated in situations involving stereotype threat (Marx et al., 2005). For example, when women are in stereotype-threatening situations involving mathematics, their self-efficacy in math assimilates to the ingroup target—self-efficacy increases after seeing an ingroup member who is talented at math and decreases after seeing an ingroup member who is weak at math. Applied to a leadership context, women may also revert into a collective mind-set in situations that activate other negative ingroup stereotypes—for example, situations involving professional leadership. If so, when women see successful female leaders, their self-beliefs may assimilate to these ingroup comparison targets, increasing their leadership-oriented self-beliefs. Contrary to this conclusion, several past studies have found that seeing successful women leaders sometimes produces a contrast effect, making women see themselves as far *less* leaderlike compared to successful female leaders. The primary goal of the present article is to resolve these mixed findings.

What Conditions Enhance Versus Impair Women's Self-Perceptions of Leadership?

A widely shared stereotype about professional leadership is the notion that men are more suited for leadership roles and women are more suited for "back-up" supportive roles (Diekmann & Eagly, 2008; Eagly & Karau, 2002; Rudman & Kilianski, 2000; Swim & Hyers, 2009). Both women and men express these stereotypes explicitly and implicitly (Dasgupta & Asgari, 2004; Eagly & Karau, 2002) in that they attribute agentic leaderlike traits, roles, and behaviors to men more than women, and communal traits, roles, and behaviors to women more than men. Moreover, women are likely to incorporate into their self-concept communal traits over agentic traits (Eagly & Karau, 2002), caretaking roles over professional roles (Devos, Blanco, Rico, & Dunn, 2008), and an interest in arts-oriented rather than science-oriented professions and majors (Lips, 2000; Stout, Dasgupta, Hunsinger, & McManus, 2011). These research findings beg the question—what conditions might free

women to imagine themselves as having counterstereotypic traits and occupying counterstereotypic roles? That is, what makes women's self-concept malleable?

We define the self-concept as a multidimensional and dynamic psychological construct that is responsive to other individuals and events in one's environment (Markus & Kunda, 1986; McGuire, McGuire, & Cheever, 1986). Although some self-related attributes may be chronically accessible because of their centrality and importance, others may vary significantly in response to people and events in the local environment. One factor that influences people's self-concept is the presence of ingroup and outgroup members in the social context (e.g., McGuire et al., 1986). In particular, we predict that the presence of successful female leaders will enhance young women's leadership self-concept *if those leaders are viewed as similar to oneself* (an assimilation effect). If, however, they are viewed as *too different*, seeing women leaders may backfire, making female perceivers view themselves as even more lacking in leadership (a contrast effect) or produce no change in self-conceptions compared to baseline. Put differently, seeing successful ingroup members may be inspiring in some contexts but deflating in others.

Consistent with these hypotheses, role model research shows that successful others become personal role models *only* when perceivers subjectively identify with them (Lockwood & Kunda, 1997, 1999) and view their achievements as attainable (Blanton, 2001; Lockwood & Kunda, 1997, 1999). Role models have beneficial effects by providing comparative information about one's own ability and future potential (Buunk, Peiro, & Griffioen, 2007), by modeling successful behaviors (Bandura, 1997), and by allowing observers to acquire skills and self-efficacy through vicarious learning (BarNir, Watson, & Hutchins, 2011), all of which enhance the motivation to succeed (Collins, 1996; Taylor, Wayment, & Carillo, 1996; Wood, 1989).

In most of the above research, identification with role models has been conceptualized as an *interpersonal* connection between the perceiver and the successful target, not a *social identity* connection based on shared membership in an important ascribed group. An exception is Lockwood (2006), who examined participants' identification with a successful individual who was either of the same sex as participants or of the other sex. However, Lockwood did not focus on stereotypically masculine careers where women are virtually absent (e.g., leadership positions in business, science, law, politics). The impact of seeing successful same-sex others is likely to be very different for stereotypically masculine professions where doubts about women's ability are pervasive and where successful women are targets of backlash (Rudman & Glick, 1999) compared to gender-neutral or feminine professions (e.g., nursing, social work).

Goals of the Present Research

Three experiments sought to investigate conditions under which exposure to successful ingroup members is beneficial

versus costly to women's self-concept in domains where their ingroup is virtually invisible. We propose that highlighting the similarity between a successful ingroup member and the perceiver will inspire counterstereotypic self-beliefs whereas highlighting the difference between a successful ingroup member and the perceiver will maintain or exacerbate stereotypic self-beliefs. Our research goes beyond past work on gender, leadership, and role models in two important ways.

First, although the present research shares some similarity with our past work on implicit beliefs about leadership (Dasgupta & Asgari, 2004), an important difference is that our past work examined changes in women's implicit beliefs about *their ingroup*; it did not assess women's *self-concept*. The distinction between *ingroup beliefs* versus one's *self-concept* is important both theoretically and practically because psychological factors that change ingroup beliefs may leave the self-concept untouched if individuals perceive those factors to be irrelevant to their personal circumstances. For example, seeing successful professional women across a variety of professions changes women's implicit beliefs about what their ingroup can do (see Dasgupta & Asgari, 2004), but it may not affect their self-concept if the exemplars are considered irrelevant to, or very different from, their personal circumstances (Lockwood & Kunda, 1997, 1999).

Second, past research on role models and the self-concept has almost exclusively measured individuals' explicit self-beliefs; in contrast, we paid special attention to implicit self-beliefs. Because women often view leadership traits (e.g., ambition, assertiveness) as interpersonally problematic compared to communal traits (e.g., caring, supportiveness; Eagly & Karau, 2002; Lips, 2000), they may be motivated to describe themselves in communal rather than agentic terms to navigate concerns about being liked. Thus, we predicted that seeing ambitious, successful, professional women would probably not change women's explicit self-beliefs, which would remain communally oriented, but would influence their implicit self-beliefs.

The divergent predictions about the malleability of implicit versus explicit self-beliefs are theoretically informed by Gawronski and Bodenhausen's (2006) associative-propositional evaluation (APE) model that describes attitude change in terms of underlying mental processes. According to this model, implicit attitude change is driven by associative processes that develop because repeated activation of two concepts that share similar features and occur temporally close together become implicitly associated in the mind. According to Gawronski and Bodenhausen, the "most important feature [of the associative process] is that associative evaluations are independent of the assignment of truth values . . . associative evaluations can be activated irrespective of whether a person considers these evaluations as accurate or inaccurate" (p. 693). In contrast, the APE model describes explicit attitude change as driven by

propositional processes that emphasize the truth or falsity of incoming information. When incoming information activates two concepts close in time that share similar features, perceivers explicitly endorse this new association as their own attitude only if they accept it as propositionally true but reject it if they believe the association is false (Gawronski & LeBel, 2008).

Although the APE model focuses on attitude change, similar principles apply to self-concept change. We propose that repeated activation of successful female exemplars framed as *highly similar to the self* creates an association between the self and those exemplars. As a result, leadership attributes possessed by the exemplars get associated with the self (i.e., me + leader). In contrast, repeated activation of female exemplars framed as *very different from the self* highlights their lack of self-relevance and prevents such an association from forming. Instead, leadership attributes become associated with others (i.e., not-me + leader).

Also consistent with the APE model, exposure to female leaders framed as similar to the self will change women's explicit self-beliefs about leadership *only if* they agree they are similar to those leaders. That is, people will engage in social comparison processes using information they have about themselves (e.g., "They tell me I am similar to her. Is that true?"). If they reject the similarity information as false their explicit self-beliefs will not change. If the gap between female leaders and the self is perceived to be very large, as in the case of exemplars presented as *very different from the self*, perceivers may even contrast their self-beliefs by explicitly stating they have no desire to achieve such leadership positions.

In sum, because passive associative processes drive changes in implicit attitudes and beliefs, seeing successful women framed as similar to the self will enhance implicit leadership self-beliefs compared to baseline. However, because active propositional processes test the veracity of incoming information before explicit attitudes and beliefs change, seeing female leaders framed as similar to the self will not change explicit self-beliefs if participants reject the similarity information as false. Female leaders framed as very different from the self may even lead to a contrast effect (more self-stereotyping) if the difference information is accepted as true.

Experiment 1

Participants were exposed to pictures and biographies of successful professional women in two experimental conditions or nonsocial, nongendered stimuli in the control condition. We manipulated whether successful exemplars were framed as very similar to or very different from most other women (including the self). High similarity was manipulated by describing successful exemplars as ordinary individuals similar to other women who attained success through hard work, discipline, and persistence. Low similarity was manipulated

by describing the exemplars as unusual individuals who attained success because of their innate talent from an early age. We then measured participants' implicit and explicit beliefs about their own leadership ability.

The framing of success as achievable with effort (malleable) versus innate (fixed) is reminiscent of person theories of intelligence (Dweck 1999; Dweck & Master, 2008), which showed that conceptions of intelligence as a fixed commodity decreases self-worth, performance, and self-confidence when faced with difficulty (Kamins & Dweck, 1999) whereas the belief that intelligence can grow over time increases self-worth, performance, and confidence when faced with difficulty (Aronson, Fried, & Good, 2002; Hong, Chiu, Dweck, Lin, & Wan, 1999). We made a parallel prediction that framing success as malleable would make women envision themselves and other ingroup members as similar to successful female leaders with the possibility of achieving similar success in the future. In comparison, framing success as fixed would make them envision themselves and others as different from successful female leaders with little possibility of achieving equivalent success.

Method

Participants. One hundred and thirty-four women were recruited from the human subject pool for extra credit (median age = 20). Seventy-eight percent identified as White, 11% as Asian, 5% as Black, 2% as multiracial, 1% as Hispanic, and 3% did not specify their race.

Materials

Selection of pictures and descriptions. We selected five women in high-profile leadership positions and professions where women are relatively rare: science, medicine, business, law, politics, and journalism (see Appendix A). Pictures and brief biographies were gathered using Internet sources. These exemplars' similarity to most other women was manipulated by portraying them as either: (a) individuals with ordinary beginnings who had achieved extraordinary success through effort, hard work, and perseverance, or (b) individuals with extraordinary early talent who were different from most other women from the beginning. Both conditions provided identical information about the women leaders' current successes. The only difference was the inclusion of a few sentences that either emphasized their ordinary beginnings similar to most other ingroup members (high-similarity condition) or emphasized their extraordinary beginnings dissimilar from most other ingroup members (low-similarity condition). For example, in both conditions Jane Goodall was described as an accomplished scientist and ethologist whose discoveries revolutionized the study of chimpanzees. In the high-similarity condition, this was followed by these two sentences:

Jane Goodall's career is a textbook example of determination and hard work. After high school, she worked several part-time jobs to finance a trip to Africa. While in Africa, she worked as a secretary for the famous anthropologist, Louis Leaky, and her genuine interest and hard work later led to her first important assignment to Tanzania where she started the very first and longest continuous field study of chimpanzees in their natural habitat.

In the low-similarity condition, we included these two following sentences:

Jane Goodall's brilliance distinguished her from her peers right after high school. Recognizing her genius, Louis Leaky, the famous anthropologist, invited her to record the behavior of chimpanzees in Tanzania where she started the very first and longest continuous field study of chimpanzees in their natural habitat.

In the control condition, we chose five nonsocial stimuli (trees) that were positive but semantically unrelated to gender to ensure that they would not influence participants' self-concept. Pictures and descriptions of trees were put together using Internet sources.

Implicit beliefs about the self. An Implicit Association Test (IAT; Greenwald, McGhee, & Schwartz, 1998) was used to assess whether participants automatically associated themselves with leadership versus supportive qualities (self-IAT). Because the IAT is a measure of *relative* association between concepts and attributes, the target concept with which the self is contrasted has to be appropriate for the research question under investigation. Although past research has typically compared the self-concept with non-specific others, this is only one of many contrast category choices that may be used in self-IATs (Pinter & Greenwald, 2005). For example, in past research IATs have contrasted the self-concept with a generic other, an individual chosen by the participant, a best friend or ingroup, and a strongly liked or disliked cultural icon (Chen, Yamaguchi, & Greenwald, 2003; Greenwald & Farnham, 2000; Greenwald, Pickrell, & Farnham, 2002; Karpinski, 2004). Depending on the specific categories used, some studies found implicit self-beliefs remain the same across contrast categories (Pinter & Greenwald, 2005) whereas other studies found implicit self-beliefs vary as a function of the specific contrast used (Karpinski, 2004).

Applying the above knowledge to the present research, our goal was to assess how women perceived their own leadership qualities compared to the *ideal professional leader* who is stereotypically envisioned as male (Eagly & Karau, 2002). To direct women to compare their own leadership attributes with that of the ideal (male) leader, and given that people typically use their own gender as a social comparison unless directed otherwise (Major, 1994), we thought it

necessary to use males as the contrasting category in the self-IAT (me vs. he).

The self-IAT comprised four types of stimuli: supportive attributes (*supporter, nurturing, sympathetic, considerate, sensitive*), leadership attributes (*leader, ambitious, powerful, achiever, influential*), first-person pronouns (*I, me, mine, myself*), and male pronouns (*he, him, his, himself*). The IAT is based on the logic that when two concepts are strongly associated in one's mind (e.g., *me* and *supportive*) participants will be faster at grouping them together. However, when they are weakly associated (e.g., *me* and *leader*) participants will be relatively slower at grouping them together. We predicted that in the control and low-similarity conditions, women would show implicit self-stereotypic associations—they would be faster at associating *me* with *supporter* and *he* with *leader* and slower at associating *me* with *leader* and *he* with *supporter*. These stereotypic self-associations would become significantly attenuated after seeing professional women leaders in the high-similarity condition.

Explicit beliefs about the self. Participants were asked to rate the extent to which the same leadership and supportive traits in the IAT described themselves on 7-point scales (1 = *does not describe me at all*, 7 = *describes me very well*). To keep the contrast category in this self-report task similar to the IAT, they were asked to compare themselves with men.

Manipulation checks: Perceived similarity, perceived success, and admiration. Two items ($\alpha = .93$) measured how similar and alike participants thought they were to the women leaders, using 11-point scales. Two additional items were used to ensure that the similarity manipulation did not affect participants' admiration for the women leaders (one item) and perception of how successful they seemed (one item).

Demographic measure. Finally, we assessed participants' age, race, and English fluency.

Procedure

Students participated in two ostensibly unrelated studies. The "first study" allegedly assessed students' general knowledge and memory about people or objects. Participants were randomly assigned to one of three conditions in which they either read biographies of successful female leaders (in the high- and low-similarity conditions) or read descriptions of nonsocial stimuli (in the control condition). We then tested their memory for the information they had read to underscore the cover story. This was followed by manipulation checks in the two experimental conditions. To keep the procedure similar in the control condition, control participants were also asked questions about what they had read. Next, participants completed the alleged "second study" described as a hand-eye coordination task (IAT) followed by explicit self-beliefs and demographic questionnaires. Finally, they were probed for suspicion and debriefed.

Results and Discussion

Manipulation check. As expected, participants judged themselves to be more similar to women leaders in the high-similarity condition ($M = 6.08$) than in the low-similarity condition ($M = 5.33$), $t(80) = -1.96$, $p = .05$. However, both groups perceived the women leaders to be equally successful ($M_s = 9.65$ and 9.29 , respectively), $t(80) < 1$, and equally admirable ($M_s = 10.50$ and 10.21 , respectively), $t(80) < 1$. Thus, framing the biographies as similar to versus dissimilar from most women did not affect participants' perceptions of how successful and admirable they were, but it did affect perceptions of how similar they were to the self.

Implicit beliefs about the self. Implicit self associations were calculated by subtracting the average latency (in milliseconds) for stereotypic blocks (*me + supporter* and *he + leader*) from the counterstereotypic blocks (*me + leader* and *he + supporter*). This difference score was converted into a modified effect size (IAT D) by dividing each participant's difference score by the pooled standard deviation of his or her responses in the critical blocks. Positive IAT D s indicate that women associated themselves with supportive more than leadership attributes (self-stereotypes), IAT D s close to zero indicate nonstereotypic self-perceptions, and negative IAT D s indicate women see themselves as having more leadership than supportive attributes (counterstereotypic self-beliefs).

A one-way ANOVA using exemplar condition as the independent variable and IAT D scores as the dependent variable revealed a significant main effect, $F(2, 131) = 4.20$, $p < .02$, such that participants in the high-similarity condition were equally fast at associating leadership and supportive traits with the self (IAT effect = 21 ms, IAT $D = .03$) whereas their peers in the control and low-similarity conditions were faster at associating supportive than leadership attributes with the self: control condition (IAT effect = 95 ms, IAT $D = .19$), $t(90) = 2.97$, $p = .004$, and low-similarity condition (IAT effect = 84 ms, IAT $D = .15$), $t(80) = 2.02$, $p = .047$ (see Figure 1). The magnitude of the self-IAT effect was significantly greater than zero in the control condition, $t(51) = 5.12$, $p < .0009$, and low-similarity condition, $t(41) = 3.26$, $p = .002$, but nonsignificant in the high-similarity condition, $t < 1$, *ns*.

Explicit beliefs about the self. Self-ratings of leadership (six items) were averaged into a single index ($\alpha = .84$). Ratings of supportive traits were combined as well ($\alpha = .73$) after removing one item that did not correlate with others (*sensitive*). We conducted a mixed-model ANOVA with exemplar condition (control, high similarity, low similarity) as the between-subjects variable and attribute type (leader vs. supporter) as the within-subjects variable. A significant main effect of attribute type, $F(1, 131) = 68.95$, $p < .0009$, indicated that participants across all conditions reported more supportive qualities ($M = 6.12$) than leadership qualities ($M = 5.07$). This main effect was not moderated by exemplar condition, $F(2, 131) = 1.89$, $p = .16$.

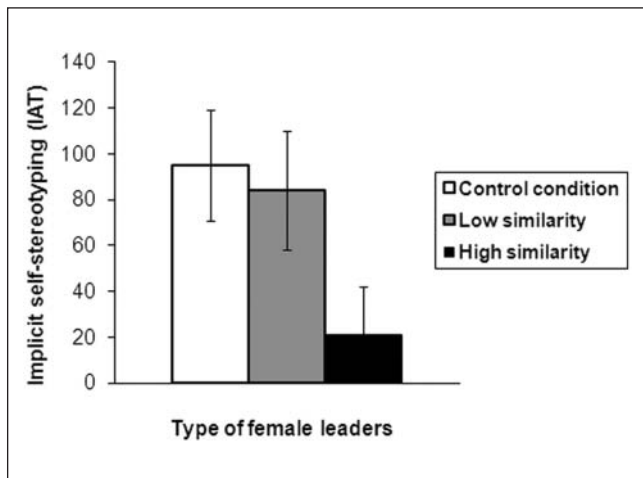


Figure 1. Effect of high- versus low-similarity female leaders on implicit self-stereotyping
IAT = Implicit Association Test.

Experiment 1 provided strong initial evidence that exposure to counterstereotypic ingroup members framed to maximize similarity enhances women's implicit leadership self-beliefs. However, as expected, their explicit self-perceptions did not change as a function of who they had seen. To ensure the stability and replicability of these findings, we conducted a second experiment in which perceived similarity was manipulated differently.

Experiment 2

In Experiment 2 leadership similarity was manipulated directly by giving participants false feedback about their leadership potential. Participants were assigned to one of three conditions in which they read about successful women leaders, after which they completed a short survey about their impressions of the leaders and their personal career goals. In two of the conditions survey responses were used as a pretext to give participants false feedback about their similarity to the women they had just read about (high-similarity condition) or difference from them (low-similarity condition). In the control condition participants completed the survey but did not receive any feedback. Following feedback, participants in the two experimental conditions were asked whether they believed the feedback was accurate. Finally, participants' implicit and explicit self-perceptions were measured in counterbalanced order.

Method

Participants. Sixty-six women were recruited from the subject pool (median age = 19). Forty-eight percent identified as

White, 17% as Black, 15% as Hispanic, 6% as multiracial, 3% as Asian, and 11% did not specify race.

Materials

Selection of pictures and descriptions. This experiment used a larger number of successful leaders than before (see Appendix B).

Manipulation of false feedback about similarity to women leaders. Participants were told that we were interested in their impression of the women leaders and their own career goals. They completed a survey asking them to indicate whether they could imagine achieving equivalent success in their future profession, write about their accomplishments, list three major life goals, and list three distinguishing personal characteristics. Participants' alleged similarity to the women leaders was manipulated by giving them false feedback about their similarity to (or difference from) the successful women based on what they had written. In the high-similarity condition participants read:

You are quite similar to the women leaders you read about earlier . . . you are quite likely to achieve a similar kind of success as the women leaders in your own professional life. You can be best described as ambitious and highly motivated . . . achievement-oriented . . . best suited for leadership positions . . . capable of becoming a pioneer in your professional field . . . influencing others and holding a powerful post within an organization.

Participants in the low-similarity condition read:

You are quite different from the women leaders you read about earlier . . . you can be best described as a nurturing individual who is willing to give other people's needs priority . . . best suited for supportive positions in which you can utilize your considerate and sympathetic nature . . . providing a harmonious environment in your workplace.

Participants in the control group did not receive any feedback.

Explicit acceptance of the false feedback. Four items ($\alpha = .85$) asked participants to indicate: (a) how much the feedback described them accurately, (b) how much they wanted the description to be true of them in the future, (c) how likely it was that the description would be true of them in the future, and (d) how important it was for them to be defined by this description on 11-point scales.

Implicit and explicit beliefs about the self. These were identical to Experiment 1.

Demographic measure. This was identical to Experiment 1.

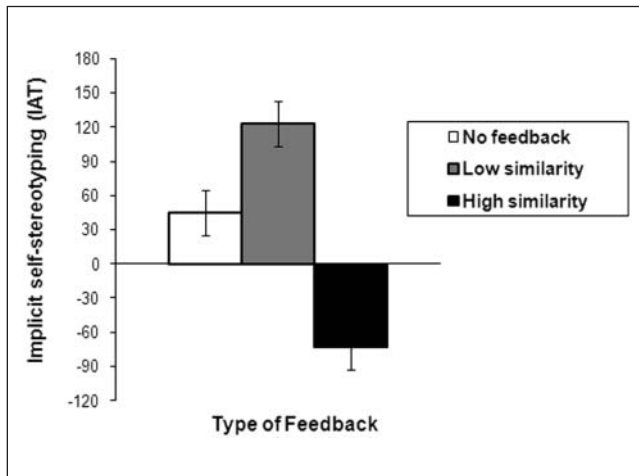


Figure 2. Effect of false feedback about similarity to female leaders on implicit self-stereotyping
IAT = Implicit Association Test.

Procedure

Participants were told they would participate in several unrelated tasks. The first task was described as a “general knowledge task” during which participants saw pictures and biographies of 16 women leaders, after which they completed a survey to assess their impressions of these individuals. Next they were randomly assigned to one of three treatment conditions. Participants in the high- and low-similarity conditions were told that their survey responses would be scored to assess their similarity to the women leaders. The experimenter collected the completed surveys, ostensibly performed some calculations, and returned with written feedback. In reality, participants had been randomly assigned to receive one of two types of feedback. Those in the high-similarity condition received false feedback describing them as “quite similar” to the women leaders, whereas those in the low-similarity condition received false feedback describing them as “quite different” from the women leaders. Control condition participants did not receive any feedback. Next, we assessed participants’ explicit acceptance of the feedback followed by the self-IAT, explicit self-beliefs (in counterbalanced order), and demographic measures. Finally, they were probed for suspicion and debriefed.

Results

Implicit beliefs about the self. A one-way ANOVA comparing women’s implicit self-perceptions (IAT *D* scores) in the three treatment conditions revealed a significant main effect, $F(2, 63) = 6.80, p = .002$. As illustrated in Figure 2, participants in the high-similarity condition exhibited *counterstereotypic* self-beliefs (IAT effect = -73 ms, IAT *D* = $-.26$)

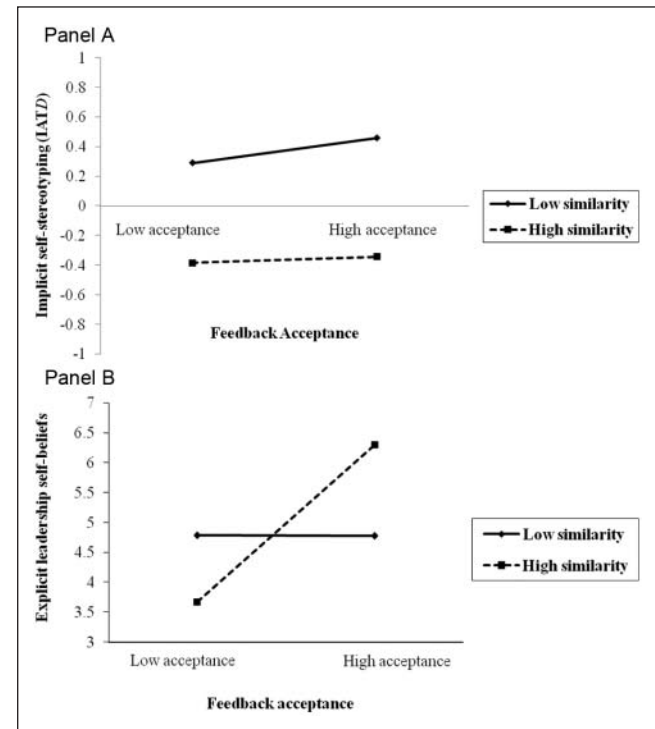


Figure 3. Panel A: Effect of false feedback and feedback acceptance on implicit self-stereotyping; Panel B: Effect of false feedback and feedback acceptance on explicit self-stereotyping
IAT = Implicit Association Test.

compared to their peers in the low-similarity condition (IAT effect = 123 ms, IAT *D* = $.36$), $t(40) = 3.23, p = .002$, as well as the control condition (IAT effect = 45 ms, IAT *D* = $.03$), $t(44) = 1.92, p = .06$. Interestingly, women in the low-similarity condition exhibited significantly more stereotypic self-beliefs compared to the control condition, $t(40) = -2.07, p = .05$.

Does explicit acceptance of false feedback affect implicit self-conceptions of leadership? If implicit beliefs change in response to information exposure regardless of perceivers’ acceptance of its “truth value” (Gawronski & Bodenhausen, 2006), women’s implicit self-beliefs ought to change after similarity feedback even if they did not explicitly believe the feedback. To test this we conducted a linear regression using feedback condition, acceptance of feedback (centered), and the interaction term (centered) as predictors and the self-IAT effect as the outcome variable. As shown in Figure 3, Panel A, a significant effect of feedback revealed that participants who received high-similarity feedback exhibited less implicit self-stereotypes than those who received low-similarity feedback ($\beta = -.74, SE = .26, p = .006$). Explicit acceptance of the feedback had no effect on implicit self-perceptions ($\beta = .09, SE = .15, p = .59$) nor was the interaction effect significant ($\beta = -.06, SE = .28,$

$p = .82$), confirming our hypothesis that implicit self-beliefs became focused on leadership after receiving high-similarity feedback regardless of whether participants accepted the feedback as true of themselves.

Explicit beliefs about the self. Participants' self-ratings of leadership and supportive traits were averaged into separate indices ($\alpha s = .89$ and $.88$, respectively). A mixed-model ANOVA was conducted with exemplar condition (control, high similarity, low similarity) as the between-subjects variable and attribute type (leader vs. supporter) as the within-subjects variable. A significant main effect of attribute type, $F(1, 61) = 13.60, p < .0009$, indicated that participants across all conditions reported having more supportive qualities ($M = 5.93$) than leadership qualities ($M = 5.27$). This was not moderated by exemplar condition, $F(2, 61) = 1.91, p = .16$.

Does explicit acceptance of false feedback affect explicit self-conceptions of leadership? We investigated whether women's explicit self-beliefs would be influenced by the feedback and the degree to which they accepted it as true. A regression was conducted with feedback type, feedback acceptance (centered), and the interaction term (centered) as predictors and participants' self-ratings of leadership abilities as the outcome variable. Results showed a significant interaction between feedback type and feedback acceptance ($\beta = 1.26, SE = 0.5, p = .02$). When disaggregated by feedback type, we found that in the high-similarity condition, the more women believed the false feedback, the more they attributed leadership traits to themselves ($\beta = .81, SE = .42, p = .07$). In the low-similarity condition, believing the feedback had no effect on women's attribution of leadership traits to themselves ($\beta = -.45, SE = .29, p = .12$).¹

Discussion

Experiment 2 showed that telling women they were similar to successful female leaders enhanced their implicit leadership self-perceptions compared to both telling women they were very different and giving them no feedback. Interestingly, this effect emerged regardless of whether participants believed the feedback. Unlike implicit beliefs, explicit self-beliefs were only influenced if participants received similarity feedback and accepted it as true.

One potential alternative explanation for these findings is that directly telling participants they were similar to, or different from, successful women may have introduced experimental demand. Participants' responses may have reflected what they believed the experimenter wanted to hear. However, had experimental demand been operating, it would have also affected participants' explicit self-beliefs, which was not the case. The fact that only implicit (not explicit) self-beliefs shifted in response to feedback suggests that experimental demand is not a confound.

Another alternative explanation is that by telling participants they were similar to (or different from) successful professional women we may have inadvertently manipulated self-affirmation (high-similarity condition) versus self-threat (low-similarity condition). Affirmation, in turn, may have enhanced implicit self-beliefs about leadership, whereas threat may have deflated such beliefs. We think this is unlikely because the feedback in both conditions was carefully crafted to be positively valenced. The low-similarity condition emphasized that participants had positive qualities such as nurturance, social sensitivity, and kindness, whereas the high-similarity condition emphasized different positive qualities such as achievement orientation, pioneering spirit, and the ability to influence others. Although these alternative explanations do not seem plausible, we sought to rule them out definitively with another experiment in which similarity to female leaders was manipulated differently *without* providing feedback about leadership.

Experiment 3

Experiment 3 extended the previous experiments in two ways. First, we used a different manipulation of similarity by varying collegiate affiliation without making any reference to leadership similarity. Participants were led to believe that the female leaders had graduated from their own undergraduate institution (high-similarity condition) or from a very different type of institution (low-similarity condition). Second, in addition to assessing implicit and explicit self-beliefs, we measured participants' career goals and aspirations.

Method

Participants. Seventy-five women were recruited from the human subjects pool (median age = 19). Seventy-two percent of women identified as White, 11% as Black, 9% as Asian, 4% as multiracial, 3% as Hispanic, and 1% did not specify their ethnicity.

Materials

Selection of pictures and descriptions. Five women who are well-known leaders in business, medicine, law, politics, and journalism were selected (see Appendix C). Participants saw pictures and brief biographies of these individuals. In the control condition, they saw the same nature stimuli as Experiments 1 and 2.

Manipulation check: Perceived similarity. Two items assessed the degree to which participants (a) felt similar to the women they had read about and (b) had lots in common with these women on 7-point scales ($\alpha = .89$).

Subjective identification. Three items assessed the extent to which participants identified with the women leaders on 7-point scales ($\alpha = .89$): "How much do you identify with the

women you just read about?” “How much do you relate to the women you just read about?” and “To what extent do you feel like you share similar life experiences with the women you just read about?”

Future career goals. Two items asked about participants' future career aspirations ($\alpha = .87$) on 7-point scales. “Looking into the future, can you envision yourself becoming a leader in your own chosen profession?” and “How likely are you to seek out a leadership role or position of power in your professional life in the future?”

Implicit beliefs about the self. The self-IAT in this experiment had one important difference: The self-concept was compared with unspecified others (*me* vs. *they*) to ensure that the results obtained in previous experiments (which used a male comparison target; *me* vs. *he*) would replicate when the comparison target was left unspecified. Third-person pronouns represented “others” (e.g., *they*, *them*, *their*, *others*).

Explicit beliefs about the self. This measure was identical to prior experiments.

Demographic measure. This measure was identical to prior experiments.

Procedure and Similarity Manipulation

Using the same cover story as before, participants were randomly assigned to one of three conditions (two experimental and one control). Those assigned to the experimental conditions were shown pictures and biographies of highly accomplished women leaders preceded by the following information. In the high-similarity condition, participants read:

These professionals, all women, are leaders in their field. The women that you're going to read about are very much like you in that they also went to UMass as undergraduates. They probably even took many of the same classes that you're taking.

In the low-similarity condition participants read:

These professionals, all women, are leaders in their field. The women that you're going to read about are different from you in that they all went to small, private colleges as undergraduates, which are very different from UMass. They probably took different classes from the classes you're taking.

In the control condition participants did not receive any additional instruction.

Next, participants completed the similarity manipulation check: a measure assessing their identification with women leaders, IAT, and explicit self-beliefs in counterbalanced order; a measure assessing their future career goals; and a demographic measure. Finally, participants were debriefed.

Results

Manipulation check: Perceived similarity. Participants judged themselves to be more similar to women leaders in the high-similarity condition ($M = 3.77$) than in the low-similarity condition ($M = 3.03$), $F(1, 40) = 3.54$, $p = .067$.

Subjective identification with women leaders. Participants identified with women leaders significantly more in the high-similarity condition ($M = 3.80$) than in the low-similarity condition ($M = 3.05$), $F(1, 40) = 4.15$, $p = .05$.

Implicit beliefs about the self. A one-way ANOVA using IAT D scores as the dependent variable revealed a significant main effect, $F(2, 72) = 3.07$, $p = .05$. As predicted, participants in the high-similarity condition were significantly faster at associating the self with leadership than supportive qualities (IAT effect = -88 ms, IAT $D = -.15$) whereas those in the control condition were faster at associating the self with supportive than leadership traits (IAT effect = 58 ms, IAT $D = .10$), $t(52) = -2.54$, $p = .01$ (see Figure 4). Participants in the low-similarity condition exhibited implicit self-beliefs that fell in the middle (IAT effect = -9 ms, IAT $D = .002$) and were nonsignificantly different from the control condition, $t(49) < 1$, $p = .33$, and the high-similarity condition, $t(39) = -1.22$, $p = .23$. In other words, seeing professionally successful women framed as similar to the self made young women implicitly view themselves as having more leadership potential compared to the control condition. However, seeing the same women framed as different from the self did not produce significant shift in implicit self-beliefs relative to controls.

Explicit beliefs about the self. A mixed-model ANOVA was conducted, Exemplar Condition (high similarity, low similarity, control) \times Attribute Type (leader vs. supporter), where exemplar condition was varied between subjects and attribute type was varied within subjects. A significant main effect of attribute type, $F(1, 70) = 28.27$, $p < .0009$, indicated that across all conditions participants reported more supportive ($M = 5.78$) than leadership ($M = 5.10$) qualities. Unexpectedly, this main effect was moderated by exemplar condition, $F(2, 70) = 3.90$, $p = .025$, indicating that participants in the low-similarity condition rated themselves as having significantly less leadership qualities ($M = 4.56$) than their peers in the high-similarity condition ($M = 5.47$), $t(39) = 2.44$, $p = .02$, and the control condition ($M = 5.25$), $t(49) = -2.29$, $p = .03$. Leadership self-ratings in the latter two conditions were statistically equivalent ($t < 1$). Self-ratings of supportiveness were similar across high-similarity, low-similarity, and control conditions (M s = 5.67 , 5.70 , and 5.98 , respectively). In other words, being told that highly successful ingroup members are very different from one's self deflates women's explicit beliefs about their leadership potential.

Future career goals and aspirations. Correlations showed that participants who expressed more leadership-oriented

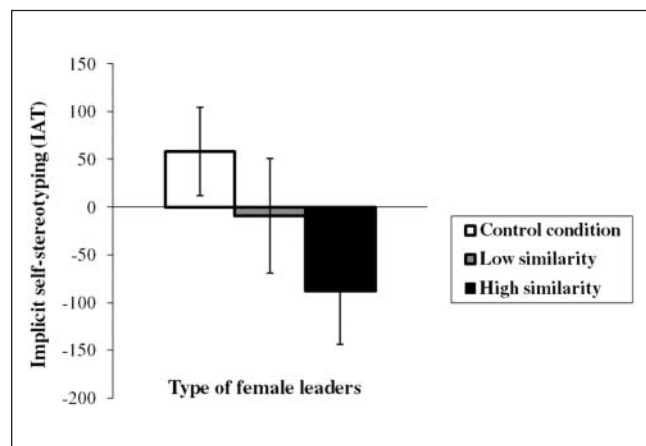


Figure 4. Effect of high- versus low-similarity female leaders on implicit self-stereotyping
IAT = Implicit Association Test.

self-beliefs both implicitly and explicitly had more ambitious career aspirations ($r = -.33, p < .01$ and $r = .66, p < .01$, respectively). To examine the effect of exemplar exposure on career goals, we conducted a one-way ANOVA with exemplar condition as the between-subjects factor. A marginally significant main effect, $F(2, 72) = 2.79, p = .06$, revealed that participants in the high-similarity condition and control condition reported more ambitious career goals ($M_s = 5.91$ and 5.98 , respectively) compared to the low-similarity condition ($M = 5.29$). Career aspirations in the low-similarity condition were lower than the control condition, $t(49) = -2.10, p = .04$, and the high-similarity condition, $t(39) = 1.73, p = .09$. Thus, highly successful ingroup members framed as *dissimilar* from the self *deflated* women's explicit career aspirations compared to the other two conditions.

Discussion

Experiment 3 replicated and extended the previous findings in several ways. First, we found that shared collegiate history is another important source of similarity. Participants were more likely to identify with female leaders whom they thought had attended their own undergraduate institution compared to a different institution. Second, seeing female leaders portrayed as similar enhanced women's implicit leadership self-concept. However, seeing female leaders portrayed as dissimilar did not change participants' implicit self-beliefs compared to the control condition, but it deflated their explicit career goals and explicit self-beliefs. This deflation effect is reminiscent of Rudman and Phelan (2010), but because these authors did not manipulate similarity, their work tacitly implied that exposure to *any* successful ingroup exemplars could produce self-deflation. Our experiment provides clarification by showing that women's

career aspirations are deflated *only* when they see successful ingroup members framed as very different from the self.

One might wonder why successful female leaders framed as similar to the self did not enhance women's career aspirations compared to controls. The most likely explanation comes from past studies showing that the closer the correspondence between successful others' domain of success and participants' own professional goals, the greater the likelihood that seeing those successful others will increase participants' own career aspirations (Lockwood & Kunda, 1997, 1999). For example, Lockwood and Kunda (1997) found that participants training to be future teachers who were exposed to a successful teacher (an exemplar relevant to their career) showed more career aspiration compared to controls who did not see a successful teacher. However, participants exposed to a successful accountant (an exemplar irrelevant to their career) did not show any increase in career aspirations. In our experiment we selected successful women from several different professions so that some of them would overlap with participants' own career interests. However, because our participants recruited from the human subjects pool had varied career interests we were unable to closely match the women leaders' professions to participants' a priori career interests. The lack of close correspondence between the two may have prevented an increase in career aspirations in the high-similarity condition.

Nevertheless, Experiment 3 provides nice evidence that successful ingroup members framed as similar benefit women's implicit self-concept. Note that in Experiment 3 similarity was manipulated *without* giving direct feedback about participants' leadership similarity to the successful women. Instead, we manipulated similarity in collegiate background. Thus these results cannot be explained by experimental demand or self-affirmation versus threat. Instead, the results are clearly attributable to manipulated similarity in collegiate background between the self and successful women.

Meta-Analysis of Experiments 1-3

We conducted a mini meta-analysis of all three experiments to assess the average effect size of participants' implicit leadership self-concept in the high-similarity condition compared to the other two conditions using guidelines outlined by Rosenthal (1984). For each experiment, effect sizes (in r) were computed for the difference between each of the two conditions of interest; these effect sizes were averaged across experiments. Averaged across experiments, the effect size difference between implicit self-beliefs in the high-similarity versus control condition was $r = .30$; the average effect size difference between the high-similarity and low-similarity conditions was also $r = .30$. Both are considered to be medium-sized effects (Cohen, 1977). Thus, pooled across all experiments participants who saw women leaders framed as similar to themselves implicitly viewed themselves as

having substantially more leaderlike qualities than those who saw leaders framed as different from themselves ($r = .30$) and those in the control conditions ($r = .30$).

General Discussion

Our research aimed to shed light on factors that benefit women's self-concept in the context of professional leadership. Whereas a great deal of past research has demonstrated the negative effect of stereotypes on individuals' self-concept, choices, and performance, our first goal was to identify what factors make women resilient to stereotypes and help them develop positive counterstereotypic beliefs about their professional potential. In so doing we also sought to resolve some mixed findings from past studies. Second, whereas previous research on self-concept malleability has mostly assessed explicit self-beliefs, we paid special attention to factors that enhance implicit self-beliefs. Third, moving beyond self-beliefs, we explored women's subjective identification with successful ingroup members and their career aspirations.

Across three experiments we manipulated participants' similarity to women leaders in different ways: (a) by framing the successful women's talent as a malleable quality achievable by most ingroup members versus a unique quality not easily achieved by others (Experiment 1), (b) by providing direct feedback about participants' similarity to (or difference from) the women leaders on the leadership dimension (Experiment 2), and (c) by emphasizing participants' similarity (or dissimilarity) to the women leaders based on their college affiliation, a variable unrelated to leadership (Experiment 3). By using different manipulations we were able to rule out potential alternative explanations that might be levied against any given manipulation.

All three experiments showed that exposure to successful ingroup members framed as highly similar to the self reduced implicit self-stereotyping compared to the control condition. In fact, women's implicit self-beliefs became significantly *counterstereotypic* in two experiments that manipulated exemplars' similarity to the *self* (Experiments 2-3) rather than their similarity to the *ingroup* (Experiment 1).

Moreover, all the three experiments showed that exposure to women leaders portrayed as very *dissimilar* from the self did not produce counterstereotypic self-beliefs. In the low-similarity condition, implicit self-beliefs were either statistically identical to controls (Experiments 1 and 3) or became more stereotypic than controls when participants were given feedback about their alleged difference from women leaders (Experiment 2). We believe the latter effect occurred because low-similarity feedback not only highlighted participants' *difference from professionally oriented women leaders* but also emphasized their *similarity to communal gender stereotypes*, which made this manipulation different from Experiments 1 and 3.

Additionally, participants' implicit self-beliefs in the low-similarity condition were significantly different from the high-similarity condition in Experiments 1 and 2 but not in Experiment 3. This suggests that as the dimension of similarity between successful exemplars and perceivers' self-concept moved further away from leadership, the impact of the exemplars' leadership qualities on perceivers' self-concept became slightly weaker. Specifically, in the first two experiments, leadership similarity was *manipulated directly* via feedback (Experiment 2) or *implied indirectly* by telling participants that most women can become successful through effort and hard work (Experiment 1). But Experiment 3 manipulated collegiate similarity, which is virtually unrelated to professional leadership. This may explain why the difference in participants' implicit leadership self-beliefs between the high- and low-similarity conditions was weaker in Experiment 3 compared to the previous experiments.

Seeing successful women leaders framed as dissimilar had one clear detrimental effect: It made participants explicitly attribute fewer leadership qualities to themselves and deflated their career aspirations (Experiment 3), suggesting that upward social comparisons with ingroup members framed as different from oneself is a threatening experience that makes women avoid future leadership opportunities (Rudman & Phelan, 2010).

Women's explicit beliefs about their leadership ability remained stereotypic across the board. They rated themselves as having more supportive than leadership qualities, which either did not change across conditions (Experiments 1-2) or became exacerbated in the low-similarity condition (Experiment 3). The divergence in the malleability of implicit versus explicit self-conceptions in response to successful ingroup members fits nicely with the APE model (Gawronski & Bodenhausen, 2006), which argues that implicit attitude change is driven by associative processes that can occur regardless of whether perceivers explicitly endorse the validity of new association, whereas explicit attitude change is driven by propositional processes that rely on verifying the truth or falsity of the propositions. Consistent with this idea, Experiment 2 showed that participants who accepted the high-similarity information as true explicitly reported more leadership self-beliefs than did those who did not accept the information as true.

The divergence between implicit versus explicit self-conceptions in our work also echoes early research by Markus and Kunda (1986), who found that situational cues produce subtle changes in the self-concept as individuals change and calibrate to their environment (e.g., some self-traits become more mentally accessible or more important while others become less so), but these changes may be masked by an opposing tendency to verify one's existing self-views and to be consistent. As such, self-beliefs measured with explicit reports may be influenced by the prevailing stable self-concept whereas self-beliefs measured with

implicit tasks may be influenced by situational changes (Markus & Kunda, 1986; Markus & Nurius, 1986). Consistent with this reasoning, our data suggest that small shifts may accrue to one's implicit self-beliefs as a function of self-relevant events that are stereotype consistent or inconsistent. Initially these small changes in the self may not be explicitly accepted as valid; many small changes may need to accumulate before they reach a tipping point and become explicitly accepted as true of oneself.

Future Directions: Possible Mechanisms?

We believe that framing women leaders as similar to the self creates an overlap between participants' self-concept and their mental representation of successful exemplars. By extension, leadership attributes associated with the exemplars become associated with the self. This process may occur in two ways. First, brief encounters with similar exemplars may temporarily activate a subset of leadership-oriented associations that may have been dormant or create new temporary associations (see Gawronski & Bodenhausen, 2006). This is most likely the underlying mechanism in the present experiments. However, a second route to self-concept malleability is also possible, by changing implicit associations incrementally over time. That is, repeated encounters with similar exemplars may strengthen mental associations linking the self with leadership attributes such that over time these associations become chronically active. Longitudinal studies are needed to tease apart these predictions by measuring whether and how long-term exemplar exposure (or lack thereof) changes implicit self-beliefs over time.

In conclusion, ingroup role models can enhance or deflate women's self-concept implicitly in the world of professional leadership even though their impact may not be consciously available. Women become resilient to stereotypes and subjectively inspired if they encounter counterstereotypic ingroup members who seem very similar to the self. However, they become vulnerable to stereotypes and dejected if they encounter successful ingroup members who appear too different from the self.

Appendix A

Connie Chung	Widely respected journalist and news anchor
Abby Cohen	One of the most successful financial analysts on Wall Street
Jane Goodall	Well known for her scientific discoveries in the field of primatology
Diane Sawyer	Among of the most famous journalists and news anchors on national TV
Marian Wright Edelman	Lawyer, founder of Children's Defense Fund, and recipient of MacArthur Foundation's "Genius Award"

Appendix B

Madeline Albright	Former U.S. Secretary of State and representative to the United Nations
Connie Chung:	Widely respected journalist and news anchor
Abby Cohen	One of the most successful Wall Street financial analysts
Eileen Collins	First American woman selected by NASA to pilot a shuttle craft through space in 1995
Cynthia Cooper	One of the best female basketball players in the world, led her team to several WNBA championships
Marian Wright Edelman	Lawyer, founder of Children's Defense Fund, and recipient of MacArthur Foundation's Genius Award
Ruth Bader Ginsburg	Associate Justice on the U.S. Supreme Court
Jane Goodall	Well known for her profound scientific discoveries in the field of primatology
Mia Hamm	Considered the best female soccer player in the world, led her team to 1996 Centennial Olympic Games
Toni Morrison	Nobel Prize-winning author, editor, and professor
Antonia Novello	First woman to become the Surgeon General of the United States in 1990
Diane Sawyer	One of the most famous television journalists and investigative reporters
Gloria Steinem	Author, journalist, and one of the major feminist leaders of the century
Meg Whitman	Ex-CEO of eBay
Oprah Winfrey	Founder, producer, and CEO of Harpo Productions, host of the number 1 rated talk show in the world
Chien Shiung Wu	World-renowned physicist who disproved the Law of Parity, which was one of the basic assumptions in physics

Appendix C

Katie Couric	Journalist and news anchor of CBS news
Mae Jamison	Medical doctor and ex-mission specialist at NASA
Sonia Sotomajor	U.S. Supreme Court Justice
Gloria Steinem	Feminist writer and political activist
Meg Whitman	Ex-CEO of eBay

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Note

1. A similar analysis using participants' explicit self-perceptions of supportiveness as the dependent variable and feedback type and feedback acceptance as predictor variables did not reveal an equivalent interaction between feedback type and feedback acceptance ($p > .10$).

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