

Aligning or Inflating Your Leadership Self-Image? A Longitudinal Study of Responses to Peer Feedback in MBA Teams

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Based on transformative learning theory (Mezirow, 1991), our study investigates the effects of peer feedback on MBA students' self-ratings of leadership competence over time. A total of 221 individuals participating in MBA project teams rated themselves and others on four aspects of leadership competence at three time points during the program. After students received peer feedback, their self-ratings decreased at subsequent time points, 3 and 6 months later; this effect was stronger for women than for men. In particular, women more quickly align their self-ratings with peers' views of them, whereas men continue to inflate their self-images. Results are discussed in terms of their implications for individual learning and management education.

The accurate self-awareness of leadership competencies is critical for success in an increasingly multicultural and changing business environment (Bartlett & Ghoshal, 1989, 2003; Green, Hassan, Immelt, Marks, & Meiland, 2003; Nohria & Ghoshal, 1997). Leadership development programs emphasize the importance of peer feedback to make individuals aware of their leadership competences as a first step in the learning process (Alimo-Metcalfe, 1998; Day, 2000; Warech & Smither, 1998). Although management scholars have identified a number of

leadership competences that are likely to help leaders work effectively in today's organizations (Evans, 1992; Tichy & Sherman, 1993), much less attention has been directed toward understanding how these competences develop and how peer feedback increases self-awareness. This omission is surprising since one of the critical techniques for supporting leadership development in most *Fortune* 1,000 companies is the use of multisource feedback (Alimo-Metcalfe, 1998; Edwards & Ewen, 1996).

As such feedback becomes institutionalized in large professional organizations, several scholars have stressed the need for additional studies of its longitudinal impact (e.g., Alvero, Bucklin, & Austin, 2001; Atwater, Waldman, & Brett, 2002; Lobel, 1990). Even though research studies have examined 360-

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degree feedback systems and individual reactions to them, little is known about the reasons for their effects or how long these reactions last (Alvero et al., 2001; Atwater et al., 2002) and which variables contribute to differences in individuals' reactions to feedback (Atwater et al., 2002). In addition, with a few exceptions (e.g., Ashford, 1989; Yammarino & Atwater, 1993), not much theoretical work attempts to explain the effects of feedback on accuracy of self-awareness.

Our work here investigates how receiving feedback from peers influences self-ratings of four leadership competences over a 6-month period by students working in project teams as part of an MBA program. Using transformative learning theory (Mezirow, 1991), we hypothesize that receiving feedback from peers may lower individuals' ratings of their leadership competences. After individuals receive feedback, their performance expectations rise, widening the gap between their ideal and actual competences, and thus, decreasing their self-ratings over time. In addition, we suggest that female team members may be more likely to accept constructive feedback than their male counterparts, and thus, decrease their self-ratings. That is, women more quickly and rationally align their self-awareness with peers' views of them; whereas men continue to rationalize and inflate their self-image over time.

This study contributes to the literature on leadership self-awareness and development in several ways. First, although much has been written about peer feedback during the last 30 years (e.g., Kluger & DeNisi, 1996; Smither, London, & Reilly, 2004), very little scholarly research has taken a longitudinal view. The effects of peer feedback can hardly be manifested on the spot; rather, it requires a lag for people to reflect on what has been communicated to them. Second, very little is known about the development of self-awareness of leadership competences. Identifying how peer feedback influences self-ratings over time may suggest ways to improve the effectiveness of feedback. Last, few studies have addressed the influence of gender as a moderator. Drawing on the organizational psychology literature on feedback, we discuss trends in gender effects on sensitivity to feedback and examine how men and women differ in their reactions to peer feedback on leadership competences.

THEORY AND HYPOTHESES

A Model of Leadership Competences

The field of leadership development has received considerable attention from researchers and prac-

tioners in the last few decades. Scholars in this area have proposed different models of leadership abilities and competences (e.g., Goleman, Boyatzis, & McKee, 2003; Hernez-Broome & Hughes, 2004). Recent work on leadership development (Day, 2000; Goleman, Boyatzis, & McKee, 2003) has proposed the use of two general dimensions to organize leadership competences. The first refers to whether the competence is directed toward the self or others; whereas the second dimension specifies whether the competence is directed toward understanding or action. Taken together, these two contrasts suggest four key leadership competences: (1) self-confidence, (2) self-management, (3) interpersonal understanding, and (4) behavioral flexibility (see Table 1). Several scholars have noted that these four leadership competences are likely to help managers work effectively in the new globalized work environment (e.g., Van der Zee & Van der Oudenhoven, 2000). We next define these competences as they relate to leadership effectiveness.

Self-confidence reflects people's perception of control over themselves and their environments, and it is based on a personal history of successful goal-directed behavior (Bearden & Teel, 1980; McCarty, 1986; Tafarodi & Swann, 1996). McCarty (1986: 841) defines self-confidence as "how individuals perceive their ability to succeed at a particular endeavor, or judge their effectiveness once a task is finished." Past research has examined various constructs that are closely related to self-confidence. For instance, the concept of *self-efficacy* refers to the belief in one's capability to perform a specific task (Gist, 1987). Similarly, *self-esteem* has been defined by Coopersmith (1967: 4-5) as "the evaluation which the individual makes and customarily maintains with regard to the self. It expresses an attitude of approval or disapproval, and indicates the extent to which the individual believes the self to be capable, significant, successful and worthy."

Self-confident persons show conviction in their ability to make decisions, organize and execute action plans, carry out new tasks, and give opinions; they persist in difficult tasks when failure seems certain and recover confidence in their abilities rapidly after a failure. Given the challenges

TABLE 1
Typology of Four Leadership Competences

Orientation	Knowledge	Action
Others-oriented	Interpersonal understanding	Behavioral flexibility
Self-oriented	Self-confidence	Self-management

and difficulties presented by organizational environments, high self-confidence gives individuals the resources to persist in the task at hand.

Self-management refers to control of one's own behavior, monitoring and managing one's own work (Manz & Sims, 1980). Self-management involves effectively assessing problems, establishing goals, monitoring time, progress, and environmental issues that may hinder the accomplishment of those goals, and regulating goal attainment (Allen, Renn, & Griffith, 2003; Frayne, 1991). Individuals are self-managing when they engage in self-controlling behavior, act as their own bosses, accept a high degree of responsibility for their work and for making decisions, and independently solve their own problems (Manz & Sims, 1989; Uhl-Bien and Graen, 1998; Walton, 1985). Similarly, Bandura (1991: 260) sees self-management as "a major cognitive mechanism for self-directedness" and "the capacity to exercise self-influence by personal challenge and evaluative reaction to one's own attainments." A person with self-management abilities shows excellent time management, keeps the level of pressure at work in the motivational range, and avoids letting pressure become destructive and dangerous. This ability is critical in a leader's maintaining focus and emotional stability in the face of challenges.

Behavioral flexibility is defined as the ability and tendency to adjust one's familiar behavioral strategies to different or more restricted circumstances (Van der Zee & Van der Oudenhoven, 2001). There is ample evidence of the importance of this dimension (Arthur & Bennett, 1995; Gullahorn & Gullahorn, 1963; Hanvey, 1976; Ruben & Kealey, 1979; Smith, 1966; Torbion, 1982), and a stream of leadership research on behavioral flexibility suggests that leaders must have a broad range of responses in order to effectively react to various situations, while preserving their own integrity and trustworthiness (Zaccaro, Gilbert, Thor, & Mumford, 1991). Flexibility is associated with the ability to learn from new experiences and mistakes, which is critical to succeed in multicultural environments (Spreitzer, McCall, & Mahoney, 1997). Leaders need to be supple and alert to social cues, able to shift ways of handling things, and capable of altering their responses to adapt effectively to new situational demands with independence and confidence (Ronen, 1989). A flexible person responds to changes in an open and constructive way, shows considerable tolerance for ambiguity, and considers and incorporates different viewpoints to achieve objectives or complete tasks.

Last, *interpersonal understanding* refers to the ability to show empathy and see things from other

people's points of view or multiple perspectives (Goleman, 1998). It involves tolerance and respect for other people's ideas, being aware of intercultural differences, and adjusting one's focus on the situation in the light of local and international differences and similarities. Interpersonal understanding is further related to the concept of *empathy* or sensitivity, which is defined as the ability to clearly be interested in others, as well as to maintain a convincingly complete and precise sense of others' emotions, experiences and thoughts (Ruben, 1976). Empathy is often mentioned as a key competence for leadership effectiveness (Arthur & Bennett, 1995; Cleveland, Mangone, & Adams, 1960; Ruben, 1976). We next outline the hypotheses regarding the above four leadership competences and their relation to peer feedback.

The Nature of Peer Feedback

According to Cannon and Witherspoon (2005), managers tend to believe that constructive feedback is crucial to the development of individuals. Constructive feedback, the process of offering valid and well-reasoned comments about the personal characteristics of individuals (Ovando, 1994), is most useful when it involves both positive and negative comments, suggesting strengths as well as areas for further skill development and performance improvement (Tornow, 1993). Within the context of our study, which samples MBA students with several years of work experience, it seems reasonable to expect that participants acknowledge the value of feedback and will use it constructively to reinforce the desired competences of their peers.

One of the most robust findings in psychology pertains to the inflation of self-views (Mabe & West, 1982; Taylor & Brown, 1988). In organizations, this tendency often manifests itself by way of the contrast of self-evaluations with those of others (Harris & Schaubroeck, 1988; Wohlers & London, 1989). In a recent meta-analysis, Heidemeier and Moser (2009) found an average difference of a third of a standard deviation between self-evaluations and those of others. Research in the area of aggressive personalities also supports the view that self-reports are often inherently inaccurate (Bing, Stewart, Davison, Green, McIntyre, & James, 2007) and nonself-report measures of workplace deviance based on multiple other-reported assessments have been found to be more accurate (Stewart, Bing, Davison, Woehr, & McIntyre, 2009). At the core of the inflation of self-views are cognitive biases, most notably attributional ones (Jones et al., 1972; Weiner, 1974, 1986), which create distortions in how

managers perceive their performance in relation to that of others. More specifically, individuals may be biased when evaluating their peers on leadership competences, reinforced by the so-called fundamental attribution error (Jones & Harris, 1967; Ross, 1977). Attribution theory assumes that people try to attribute causes to behavior; attributing a problem or behavior to individual rather than situational factors is a pervasive and robust phenomenon (Jones, 1979; Ross, 1977). When problems arise among team members, individuals are more likely to remember critical negative events (Labianca, Brass, & Grey, 1998) and attribute these negative events to others' dispositional characteristics (e.g., others' lack of self-management or flexibility). Thus, we expect feedback from peers to be critical and below people's own self-appraisals.

Hypothesis 1: Self-ratings of leadership competences will be higher than peers' ratings.

Longitudinal Effects of Peer Feedback on Self-Ratings of Leadership

The theory of transformative learning (Mezirow, 1991, 2000) offers a possible explanation for the effects of peer feedback on self-ratings of leadership competences over time. Mezirow defines *learning* as "the process of making a new or revised interpretation of the meaning of an experience, which guides subsequent understanding, appreciation and action" (1990: 1) and suggests that the most significant learning occurs during life transitions, such as returning to school. According to Mezirow, the new information needs to be incorporated by the individuals into an already "well-developed symbolic frame of reference" so that the incorporation of peer feedback requires transformation of this symbolic frame of reference. But when the new information is too surprising, individuals tend to obstruct its assimilation and develop psychological defense mechanisms.

This theory concedes that there is often considerable emotional fallout associated with learning that challenges individuals' perceptions of themselves. These challenges are "painful; they often call into question deeply held personal values and threaten our very sense of self" (Mezirow, 1991: 168). Feedback from others leads one to compare others' ratings with self-evaluations and triggers critical reflection about oneself (Church, 1994; Tornow, 1993; Yammarino & Atwater, 1993). This critical reflection is at the heart of transformative learning, since it moves people from being unconsciously incompetent to consciously incompetent (Howell, 1982). According to Mezirow (1990: 359), being rated

lower than one expects is a "disorienting dilemma;" transformative learning threatens psychological security as it challenges "comfortably established beliefs and values, including those that may be central to self-concept, and . . . changes . . . long-established and cherished relationships." The schema of the self-concept develops slowly over time through repeated experiences with persons and situations. Challenges to this self-concept create a state of disequilibrium.

One possible response to this disequilibrium is that individuals try to verify their self-concept and interpret information so that their self-image remains stable (Baumeister, 1999; Steele, Spencer, & Lynch, 1993). However, when feedback is strong, unambiguous, unanimous among peers, and contrary to one's self-image, self-verification becomes more difficult. Research has shown that negative information has a greater impact on individuals' attitudes, behaviors, and even physiological responses than positive information (for a review see Taylor, 1991). This "negative asymmetry" has been found in variables such as life satisfaction, mood, and stress (e.g., Rook, 1984, 1990; Schuster, Kessler, & Aseltine, 1990). Also, the desire to be perceived as modest (Kurman & Sriram, 2002) and the need to avoid cognitive dissonance motivate individuals to merge their views of themselves with those of their significant others. Supporting this notion, a study by Atwater, Waldman, Atwater, and Cartier (2000) showed that self-ratings of supervisors who received feedback from their subordinates lowered after 10 months. Negative peer feedback that is inconsistent with people's self-image should also make them reshape their self-concepts, assuming that the average peer rating is accurate. Thus, we would expect that inflated self-perceptions should be readjusted over time.

Hypothesis 2: After individuals receive feedback from peers, their self-ratings of leadership competences will decrease at subsequent measurement points.

Gender Differences in Response to Peer Feedback

We next examine whether self-ratings of leadership competences exhibit any systematic tendencies with respect to gender. It is posited that women will be more responsive to peer feedback than men. Meta-analytic research findings about gender differences in leadership (Eagly & Johnson, 1990; Eagly & Karau, 1991; Eagly, Karau, & Makhijani, 1995) show that men and women are generally equally effective as leaders (see also Cleveland, Stockdale, & Murphy, 2000; Powell, 1993). However,

much evidence points to a heightened sensitivity of women to feedback from others, especially negative feedback. Some research has uncovered gender differences in reaction to negative feedback; where women are more likely to react positively and make use of that feedback than men (Johnson & Helgeson, 2002; Schleicher, Van Iddekinge, Morgeson, & Campion, 2010). Research further suggests that women perceive negative feedback as being more accurate and as providing more useful information about themselves (Roberts & Nolen-Hoeksema, 1989, 1994). Last, women are also more likely to attribute failure to internal rather than external factors (Boggiano & Barrett, 1991; Hirshy & Morris, 2002). The literature on feedback in organizations has previously shown that women tend to produce self-ratings that are more in agreement with the ratings of others (Brutus et al., 1999; London & Wohlers, 1991; Roberts & Nolen-Hoeksema, 1994). However, most of these previous studies took place within simulated environments or organizational settings, and not in educational settings with the purpose of leadership development.

In sum, it is posited that the heightened responsiveness of women to feedback from others will manifest itself through a greater adjustment in their self-ratings of leadership competencies and a more rapid alignment of their self-awareness with others' views of them. In contrast, men will be less sensitive to this external feedback, and their self-ratings will remain unaltered as a result.

Hypothesis 3: There will be a significant difference between men's and women's self-ratings of leadership competencies over time, such that women will decrease their self-ratings more than men.

METHODS

Sample

We obtained data from 221 MBA students from four different sections of a top-ranked MBA program at a business school in Spain. The students in the sample represented 27 nationalities. The language of instruction was English. The sample included 169 males and 52 females, with a mean age of 30.36 years and an average of 6.39 years of work experience, and approximately half of them had some managerial experience. When students entered the MBA program, they were assigned to small project teams consisting of 5–6 students. These teams worked every day on the preparation of cases and assignments for the following day. As a result, students became quite familiar with one

another. The peer feedback was performed within these learning teams using the peer evaluation survey, which we describe next.

Procedure

The peer evaluation survey (PES) was developed by the first and third authors in the fall of 2003 with the help of the Information Technology department of the business school. The survey is part of a Feedback and Development Workshop that is mandatory for all MBA students, and it is an integral part of the MBA curriculum. Students complete this web-based survey at three different times during their MBA program to evaluate themselves and other members of their learning teams in leadership competencies. The three waves of data collection coincided with the end of each term: Time 1 (T1) in January, Time 2 (T2) in early April (3 months later), and Time 3 (T3) in late June (3 months later). At each point on time, students go to a large room with computers available for everybody to complete the web-based survey after receiving instructions from a faculty member on how to use the system. One week later, students attend a half-day seminar in which they receive the individual and personalized reports in class. The reports include quantitative data on students' scores in each of the competencies (the average ratings of the target person from the other members of the team on each competence) and qualitative information on their leadership skills from their peers. This feedback is anonymous in that the data are aggregated within the learning team without identifying information. Then, after receiving general guidelines from the faculty member on how to give and receive feedback, students join their learning teams in breakout rooms to discuss during 1 hour their individual reports with their peers, with the purpose of helping each other to learn and develop leadership skills. In order to avoid external biases in the assessment of leadership competencies, students only receive a pass-fail grade based on their attendance. Also, as a safeguard, professors are encouraged to review qualitative comments before students receive their reports in order to ensure that they do not receive any offensive feedback from their peers.

Measures

Leadership Competencies

The four leadership competencies were measured by way of the web-based peer evaluation survey. Following the recommendations of Clark and Wat-

son (1995), the development of the survey progressed through several stages. First, in order to generate a pool of items, we conducted a review of the literature on each of the leadership competences, as well as open interviews with faculty members at the business school. We provided faculty members with the definitions of the competencies outlined above and asked them for examples of student behaviors in the academic context that illustrated each. Based on these interviews and the preliminary review of the literature, a survey with 10 items per competence was generated. Following Schriesheim, Powers, Scandura, Gardiner, and Lankau (1993), the items were content analyzed by using a panel of 10 MBA students and 7 business school faculty members to determine the degree to which each of the items represented the dimensions in which they were included by using a 5-point scale ranging from 1 = *not at all* to 5 = *completely*. Definitions of the four leadership competences were provided. Items that had higher mean scores in a dimension that was not originally assigned were dropped. Similarly, we dropped items that were perceived as ambiguous or did not fit well with the definitions of the four competences. As a result, 12 items were dropped and the first version of the scale consisted of 28 items: self-confidence (8 items), flexibility (6 items), interpersonal understanding (6 items), and self-management (8 items).

Second, a pilot study was conducted with 375 MBA students. Students were asked to evaluate themselves by using the leadership survey. The responses were factor analyzed with an exploratory factor analysis (EFA) applying an oblique rotation. We selected the items that had the highest loadings, and at the same time, were different enough to avoid redundancies and increase the construct space. Also, students were asked to comment on the clarity of the items that led to the streamlining of some. As a result, a survey with 4 items per competency was used with more than 600 students in 2004. Because each student is required to evaluate the survey between 5 and 7 peers (depending on the size of the team), we further reduced the survey to make it more manageable and to avoid biases due to fatigue. After conducting exploratory and confirmatory analyses on this new dataset, the final survey was reduced to 3 items per scale.

This final survey version (see Appendix A), on which the current investigation is based, included the 3-item scales for each competency using a 5-point response format (1 = *"completely disagree"* to 5 = *"completely agree"*). Students rated themselves and the rest of the group members on each

item. *Self-confidence* includes (1) "Shows confidence in his/her capabilities to organize and execute action plans," (2) "Shows confidence in his/her skills to overcome any obstacle," and (3) "Shows confidence when facing unforeseen situations." *Self-management* consists of (1) "Knows when to work and when to relax," (2) "Prioritizes tasks and activities properly," and (3) "Knows how to get organized to balance the pressures of work." *Behavioral flexibility* was measured with the following three items: (1) "Adapts easily to changes," (2) "Doesn't feel stressed or frustrated when doing several tasks at the same time," and (3) "Adapts well to changes in plans and objectives that had been previously agreed upon." Last, *Interpersonal understanding* includes (1) "Understands others' points of view," (2) "Puts him/herself in the place of others and feels respect for their opinions," and (3) "Actively seeks the opinion of others."

Table 2 reports the standardized confirmatory factor loadings of the leadership competences scale. The confirmatory factor analysis (CFA) was conducted using AMOS 18.0 (Arbuckle) with the purpose of testing the fit of the 4-factor structure of the scale. As the table shows, the overall fit of the 4-factor model to the data were quite good [$\chi^2(48) = 84.84, p = .001$; comparative fit index (CFI) = .95, root-mean-square error of approximation (RMSEA) = .06, AIC = 168.84]. A Cronbach's coefficient alpha score was computed for each competence. Reliability coefficients of the four scales were .86 for self-confidence, .86 for self-management, .78 for flexibility, and .84 for interpersonal understanding. These results indicate that the questionnaire assesses the four leadership competences in an internally consistent manner. For comparison purposes, we ran CFA analyses with 3-, 2- and 1-factor structures. The 2-factor model combined the two pairs of competences that are theoretically closer. One factor included interpersonal understanding and behavioral flexibility; whereas the other factor included self-control and self-management. The models with 1-factor structure [$\chi^2(57) = 2,724.54, p < .000, CFI = .82, RMSEA = .17, AIC = 2,790.34$] and 2-factor structure [$\chi^2(53) = 192.17, p < .000, CFI = .89, RMSEA = .12, AIC = 178.44$] showed a poor fit with the data. The model with a 3-factor structure, however, showed a good fit [$\chi^2(51) = 100.44, p < .000, CFI = .93, RMSEA = .067, AIC = 168.84$], although the 4-factor model was still a better fit with the data (Difference $\chi^2(3) = 11.46, p < .01$). Thus, we ran the analyses on the four leadership competencies separately.

Participants in the study evaluated themselves and every other member of their learning team on

TABLE 2
Confirmatory Factor Analysis of the Leadership Competencies Survey

	Factors			
	1	2	3	4
Self-confidence				
1. Shows confidence in his/her capabilities to organize and execute action plans	.81	.29	.06	.13
2. Shows confidence in his/her skills to overcome any obstacle	.79	.15	.21	.17
3. Shows confidence when facing unforeseen situations	.66	.19	.42	.19
Self-management				
4. Knows when to work and when to relax	.36	.56	.26	.34
5. Prioritizes tasks and activities properly	.52	.68	.21	.19
6. Knows how to get organized to balance the pressures of work	.47	.55	.25	.19
Flexibility				
7. Adapts easily to changes	.23	.08	.59	.54
8. Doesn't feel stressed or frustrated when doing several tasks at the same time	.42	.31	.55	.16
9. Adapts well to changes in plans and objectives that had been previously agreed upon	.17	.29	.52	.37
Interpersonal understanding				
10. Understands others' points of view	.14	.13	.17	.77
11. Puts him/herself in the place of others and feels respect for their opinions	.03	.17	.26	.83
12. Actively seeks the opinion of others	.24	.12	.06	.69
Cronbach's Alpha	.86	.83	.78	.86

each of the four leadership competences. In order to obtain a single measure of peer-ratings for each participant, we computed an aggregated measure with the ratings of his or her teammates, and therefore, we need to justify aggregation across peers. We computed the multi-item interrater agreement index (rWG(J); James, Demaree, & Wolf, 1984, 1993; see also Lebreton & Senter, 2007). Our results show that the average rWG(J) indexes for the four competencies and three time periods ranged from .88 to .94. Similarly, the intraclass correlation coefficients (ICC; Kenny & Lavoie, 1985) ranged from .67 to .81, and they are statistically significant beyond the $p < .001$ level. These results suggest very strong interrater agreement (Lebreton & Senter, 2007) in responses among group members when evaluating the leadership competencies of individual members. We therefore computed the average evaluation that each student received from team members as an overall index of leadership competencies as perceived by others. We make the assumption that, on-the-average, the peer evaluations, aggregated across multiple peers, is likely to be a better representation of the "true score" than the self-report.

Gender and Control Variables

Gender was a dummy variable with "1" signifying women. We controlled for a number of demographic variables, since they appear to affect an individual's initial self-perception and self-rating. For instance, ethnicity and education have been found to influence leadership ratings (Wexley &

Nemeroff, 1975), and work experience seems to be important in formulating self-perceptions (Yammarino & Atwater, 1993). We thus included participants' culture, age, class, work experience, managerial experience, and academic background as control variables. We controlled for *culture* because past research has found that when cultural values are inconsistent with those inherent to peer feedback (i.e., high collectivism and power distance), feedback is more likely to be perceived as criticism, and recipients show declines in skill development (Shipper, Hoffman, & Rotondo, 2007). Culture was coded with two dummy variables depending on the country of origin. The clusters included 128 students from Euro-Latin and Latin American countries (e.g., Spain, Italy, Mexico, Colombia, Ecuador), 60 students from Anglo and Germanic countries (e.g., US, UK, Germany), and 33 students from the Middle East and Asian countries. We also controlled for *age*, *work experience*, and *managerial experience* because these three factors might influence participants' self-perceptions of leadership competences. Age and work experience were measured as number of years, while managerial experience was coded as a dummy variable with 1 assigned to some managerial experience. We also controlled for *academic background* because the type of knowledge individuals had prior to joining the MBA program may be a source of variation in individuals' self-estimates of leadership competences. We were particularly interested in controlling for engineering background because students with this type of training are less likely to be exposed to management and leader-

ship theories. Similarly, a recent article by Leonardi, Jackson, and Diwan (2009) suggests that engineers prefer to work alone and try to ensure that their contribution stands out; they rank themselves against their peers and place more emphasis on individual rather than on team accomplishments. *Academic background* was coded as 1 for participants with engineering background and 0 for the rest and *class* was represented by three dummy variables. Last, we introduced a control for *baseline level of leadership competencies* by including "peer" ratings of leadership competencies at Time 1 (T1) as a covariate in all our models. Our argument that women will be more affected by peers' feedback than men is based on the assumption that they receive the same feedback to begin with from their peers. Thus, we introduced peer's ratings at T1 as a covariate to explore the subsequent impact of these ratings on men's and women's self-assessments.

RESULTS

Descriptive Results

Tables 3 and 4 present means, standard deviations, and correlations among the self- and peer ratings of the four leadership competences and gender, for each time period. As expected, the four leadership competences showed statistically significant correlations, with coefficients (r) ranging from .37 to .77 at T1, from .49 to .86 at T2, and from .58 to .95 at T3. Gender did not show any statistically significant correlation with self-ratings of

leadership competences at T1. However, gender does show negative and statistically significant correlations with all self-ratings of leadership competences at T2 (r ranges from $-.14$ to $-.21$) and with ratings of two competences at T3 (self-confidence $r = -.26$; flexibility $r = -.22$). Similarly, gender did not show any statistically significant correlation with other-ratings of leadership competences at T1. However, gender does show negative and statistically significant correlations with three other-ratings of leadership competences at T2: self-management ($r = -.15$, $p < .05$), behavioral flexibility ($r = -.14$, $p < .05$), and interpersonal understanding ($r = -.23$, $p < .05$).

Hypothesis 1: The Nature of Peer Feedback

Hypothesis 1 states that peer evaluations will be lower than self-ratings of leadership competencies. To test this hypothesis, we conducted paired comparisons of self-ratings versus peer ratings on all four leadership competences at Times 1, 2, and 3. At Time 1, peer ratings are significantly lower than self-ratings for all leadership competences: self-confidence [$t(214) = 6.22$, $p < .001$], self-management [$t(214) = 4.38$, $p < .001$], behavioral flexibility [$t(214) = 4.48$, $p < .001$] and interpersonal understanding [$t(214) = 8.93$, $p < .001$]. The same pattern is repeated at Time 2 for self-confidence [$t(214) = 5.77$, $p < .001$], self-management [$t(214) = 3.89$, $p < .001$], behavioral flexibility [$t(214) = 6.29$, $p < .001$], and interpersonal understanding [$t(214) = 6.59$, $p < .001$]; and again at Time

TABLE 3
Means and Standard Deviations for the Pooled Sample and Across Gender Groups

Leadership Competences	Pooled sample		Men		Women	
	Self-rating mean (SD)	Peer-rating mean (SD)	Self-rating mean (SD)	Peer-rating mean (SD)	Self-rating mean (SD)	Peer-rating mean (SD)
Time 1						
Self-confidence	3.95 (.54)	3.69 (.49)	3.99 (.51)	3.70 (.50)	3.84 (.62)	3.67 (.49)
Self-management	3.91 (.60)	3.73 (.52)	3.93 (.57)	3.73 (.52)	3.84 (.71)	3.71 (.52)
Flexibility	3.87 (.67)	3.71 (.55)	3.89 (.67)	3.72 (.54)	3.83 (.68)	3.66 (.57)
Understanding	4.00 (.61)	3.68 (.56)	3.98 (.59)	3.70 (.52)	4.03 (.66)	3.62 (.67)
Time 2						
Self-confidence	3.85 (.63)	3.59 (.61)	3.92 (.56)	3.64 (.57)	3.64 (.80)	3.44 (.70)
Self-management	3.76 (.68)	3.55 (.64)	3.82 (.65)	3.61 (.61)	3.58 (.77)	3.38 (.70)
Flexibility	3.81 (.62)	3.55 (.62)	3.89 (.57)	3.60 (.59)	3.58 (.71)	3.39 (.71)
Understanding	3.83 (.60)	3.54 (.65)	3.88 (.57)	3.63 (.59)	3.68 (.65)	3.26 (.75)
Time 3						
Self-confidence	3.74 (.66)	3.60 (.58)	3.84 (.63)	3.64 (.56)	3.42 (.66)	3.47 (.60)
Self-management	3.67 (.70)	3.52 (.60)	3.73 (.69)	3.55 (.59)	3.51 (.74)	3.43 (.62)
Flexibility	3.70 (.68)	3.58 (.60)	3.79 (.62)	3.60 (.61)	3.43 (.78)	3.50 (.59)
Understanding	3.75 (.64)	3.53 (.61)	3.80 (.63)	3.58 (.59)	3.60 (.65)	3.38 (.63)

Note. $N = 221$ (169 males and 59 females).

TABLE 4
Means, Standard Deviations, and Correlations of Self-Ratings and Peer Ratings

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Gender		-.02	-.02	-.05	-.05	-.13	-.15	-.14	-.23	-.13	-.09	-.07	-.12
2. Self-confidence T1	-.11		.75	.75	.69	.38	.35	.34	.32	.26	-.00	.21	-.02
3. Self-management T1	-.06	.58		.77	.75	.33	.39	.34	.32	.28	.08	.26	.05
4. Flexibility T1	-.05	.48	.48		.77	.40	.44	.45	.40	.24	.01	.23	-.01
5. Understanding T1	.03	.37	.41	.53		.41	.42	.41	.50	.27	.06	.22	.05
6. Self-confidence T2	-.19	.32	.25	.13	-.00		.85	.83	.74	.39	.21	.40	.18
7. Self-management T2	-.15	.27	.39	.12	.03	.70		.86	.79	.30	.17	.33	.11
8. Flexibility T2	-.21	.22	.16	.31	.11	.66	.59		.83	.34	.13	.37	.10
9. Understanding T2	-.14	.16	.14	.20	.23	.58	.49	.65		.35	.21	.36	.18
10. Self-confidence T3	-.26	.19	.19	.10	-.12	.43	.36	.33	.25		.84	.84	.75
11. Self-management T3	-.13	.16	.25	.12	-.05	.33	.46	.31	.23	.79		.84	.95
12. Flexibility T3	-.22	.18	.13	.22	.00	.39	.34	.45	.32	.74	.75		.84
13. Understanding T3	-.13	.03	-.03	.05	.09	.16	.17	.30	.31	.58	.58	.74	

Note. $N = 221$. Correlations greater than .14 are significant at $p < .05$ and greater than .19 are significant at $p < .01$. Correlations among self-ratings are below the diagonal and peer ratings are above the diagonal. Reliability indexes (Cronbach's alphas) in the diagonal.

3, for self-confidence [$t(214) = 3.03, p < .01$], self-management [$t(214) = 3.19, p < .01$], behavioral flexibility [$t(214) = 2.98, p < .01$], and interpersonal understanding [$t(214) = 5.63, p < .001$]. That is, at all three measurement points, participants have an overly positive image of themselves compared to their peers' ratings. These results support Hypothesis 1.

Hypothesis 2: Longitudinal Effects of Peer Feedback on Self-Ratings of Leadership Competencies

To test Hypothesis 2, we used a repeated-measures general linear model (GLM) for each of the four leadership competencies with Time (T1, T2, and T3) as the within-subjects factor and Gender as the between-subjects factor, controlling for class, culture, work experience, managerial experience, academic background, and baseline peer ratings. Hypothesis 2 posits a decline of leadership self-ratings across time. As expected, Table 3 (column 1) shows that there were statistically significant time differences on self-ratings for all four competencies. Students reported lower self-ratings across all three time points for self-confidence (T1 = 3.95, T2 = 3.85, and T3 = 3.74; $F(2,205) = 4.53, p < .05$), self-management (T1 = 3.91, T2 = 3.76 and T3 = 3.67, $F(2,205) = 9.37, p < .01$), behavioral flexibility (T1 = 3.87, T2 = 3.81, and T3 = 3.70; $F(2,205) = 29.85, p < .01$) and interpersonal understanding (T1 = 4.00, T2 = 3.83 and T3 = 3.75; $F(2,205) = 17.95, p < .01$). These findings suggest a decline in leadership self-ratings across time, providing solid support for Hypothesis 2.

Hypothesis 3: Gender Differences in Reaction to Peer Feedback

Hypothesis 3 states that women will decrease their self-ratings of leadership competences over time to a greater extent than men. That is, women would more quickly align their self-ratings of leadership competences with their peers' views of them; whereas men would continue to inflate their self-image as compared to their peer ratings. To test this hypothesis, we examined the interaction term between Time and Gender in the repeated-measures GLM on Table 5. The results support the interaction hypothesis for three out of the four leadership competences.

First, self-confidence ratings were significantly different across gender groups [$F(2,205) = 14.81, p < .001$], with women reporting lower self-

TABLE 5
Results From General Linear Model for the Effect of Gender Group (Men and Women) and Time (T1, T2, T3) on Self-Rating of Leadership Competencies

	Time		Gender		Time x Gender	
	$F(1,206)$	η^2	$F(1,206)$	η^2	$F(1,206)$	η^2
Self-confidence	4.53*	.03	14.81**	.09	3.92*	.03
Self-management	9.37**	.06	3.09*	.02	0.27	.00
Flexibility	29.85**	.16	7.58*	.05	6.12**	.04
Understanding	17.95**	.10	1.87	.01	3.91*	.03

Note. $N = 221$. * $p < .05$, ** $p < .01$. Controls for age, work experience, managerial experience, academic background, culture, class, and baseline level of leadership competencies.

confidence levels as compared to men. In addition and as expected, the Gender \times Time interaction was statistically significant [$F(2,205) = 3.92, p < .05$]. Figure 1 shows the direction of the interaction. Men and women did not differ in their self-ratings of self-confidence at Time 1 (Men = 3.99 vs. Women = 3.84, $t(214) = 1.48, ns$). At Time 2, however, females reported significantly lower self-confidence than males (Men = 3.92 vs. Women = 3.64, $t(214) = 2.71, p < .01$). Furthermore, gender differences in self-ratings of self-confidence broadened at Time 3 (Men = 3.84 vs. Women = 3.42, $t(214) = 3.85, p < .01$). These results provide support for the interaction hypothesis regarding self-confidence. Although on a 5-point Likert scale the maximum distance in self-confidence ranges from 4.00 for males at Time 1 and 3.4 for women at Time 3, the small standard deviation ($SD = .5$) makes the .6 difference in self-confidence a meaningful difference in practical terms. It is more than 1 full standard deviation difference.

Second, gender differences in self-management ratings were statistically significant [$F(2,205) = 3.09, p < .05$], with females reporting lower self-ratings of self-management than males. However, the Gender \times Time interaction did not reach statistically significant levels. Thus, Hypothesis 3 was not supported for self-management.

Third, behavioral flexibility ratings were significantly different across gender groups [$F(2,205) = 7.58, p < .01$], with females reporting lower behavioral flexibility levels as compared to males. As expected, the Gender \times Time interaction

was statistically significant [$F(2,205) = 6.12, p < .01$]. Figure 2 shows the direction of the interaction. Men and women did not differ in their self-ratings of behavioral flexibility at Time 1 (Men = 3.89 vs. Women = 3.83; $t(214) = .46, ns$). At Time 2, however, women reported significantly lower self-ratings of behavioral flexibility than men. (Men = 3.89 vs. Women = 3.58; $t(214) = 3.04, p < .01$). Furthermore, these gender differences in self-rating of behavioral flexibility remain at Time 3 (Men = 3.79 vs. Women = 3.43, $t(214) = 3.16, p < .01$). This finding is depicted in Figure 2. These results provide further support for Hypothesis 3 regarding behavioral flexibility.

Last, the data show no significant differences between men and women in self-ratings of interpersonal understandings. The Time \times Gender interaction, however, was statistically significant [$F(2,205) = 3.91, p < .05$]. Figure 3 shows the direction of the interaction. As expected, there were no gender differences in self-ratings of interpersonal understanding at Time 1 (Men = 3.98 vs. Women = 4.03, $t(214) = -.50, ns$). However, at Time 2, women reported significantly lower self-estimates than did males on interpersonal understanding (Men = 3.88 vs. Women = 3.68; $t(214) = 2.09, p < .05$), although these gender differences are only marginally significant at Time 3 (Men = 3.80 vs. Women = 3.60, $t(214) = 1.86, p = .06$).

Although the general linear models reported above are appropriate to examine the Gender \times Time interactions, those are group-level analyses comparing males with females. In order

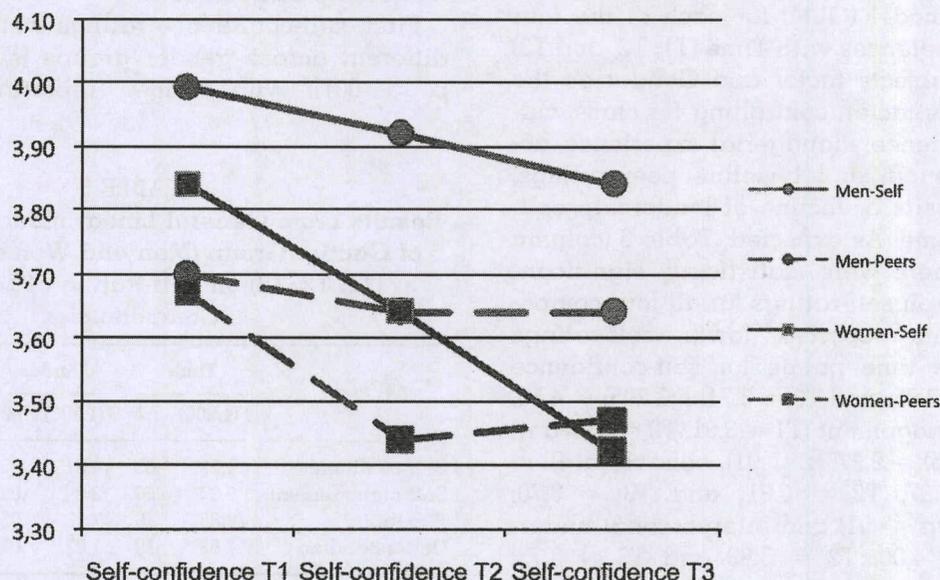


FIGURE 1
Gender Differences Across Time of Self-Ratings and Peer Ratings of Self-Confidence

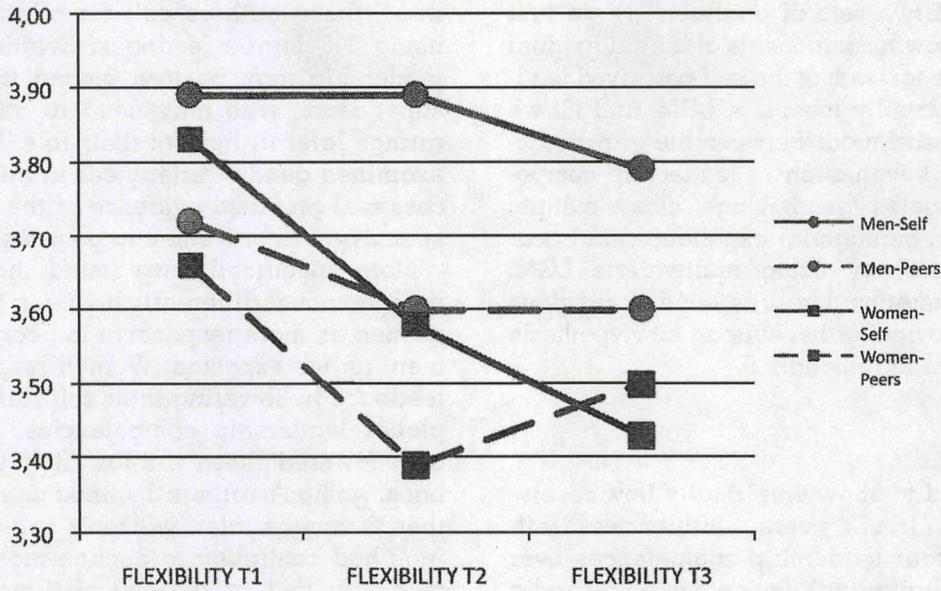


FIGURE 2

Gender Differences Across Time in Self-Rating and Peer Ratings of Behavioral Flexibility

to explore potential individual differences within the female group and the male group in terms of variance in feedback reaction, we performed additional analyses using a latent growth model (LGM) technique. Latent growth modeling provides a statistical tool for examining the role of change in the level of self-evaluation of leadership competences over time and whether there are interindividual differences in this change. In LGM, the intercept factor indicates the initial state of a particular leadership competence and the slope factor indi-

cates the growth rate of that leadership competence over time. In particular, the mean of the slope factor (μ_s) indicates whether there is significant change in the self-evaluation of leadership competences over time, and we expected that it would be negative and significant, showing that on the average the level of self-evaluation of leadership competences is decreasing over time. The variance estimate of the slope factor (σ_s^2) indicates whether there was individual variation in change over time.

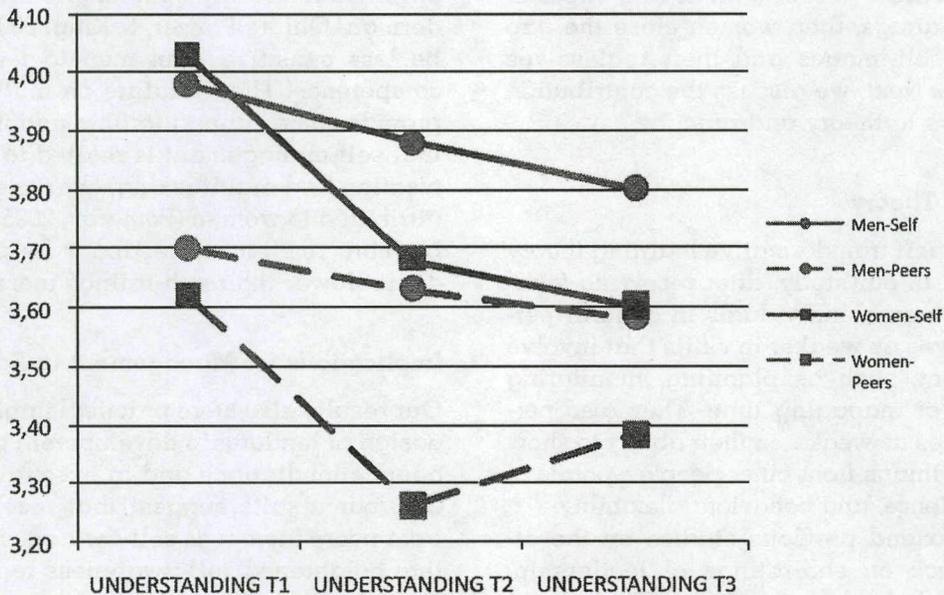


FIGURE 3

Gender Differences Across Time in Self-Rating and Peer Ratings of Interpersonal Understanding

We conducted two sets of analyses: (1) we first examined the growth components of intraindividual change over time for each of the self-perceived leadership competences by means of LGM, and (2) we examined the associations between the growth factors for each self-evaluation of leadership competence and covariates (gender, age, class, culture, work experience, managerial experience, and academic background) by using multivariate LGM. Overall, these additional results confirm previous analyses and provide further support for Hypothesis 3. We report them in Appendix B.

DISCUSSION

Our study aimed to show empirically how receiving feedback from peers influences self-evaluations of four leadership competences over time. Using a longitudinal design, we employed a leadership competence appraisal to examine the degree to which self-ratings and peer ratings on these competences changed 3 and 6 months after an initial appraisal. On the basis of transformative learning theory (Mezirow, 1991, 2000), we predicted that receiving peer ratings that are lower than self-ratings would reduce individuals' self-perceptions of leadership competences at subsequent times. In addition, based on the literature regarding gender differences in feedback and leadership, we expected that women would more quickly respond to peer feedback by aligning their self-ratings of leadership with their peers' ratings more than men. Our results generally support both of these predictions. If peer ratings can be considered a more accurate assessment of real capabilities than self-ratings, then women close the gap between their self-images and their real selves faster than men. Next, we discuss the contribution of these findings to theory and practice.

Contribution to Theory

Our results support transformative learning theory (Mezirow, 1991). In our study, after receiving feedback from their peers, individuals in general perceived themselves as weaker in skills that involve self-management, such as planning, monitoring their progress, or managing time. They also perceived themselves as weaker in their ability to show empathy or see things from other people's points of view, self-confidence, and behavioral flexibility.

Our results extend previous studies on the effects of feedback on self-ratings of leadership. Whereas the study by Atwater et al. (2000) focused on upward feedback, our study examined peer feedback, which involves different dynamics. In-

deed, these authors call for additional research using 360-degree feedback. Evaluating peers on leadership may be less biased than evaluating supervisors, who may need to adjust their self-ratings later in light of their role. In addition, we examined gender differences in this learning process and provided evidence of the heightened responsiveness of women to peer feedback.

More specifically, we found that women and men respond differently to peer feedback, with women as more responsive to peer feedback than men, as we expected. Women responded to peer feedback by lowering their self-ratings on all four global leadership competencies. Although men also lowered these ratings after receiving feedback, women's ratings declined more strongly. Further, 6 months later, women's self-confidence ratings had continued to decline more steeply than men's. In fact, at the end of 6 months, women's self-ratings had essentially converged with peer ratings of them. These results suggest that women are closing the gap between self- and peers' ratings faster than men, exhibiting more sensitivity to social cues. Thus, while it is true that feedback is a critical method in any leadership development program, these results suggest that such feedback has more impact for women than it has for men.

In particular, we found these gender differences in reaction to peer feedback to be persistent for three out of the four leadership competences, namely self-confidence, behavioral flexibility, and interpersonal understanding. Internalized gender stereotypes may explain why this effect was not found for self-management. Since self-management might be a stereotypical female attribute (e.g., Ruderma, Ohlott, Panzer, & King, 2002), women may be less sensitive than men to feedback on this competence. The literature on multitasking might provide some support for this notion. To the extent that self-management is related to personal organization and multitasking, characteristics socially attributed to women (Pomeroy, 2005), women might be more resilient to feedback by peers, and they do not lower their self-ratings more than men.

Implications for Management in Education

Our results also have practical implications for the design of leadership development programs in academic institutions and in executive training. For one, our results suggest that receiving feedback from peers increases self-awareness. To the extent that heightened self-awareness represents a positive educational outcome, business schools would benefit from the implementation of systematic peer-evaluation systems within their educational

programs. Recently, Brutus and Donia (2010) commented on the fact that, while peer evaluations are very common in business schools, they are most often embedded within individual courses as opposed to being standardized across the curriculum. Individual development through feedback is optimized when students receive feedback over time in a standardized format, as was done in this study. Second, our findings underscore the importance of support after feedback is delivered. Whereas peer evaluations alone may be sufficient to trigger development, research has shown that coaching is important following feedback (Smither, London, Flautt, Vargas, & Kucine, 2003). Luthans and Peterson (2003) suggested that such coaching should focus not only on enhanced self-awareness but also on behavioral management, and Yammarino and Atwater (1993) proposed that trained professionals should handle such feedback delivery. Accordingly, we suggest that leadership development programs should be carefully designed to include both peer feedback and tailored coaching sensitive toward the way men and women respond to peer feedback, albeit meeting the standards of Affirmative Action Programs. In this way such programs may help both men and women identify an agenda to understand opinions held by peers, close the gaps discovered, and practice new competences. To our knowledge, similar results about gender effects and feedback have never been found in an educational setting. Our study further makes a real contribution because, for a study on feedback, it is based on a design with a significant amount of experimental control without compromising on external validity: It is conducted within a "real" educational context and is aimed at generalizing to other educational contexts. A final point about support: The longitudinal trends uncovered suggest that it is most useful after one or two feedback episodes, when students have had the chance to reflect and begin internalizing the information. Furthermore, following Mezirow's theory of transformative learning, support during the developmental planning can be maximized when the teaching materials used reflect the real-life experiences of participants so that they can critically assess the new information. Such teaching methods may include critical incidents and life story analyses, as they provide opportunities for critical reflection on previous assumptions and for development of action plans.

Limitations and Future Research

We noted above that individually oriented coaching programs may be necessary to improve global lead-

ership competences significantly and quickly. Future research that examines the combined effect of peer feedback with individual coaching programs will be valuable (e.g., Brutus & Donia, 2010). Also, our total lag of 6 months is not enough time to detect improvements. Although the study would benefit from a longer time period, other longitudinal studies examining student evaluations have used similar or even shorter timing. For instance, McNatt (2010) gathered longitudinal data separated by approximately 4 months; Langfred (2007) and Jehn and Mannix (2001) collected three waves of student data separated by intervals of approximately 1 month; Lester, Meglino, and Korsgaard (2002) collected data from newly formed student groups over three time periods, separated by 9 and 5 weeks. Accordingly, we acknowledge that collecting data from students over a course period inherently involves a time limitation and that future studies should include a longer lag from the time feedback is received to the time one can expect improvements. Similarly, Smither, London, and Richmond (2005: 203) found that leaders' negative reactions caused by unfavorable feedback decreased after 6 months, and suggested that "negative feedback may take a while to sink in or recipients may need some time to reflect and absorb the feedback."

It is also possible that males do not lower their self-ratings as much as females over time because ratings of male leadership competences by others tend to be higher or in greater consensus in comparison with the other ratings for females. We have examined this alternative explanation in our data in two ways: (1) we tested that the mean of the other-ratings was lower than the self-rating for both men and women; and (2) we tested that the variance of the other-ratings is low such that the peer feedback is clearly unambiguous for both gender groups. First, the means of the other-ratings are in all cases below the self-ratings for both men and women at Time 1 and Time 2, indicating that both men and women received feedback that was below their self-ratings. The data at Time 3, however, shows that women have closed the gap between their self- and other-ratings on three out of four competencies (the exception is interpersonal understanding). Second, we also explored the possibility that men and women did not receive this feedback with the same consistency. Because we have computed an interrater agreement for each individual, competence, and time period, we were able to introduce these data as individual variables and model this measure of team consensus on individuals' gender. We introduced 12 variables corresponding to the interrater agreements for each competence and time period. Low values indicate that the person received the

feedback from their peers with little agreement, and high values indicated high consistency and agreement among team members on their evaluations of the target member. The indexes and standard deviations for men and women are quite similar, although women's indexes are a little bit lower. Therefore, we ran three MANCOVAs (one per time period) to examine any differences between men and women on interrater agreements. None of the comparisons yielded statistical significance (mean $rWG(J)$ and standard deviation of interrater agreement indexes at T1, T2 and T3 are .91 (.30), .91 (.25) and .91 (.33) for men and .89 (.27), .88 (.17), .87 (.24) for women). Thus, our results show that the interrater agreement indexes apply equally for men and women. These results support our assumption that the others' ratings were similar in terms of level (mean) and congruency (variance) for both men and women. Further, our study assumes that on the average the peer ratings, aggregated across multiple peers, are likely to be more accurate than the self-ratings of leadership competences (Conway & Lance, 2010). However, the self-report may be superior to peer-reports in cases when the self is the only one truly "knowing," such as with certain forms of workplace deviance (see Bennett & Robinson, 2000) or other "private" events and constructs (Chan, 2009; Skinner, 1957). We thus encourage future scholars that examine self- and others-ratings to carefully consider the accuracy of these ratings, depending on the construct under study. Our study design did not include a control group and cannot be viewed as a true experiment. Yet, in a repeated measure design, subjects serve as their own control (Stevens, 2002). In addition, we statistically controlled for several variables and were able to examine the leadership competences before and after feedback. However, future studies that include a control group in their design may be useful in order to rule out alternative explanations and establish causality. Another limitation of our sample is that women constitute less than a third of participants (approximately 30%). This reflects the real ratio of women to men in the MBA program we studied and is in line with MBA programs in the United States; according to the Association to Advance Collegiate Schools of Business (AACSB), women composed about 33% of the student body 5 years ago, when our data were collected. Also, due to data limitations, we were unable to test whether leadership development was related to performance. Future studies may thus examine whether increased convergence of the self- to the peer-evaluation ratings over time is associated with increased performance and directly model self-to-other discrepancy with polynomial regres-

sion (Edwards & Parry, 1993), in order to overcome difference score difficulties. Last, since this study used a sample of MBA students, generalizing the findings to executive training in work settings should be done with caution. A high proportion of students in our sample are from Euro-Latin and Latin American countries, which are known for values such as high power distance and masculinity. These cultural values make individuals more likely to perceive the peer feedback as criticism (Shipper et al., 2007). However, these Latin countries are also known for high collectivism. Research has shown that collectivist people tend to seek more feedback from peers (Hwang & Francesco, 2010) and that this increases their knowledge and learning outcomes (Couto & Viera, 2004; Nakata & Sivakumar, 1996). To allow further generalization, it would be of value to replicate these findings across national cultures where power distance and masculinity-femininity differ (Hofstede & Bond, 1984) and in executive training settings.

Appendix A

Leadership Competencies Survey

SELF-EVALUATION OF LEADERSHIP COMPETENCIES

Instructions: Please indicate the extent to which you agree with each of the following statements using the following 5-point scale: 1 = *completely disagree* to 5 = *completely agree*.

Self-Confidence

I show confidence in my capabilities to organize and execute action plans.

I show confidence in my skills to overcome any obstacle.

I show confidence when facing unforeseen situations.

Self-Management

I know when to work and when to relax.

I prioritize tasks and activities properly.

Knows how to get organized to balance the pressures of work.

Behavioral Flexibility

I adapt easily to changes.

I do not feel stressed or frustrated when doing several tasks at the same time.

I adapt well to changes in plans and objectives that had been previously agreed upon.

Interpersonal Understanding

I understand others' points of view.

I put myself in the place of others and feel respect for their opinions.

I seek actively the opinion of others.

OTHERS EVALUATION OF LEADERSHIP COMPETENCIES

Instructions: Please indicate the extent to which you agree with each of the following statements for each member of your team,

using the following 5-point scale: 1 = *completely disagree* to 5 = *completely agree*.

Self-Confidence

Shows confidence in his/her capabilities to organize and execute action plans.

Shows confidence in his/her skills to overcome any obstacle.

Shows confidence when facing unforeseen situations.

Self-Management

Knows when to work and when to relax.

Prioritizes tasks and activities properly.

Knows how to get organized to balance the pressures of work.

Behavioral Flexibility

Adapts easily to changes.

Does not feel stressed or frustrated when doing several tasks at the same time.

Adapts well to changes in plans and objectives that had been previously agreed upon.

Interpersonal Understanding

Understands others' points of view.

Puts him/herself in the place of others and feels respect for their opinions.

Seeks actively the opinion of others.

Appendix B

Results From Latent Growth Modeling

We estimated a linear growth model over our three measurement points. Although this modeling can be used with our data since the measurement at three points is typically the minimum needed to estimate latent growth curves according to Bollen and Curran (2006), we acknowledge that the number of measurements over time for these LGM analyses are not optimal, as Preacher et al. (2008) suggest four to five measurement occasions in order to obtain adequate statistical power and avoid limitations in degrees of freedom. The model was constructed by defining the intercept factor as the initial status of self-evaluations of leadership competences by setting the loadings of variables from Time 1 to Time 3 to 1 on the intercept factor and to 0, 1, and 2 on the slope factor. All models were performed with Mplus statistical program, version 5 (Muthén & Muthén, 2005) using maximum likelihood estimator. We assessed model fit with chi-square (χ^2), the CFI, Tucker-Lewis Index (TLI), RMSEA, and standardized root-mean square residual (SRMR; Hu & Bentler, 1999). Because of the three measurement points, the fit indices were almost perfect in our data analysis. We therefore acknowledge that the change in rate of change could not be determined due to limitations in degrees of freedom.

GROWTH RATES OF SELF-PERCEIVED LEADERSHIP COMPETENCES

We constructed models containing the growth components for initial level and change (i.e., initial status and growth rate) for self-confidence, self-management, behavioral flexibility, and interpersonal understanding. The fit indexes suggested that the linear model fitted the data on all four variables adequately, as shown in Table 1-ApB. Table 2-ApB displays the parameter

estimates of latent growth models for all four self-perceived leadership competences to test our hypotheses.

The estimated rate of growth in self-perceived confidence decreased per 3-month interval significantly ($-.11, p < .001$), supporting Hypothesis 2. In addition, the results showed inter-individual variation in both the initial level and linear change in self-confidence (.16, $p < .001$; and .08, $p < .01$). Similarly, the estimated growth rates in self-management decreased per 3-month interval and the decrease was significant ($-.12, p < .001$). Also, the mean growth rate on behavioral flexibility and interpersonal understanding decreased significantly in the same time intervals ($-.09, p < .01$; and $-.13, p < .001$). In addition, the results showed interindividual variation in both initial level (.23, $p < .001$. 12, $p < .05$; and .14, $p < .01$) and linear change (.09, $p < .01$. 05, $p < .1$; and .07, $p < .05$) in self-management, behavioral flexibility, and interpersonal understanding, respectively. The relationship between initial status and growth rate was not statistically significant for any leadership competence, suggesting that on the average the level of initial leadership competence was not associated with the level of decline over time.

CHANGE IN SELF-PERCEIVED LEADERSHIP COMPETENCES AND COVARIATES (I.E., GENDER)

Because our results indicated interindividual variation in change in all four leadership competences, we conducted multivariate latent growth modeling to examine the explanatory variables for this interindividual variation. In these analyses, gender, age, class, culture, work experience, managerial experience, and educational background were included in the models as covariates. These variables were allowed to correlate with the growth factors. These results are displayed in Tables 3-ApB and 4-ApB.

First, we examined the associations between self-confidence and covariates. The multivariate model showed adequate fit [$\chi^2(11) = 21.42$; CFI = .94; TLI = .83; RMSEA = .06; SRMR = .03]. The results indicated that change in self-confidence was only related to gender, suggesting that on the average women experience a higher rate of decline than men over time ($\rho = -.16, p < .05$). This result further supports our hypothesis that women react more strongly to peer feedback for self-confidence (Hypothesis 3).

Second, we examined the associations between self-management and covariates. The multivariate model showed adequate fit [$\chi^2(11) = 6.23$; CFI = 1.00; TLI = 1.19; RMSEA = .00; SRMR = .02]. The results indicated that change in self-management was not related to gender or any of the other covariates. Thus, Hypothesis 3 was not supported for self-management.

Third, we examined the associations between behavioral flexibility and covariates. The multivariate model showed adequate fit [$\chi^2(11) = 8.47$; CFI = 1.00; TLI = 1.08; RMSEA = .00; SRMR = .02]. The results showed that change in behavioral flexibility was related to gender, suggesting that on the average the decreasing trend in behavioral flexibility over time is steeper for women than men ($\rho = -.19, p < .01$). Hypothesis 3 was therefore supported for behavioral flexibility.

Finally, we examined the associations between self-evaluations of interpersonal understanding and covariates. The multivariate model showed adequate fit [$\chi^2(11) = 14.31$; CFI = .89; TLI = .69; RMSEA = .04; SRMR = .02]. The results showed that change in interpersonal understanding was related to gender, suggesting that on the average women experience a higher rate of decline in interpersonal understanding than men ($\rho = -.15, p < .05$). Thus, Hypothesis 3 was supported for interpersonal understanding.

As far as other covariates are concerned, change in behavioral flexibility was related to work experience ($\rho = -.02$, $p < .05$), suggesting that the decreasing trend in behavioral flexibility over time is steeper for individuals with higher work experience, possibly because they are more open to peer feedback due to their previous rich experience of behavioral interactions at the workplace. In other words, the differences in the rates of change of behavioral flexibility among individuals (i.e., slopes) were further driven by work experience. Overall, and consistent with prior analysis, results showed that individuals decreased their self-ratings of leadership competences over time, and this decrease was higher for women than men, thus supporting Hypotheses 2 and 3.

MALE AND FEMALE SUBSAMPLES

In order to examine these gender differences in more depth, we conducted additional LGM analyses for both the female and male subsamples. As with the pooled sample, we first examined the growth components of intraindividual change over time and then the associations between the growth factors and covariates for each subsample, when applicable.

Results for the Female Subsample

The models constructed for the female subsample fitted the data on all four leadership competences adequately, as suggested by the fit indexes shown in Table 5-ApB. As shown in Table 6-ApB, the estimated rate of growth on all four leadership competences decreased per 3-month interval significantly for women ($-.21$, $p < .001$; $-.17$, $p < .05$; $-.19$, $p < .001$; $-.25$, $p < .001$). In addition, the results showed interindividual variation in the initial level of all four competences ($.31$, $p < .01$. $.54$, $p < .001$. $.36$, $p < .01$ and $.37$, $p < .01$). There was also interindividual variation in linear change for three out of four competences, namely self-confidence, self-management, and behavioral flexibility ($.15$, $p < .01$. $.17$, $p < .01$; and $.12$, $p < .05$).

To further examine this interindividual variation, we conducted multivariate latent growth models for the female subsample, including covariates. The multivariate models showed adequate fit for all four leadership competences, as suggested by the fit indexes shown in Table 7-ApB.

As shown in Table 8-ApB, the results indicated that change in self-confidence, behavioral flexibility and interpersonal understanding was not related to any of the covariates for women. Change in self-management, however, was related to work experience ($\rho = .05$, $p < .05$), suggesting that women who have more work experience showed lower rates of decline in behavioral flexibility over time. Thus, the differences in the rates of change of self-management among women (i.e., slopes) were further driven by work experience. In addition, initial status of self-confidence and self-management was not related to any of the covariates. Nonetheless, initial status of behavioral flexibility and interpersonal understanding were related to class 2 ($\rho = -.75$, $p < .01$; and $\rho = -.56$, $p < .05$), suggesting that women of this class reported lower behavioral flexibility and interpersonal understanding at the baseline. Further, initial status of interpersonal understanding was related to the Anglo culture ($\rho = -.52$, $p < .05$), suggesting that Anglo women reported lower interpersonal understanding at Time 1. In sum, the differences in the starting points at the individual level (i.e., intercepts) of women's interpersonal understanding were driven by class membership and culture; whereas the differences in the intercepts of women's behavioral flexibility were further driven by class membership.

Results for the Male Subsample

The models constructed for the male subsample fitted the data on all four leadership competences adequately, as suggested by the fit indexes shown in Table 9-ApB. As shown in Table 10-ApB, the estimated rate of growth on self-confidence and self-management decreased per 3-month interval significantly for men ($-.08$, $p < .01$; and $-.10$, $p < .01$). In addition, the results showed interindividual variation in the initial level of self-confidence and self-management ($.10$, $p < .05$; and $.12$, $p < .05$). However, there was no interindividual variation in linear change of all four competences, thus additional multivariate latent growth models were not constructed.

Taken together, the subsample analyses indicated that there were no interindividual differences in competence change for men, while there was variation in growth for women, most of which was not explained by the variables used in this study. These results open interesting avenues for future research, which may explore other factors that drive interindividual differences of female leadership development.

TABLE 1-ApB
Latent Growth Model Specifications

Variable	df	χ^2	CFI	TLI	RMSEA	SRMR
Self-confidence	1	.11	1.00	1.05	.00	.00
Self-management	1	.43	1.00	1.02	.00	.01
Behavioral flexibility	1	.59	1.00	1.02	.00	.01
Interpersonal understanding	1	.66	1.00	1.04	.00	.01

TABLE 2-ApB
Parameter Estimates of Latent Growth Models for Self-Confidence, Self-Management, Behavioral Flexibility, and Interpersonal Understanding

Parameter	Self-confidence	Self-management	Behavioral flexibility	Interpersonal understanding
Mean initial status	3.96***	3.91***	3.89***	3.99***
Variance in initial status	.16***	.23***	.12*	.14**
Mean growth rate	-.11***	-.12***	-.09**	-.13***
Variance in growth rate	.08**	.09**	.05+	.07*
Covariance (initial status with growth rate)	-.05+	-.06+	-.03	-.05+

* $p < .05$, ** $p < .01$, *** $p < .001$

TABLE 3-ApB
Multivariate Latent Growth Model Specifications

Variable	df	χ^2	CFI	TLI	RMSEA	SRMR
Self-confidence	11	21.42	.94	.83	.06	.03
Self-management	11	6.23	1.00	1.19	.00	.02
Behavioral flexibility	11	8.47	1.00	1.08	.00	.02
Interpersonal understanding	11	14.31	.89	.69	.04	.02

TABLE 4-ApB
Correlations Between Growth Factors and Covariates in Multivariate Latent Growth Analyses

	Initial status of self-confidence	Change in self-confidence	Initial status of self-management	Change in self-management	Initial status of behavioral flexibility	Change in behavioral flexibility	Initial status of interpersonal understanding	Change in interpersonal understanding
Gender	-.09	-.16*	-.06	-.08	-.03	-.19**	.06	-.15*
Age	.02	-.00	.00	.01	.00	.01	-.01	.01
Class 1	-.26**	.13	-.16	.06	-.11	.02	-.13	.09
Class 2	-.21*	-.07	-.11	-.12	-.17	-.15+	-.07	-.06
Class 3	-.15	.13	-.09	.05	.08	-.05	-.10	.02
Latin culture	.13	-.02	.17	.05	.15	-.03	.12	-.08
Anglo culture	.20	-.03	.16	.03	-.10	.07	-.08	-.03
Work experience	-.01	.01	-.00	-.01	.01	-.02*	.01	-.01
Managerial experience	.07	-.10	.01	-.06	.02	-.12+	.06	-.12+
Academic background	.06	-.05	.05	-.08	.10	-.10+	.07	-.03

TABLE 5-ApB
Latent Growth Model Specifications for the Female Subsample (N = 53)

Variable	df	χ^2	CFI	TLI	RMSEA	SRMR
Self-confidence	1	.00	1.00	1.10	.00	.00
Self-management	1	1.21	.99	.98	.06	.03
Behavioral flexibility	1	.25	1.00	1.08	.00	.01
Interpersonal understanding	1	3.81	.88	.65	.23	.06

TABLE 6-ApB
Parameter Estimates of Latent Growth Models for Self-Confidence, Self-Management, Behavioral Flexibility and Interpersonal Understanding for the Female Subsample (N = 53)

Parameter	Self-confidence	Self-management	Behavioral flexibility	Interpersonal understanding
Mean initial status	3.86***	3.86***	3.83***	4.04***
Variance in initial status	.31**	.54***	.36**	.37**
Mean growth rate	-.21***	-.17*	-.19***	-.25***
Variance in growth rate	.15**	.17**	.12*	.06

TABLE 7-ApB
Multivariate Latent Growth Model Specifications for the Female Subsample (N = 53)

Variable	df	χ^2	CFI	TLI	RMSEA	SRMR
Self-confidence	10	9.19	1.00	1.08	.00	.04
Self-management	10	5.99	1.00	1.24	.00	.02
Behavioral flexibility	10	5.60	1.00	1.42	.00	.03
Interpersonal understanding	10	10.29	.99	.97	.02	.03

TABLE 8-ApB
Correlations Between Growth Factors and Covariates in Multivariate Latent Growth Analyses for the Female Subsample (N = 53)

	Initial status of self-confidence	Change in self-confidence	Initial status of self-management	Change in self-management	Initial status of behavioral flexibility	Change in behavioral flexibility	Initial status of interpersonal understanding	Change in interpersonal understanding
Age	.04	-.02	.01	-.01	-.01	.04	-.04	.01
Class 1	-.27	.10	-.17	.07	-.43+	.26	-.37	.04
Class 2	-.39	-.03	-.22	-.07	-.75**	.22	-.56*	.17
Class 3	-.23	.18	-.15	.11	-.21	.22	-.31	-.05
Latin culture	-.06	.09	.43+	.04	.14	-.04	-.08	-.10
Anglo culture	-.24	.15	.09	.18	-.31	.18	-.52*	.07
Work experience	-.05	.06	-.11	.05*	-.03	.01	-.05	.03
Managerial experience	.23	-.04	.00	.15	.09	.05	.27	.03
Academic background	.02	-.06	-.23	-.00	-.22	-.16	.08	.02

TABLE 9-ApB
Latent Growth Model Specifications for the Male Subsample (N = 167)

Variable	df	χ^2	CFI	TLI	RMSEA	SRMR
Self-confidence	1	.12	1.00	1.34	.00	.01
Self-management	1	.04	1.00	1.10	.00	.00
Behavioral flexibility	1	1.32	.99	.97	.04	.03
Interpersonal understanding	1	.00	1.00	1.28	.00	.00

TABLE 10-ApB
Parameter Estimates of Latent Growth Models for Self-Confidence, Self-Management, Behavioral Flexibility, and Interpersonal Understanding for the Male Subsample (N = 167)

Parameter	Self-confidence	Self-management	Behavioral flexibility	Interpersonal understanding
Mean initial status	3.99***	3.93***	3.92***	3.99***
Variance in initial status	.10*	.12*	.04	.07
Mean growth rate	-.08**	-.10**	-.06	-.10
Variance in growth rate	.05	.05	.02	.06

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