

## TRAIT AND BEHAVIORAL THEORIES OF LEADERSHIP: AN INTEGRATION AND META-ANALYTIC TEST OF THEIR RELATIVE VALIDITY

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The leadership literature suffers from a lack of theoretical integration (Avolio, 2007, *American Psychologist*, 62, 25–33). This article addresses that lack of integration by developing an integrative trait-behavioral model of leadership effectiveness and then examining the relative validity of leader traits (gender, intelligence, personality) and behaviors (transformational-transactional, initiating structure-consideration) across 4 leadership effectiveness criteria (leader effectiveness, group performance, follower job satisfaction, satisfaction with leader). Combined, leader traits and behaviors explain a minimum of 31% of the variance in leadership effectiveness criteria. Leader behaviors tend to explain more variance in leadership effectiveness than leader traits, but results indicate that an integrative model where leader behaviors mediate the relationship between leader traits and effectiveness is warranted.

Leadership is one of the most discussed and debated topics in the social sciences (Avolio, Sosik, Jung, & Berson, 2003; Bass, 1990; Bennis, 2007). Research on leadership began with a search for heritable attributes that differentiated leaders from nonleaders and explained individuals' effectiveness as leaders (Galton & Eysenck, 1869). In effect, this early research was the beginning of the trait paradigm of leadership research. Subsequent studies have established that individual characteristics,

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such as demographics, skills and abilities, and personality traits, predict leadership effectiveness (e.g., Eagly, Karau, & Makhijani, 1995; Judge, Bono, Ilies, & Gerhardt, 2002; Judge, Colbert, & Ilies, 2004; Mumford, Campion, & Morgeson, 2007).

Critiques of the leader trait paradigm (Jenkins, 1947; Mann, 1959; Stogdill, 1948) prompted scholars to look beyond leader traits and consider how leaders' behaviors predicted effectiveness. This led to research on initiation of structure and consideration (Hemphill & Coons, 1957; Stogdill, 1963), and established the behavior paradigm of leadership research. The influence of the leader behavior paradigm can be seen across leadership theories, including Fiedler's (1967) contingency model, Blake and Mouton's (1964) managerial grid, and the work on transformational and transactional leadership (the full range model of leadership; Avolio et al., 2003; Bass, 1985; Podsakoff, MacKenzie, Moorman, & Fetter, 1990). Not only did the leader behavior paradigm provide the basis for new theory, but meta-analytic evidence also suggests that leader behaviors are important predictors of leadership effectiveness (Judge & Piccolo, 2004; Judge, Piccolo, & Ilies, 2004).

Both leader traits and behaviors have been investigated in scores of research studies. Despite the theoretical and applied value of these studies, leadership research is plagued by a lack of integration. In fact, scholars dating back to Bennis (1959) and as recently as Avolio (2007) have lamented over the proliferation and lack of integration of leadership theories and constructs. The primary criticism is that leadership scholars create new theories of leadership without attempting to compare and contrast the validity of existing theories.

The lack of integration in leadership research is evident both within and across the trait and behavior paradigms, as research within each paradigm generally focuses on a single trait or behavioral perspective. For example, within the trait paradigm, Eagly, Johannesen-Schmidt, and van Engen (2003) provided meta-analytic estimates for gender and leadership effectiveness, whereas Judge et al. (2002, 2004) did the same for personality and intelligence, respectively. None of these studies controlled for or compared the effects of different traits, such as gender, personality, and intelligence concurrently. This lack of integration is problematic given that many of these studies found similar effect sizes across leader traits. For example, Judge et al. (2002) found absolute effect sizes ranging from .16 to .24 for personality and leadership effectiveness, whereas Judge et al. (2004) found an effect size of .21 for intelligence. However, because there was no integration across traits, it remains unclear as to whether these are independent effects.

Similarly, research within the leader behavior paradigm often focuses on a single behavioral perspective. For example, Judge and Piccolo (2004)

meta-analyzed the literature on transformational and transactional leadership, and Judge, Piccolo, and Ilies (2004) did the same for initiating structure and consideration. Neither of these studies integrated across leader behaviors or considered whether the effects were independent. Yet, initiating structure and transactional leadership both focus on task-oriented leader behaviors, whereas consideration and transformational leadership both comprised relational-oriented leader behaviors (Bass & Bass, 2008; Fleishman, 1953). Given the conceptual similarity, it is not surprising that separate meta-analyses found similar effect sizes—for example, overall validities of .41 for consideration and .44 for transformational (Judge & Piccolo, 2004; Judge et al., 2004). Thus, the two leader behavior paradigms that have shaped leadership research for decades may not be independent, and even more importantly, it is unclear if one is a better predictor of leadership effectiveness.

This article reviews and integrates the literature on leader traits and behaviors, and takes a first step toward an integrative theory of how leader traits and behaviors influence leadership effectiveness. To accomplish this, we follow a three-stage process. First, based on a narrative review of the literature, we develop a conceptual model that organizes the current literature and models how leader traits and behaviors affect leadership effectiveness (see Figure 1). Second, we empirically test the relative validity of select leader traits and behaviors using a combination of previously published meta-analytic data and new meta-analyses. Third, we investigate an exemplary set of relationships from our conceptual model to see if leader behaviors are one possible mechanism through which individual traits influence leadership effectiveness.

### *Conceptualizing Leadership Effectiveness*

Before presenting our integrative model, we first define the leadership effectiveness domain. Scholars often vary in their definition of leadership effectiveness (Avolio et al., 2003; Yukl, 2006), which is one reason the literature is not well integrated. Based on our review of the literature, leadership effectiveness criteria can be conceptualized along three dimensions: (a) content, (b) level of analysis, and (c) target of evaluation. As shown in Figure 1, the content of leadership effectiveness can relate to task performance (e.g., individual or group performance), affective and relational criteria (e.g., satisfaction with the leader), or overall judgments of effectiveness that encompass both task and relational elements (e.g., overall effectiveness of the leader). The level of analysis corresponds to whether leadership effectiveness is conceptualized at the individual, dyadic, group, or organizational level. For example, some studies conceptualize leadership effectiveness as individual-level leader effectiveness, whereas other

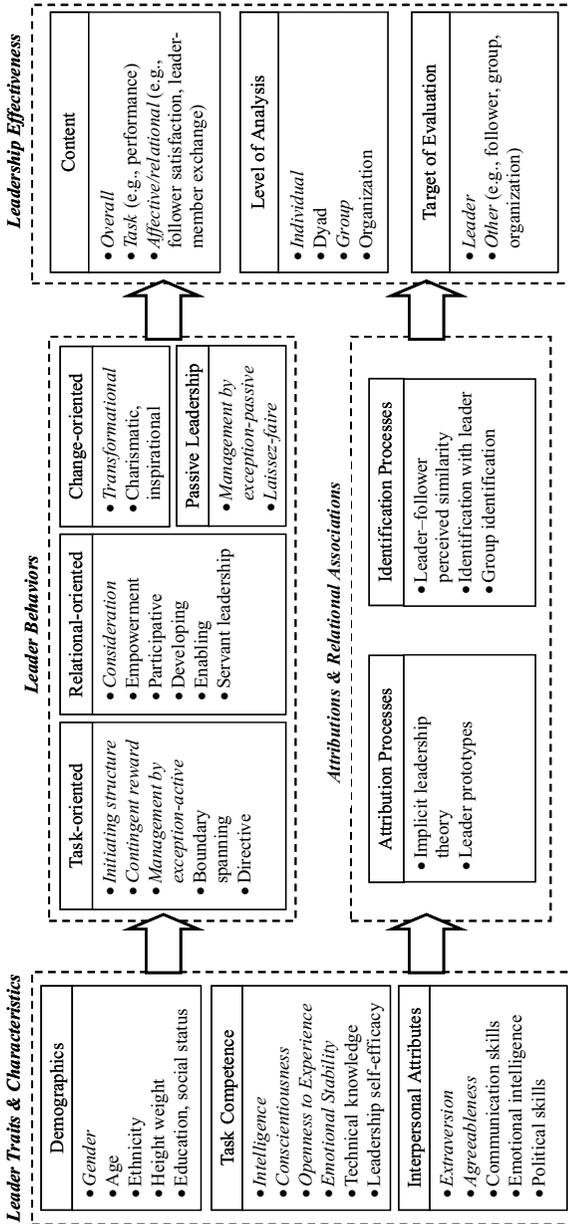


Figure 1: An Integrated Model of Leader Traits, Behaviors, and Effectiveness.

studies focus on dyadic-level relationships, group-level performance, or organizational performance (Kaiser, Hogan, & Craig, 2008). Finally, target of evaluation refers to whether the leader is the target of evaluation (e.g., leader effectiveness, satisfaction with leader) or another outcome that is within the domain of leadership effectiveness but not specific to the leader (e.g., group performance).

As Yukl (2006: 11) notes, “the selection of appropriate [leadership effectiveness] criteria depends on the objectives and values of the person making the evaluation, and people have different values. . . it is usually best to include a variety of criteria in research on leadership effectiveness.” In this study, we focus on four distinct leadership effectiveness criteria: (a) individual leader effectiveness, (b) group performance, (c) follower satisfaction with leader, and (d) follower job satisfaction. We chose these criteria for two reasons. First, we wanted to cover a range of content dimensions, levels of analyses, and targets of evaluation. Individual leader effectiveness provides an individual-level, leader-focused assessment of overall effectiveness. Group performance offers a group-level, other-focused assessment of task-related performance, and follower satisfaction (with the leader and job) provides an affective, individual-level, and other-focused assessment of leadership effectiveness. Second, given that we are using meta-analytic techniques, we can only include those criteria that have been examined across a sufficient number of studies. With these criteria, we meet both of these parameters and are able to examine the relative validity of traits and behaviors across a diverse set of important criteria.

#### *Toward an Integrated Model of Leader Traits and Behaviors*

Although prior research has established that leadership effectiveness is influenced by both leader traits and behaviors, it is not clear from this research how leader traits and behaviors complement or supplement each other, and how they can be incorporated into a more integrative model of leadership effectiveness. Based on prior reviews (Avolio et al., 2003; Bass & Bass, 2008; Yukl, Gordon, & Taber, 2002) and our own review of the literature, most leader traits can be organized into three categories: (a) demographics, (b) traits related to task competence, and (c) interpersonal attributes. Similarly, leader behaviors are often discussed in terms of whether the behavior is oriented toward (a) task processes, (b) relational dynamics, or (c) change.

Drawing on this classification scheme, we develop a conceptual framework that organizes the current literature and models how leader traits and behaviors affect leadership effectiveness (Figure 1). In this model, we incorporate a wide range of leader traits and behaviors that were identified in

our narrative review. Our empirical tests focus on a subset of these leader traits and behaviors. Specifically, we focus on those traits and behaviors that comprise most of the empirical research on leadership, and at least one trait or behavior from each major category. Although we incorporate other, less commonly studied variables in our model, these traits and behaviors have not been studied enough empirically to be included in our meta-analytic tests.

With respect to leader traits, we focus on gender, intelligence, and the Big Five personality traits (Costa & McCrae, 1992). Collectively, these leader traits span the demographic, task competence, and interpersonal dimensions. For leader behaviors, we focus on transformational leadership, specific dimensions of transactional leadership (e.g., contingent reward), initiating structure, and consideration. We also focus on leader behaviors related to passive leadership, namely laissez-faire and management by exception-passive (MBEP). For the sake of clarity, we italicize in Figure 1 those leader traits and behaviors that are examined in our empirical analyses.

Finally, an important aspect of our model is that we position leader behaviors as one possible mechanism through which leader traits influence leadership effectiveness. In some cases, it might be that leader traits and behaviors have independent effects on effectiveness, but we posit that behaviors can also serve as a key mediator in the relationship between leader traits and effectiveness. Considering that leader traits such as gender and personality are often discussed in terms of the behaviors associated with those traits, the idea that leader behaviors mediate the relationship between leader traits and effectiveness seems especially plausible. We also posit that traits impact outcomes not through actual behavior but rather by how those traits are perceived by others and the attributions that people make related to individual traits. Altogether, Figure 1 provides an integrative account of research on leader traits and behaviors, and points to possible mechanisms linking traits, behaviors, and effectiveness.

### *The Leader Trait Paradigm*

In reviewing trait theories of leadership, Bass (1990) proposed two questions: (a) Which traits distinguish leaders from other people, and (b) what is the magnitude of those differences? With respect to the first question, leadership scholars have generally examined leader traits related to demographics (e.g., gender, age, education), task competence (e.g., intelligence, Conscientiousness), or interpersonal attributes (e.g., Agreeableness, Extraversion; Bass & Bass, 2008). Unfortunately, little to no research has systematically addressed Bass' second question regarding the relative magnitude of effects across leader traits.

Understanding the relative validity of leader traits is important because traits might not be independent. For example, there are biological and sociocultural reasons for why men and women score differently on personality and intelligence (Feingold, 1994; Halpern, 1997). The biological model posits that gender differences are a function of innate differences between sexes, whereas the sociocultural model posits that social and cultural factors directly produce differences. A detailed discussion of these models is beyond the scope of this article, but it is clear that gender differences exist for both intelligence and personality (Feingold, 1994; Halpern, 1997; Hedges & Nowell, 1995). In addition, meta-analyses on the relationship between intelligence and personality suggest that Extraversion and Openness to Experience are related to intelligence (Ackerman & Heggestad, 1997; Judge, Jackson, Shaw, Scott, & Rich, 2007). This finding is especially interesting considering that Extraversion and Openness to Experience are personality traits that have been shown to have strong relationships with leadership effectiveness (Judge et al., 2002). Thus, it is likely that the effects of gender, intelligence, and personality are not independent. In the following sections, we build a theoretical case for why certain leader traits will be more predictive of leadership effectiveness than other traits. Moreover, we specify how the relative validity of leader traits will vary by leadership effectiveness criteria.

*Demographics.* Among the possible demographics of leaders, gender has received the most attention. Other demographics such as physical characteristics (e.g., height; Judge & Cable, 2004), education (Howard & Bray, 1988), and experience (Fiedler, 1970) have been examined in prior research, but the amount of research on these other demographics pales in comparison to the research on gender and leadership. Most notably, Eagly and colleagues (Eagly & Johnson, 1990; Eagly, et al., 1995, 2003) meta-analyzed the relationship between gender and leadership and found that, although men and women exhibit some differences in leadership style, men and women appear to be equally effective—thus drawing into question gender as a valid predictor of leadership effectiveness.

Based on this research, we do not expect to see differences between genders in terms of leadership effectiveness. We also propose any differences that might exist are due to confounding relationships with other leader traits such as intelligence and personality (Feingold, 1994; Halpern, 1997). Thus, when examining gender in conjunction with these other leader traits, we do not expect to observe a meaningful effect of gender on leadership effectiveness.

*Task competence.* Task competence is a general category of leader traits that relate to how individuals approach the execution and performance of tasks (Bass & Bass, 2008). Although a variety of task-related personality traits have been studied, leadership scholars most often describe

task competence in terms of four traits: intelligence, Conscientiousness, Openness to Experience, and Emotional Stability. Intelligence reflects a general factor of cognitive abilities related to individuals' verbal, spatial, numerical, and reasoning abilities, and has been established as a consistent predictor of task performance (Hunter & Hunter, 1984). With respect to intelligence and leadership, Judge et al. (2004) meta-analyzed 151 samples and found that intelligence was positively related to leadership effectiveness ( $r_c = .21$ ).

Beyond intelligence, Conscientiousness, Openness to Experience, and Emotional Stability are often used to describe how one approaches and reacts to task work (Barrick & Mount, 1991). Conscientiousness reflects the extent to which a person is dependable, dutiful, and achievement-oriented, and is often associated with deliberate planning and structure. Openness to Experience is commonly associated with being imaginative, curious, and open minded to new and different ways of working. Emotional Stability refers to a person's ability to remain calm and not be easily upset when faced with challenging tasks. In a meta-analysis of 73 independent samples, Judge et al. (2002) found that Conscientiousness ( $r_c = .16$ ), Openness to Experience ( $r_c = .24$ ), and Emotional Stability ( $r_c = .22$ ) were all positively related to leadership effectiveness.

*Interpersonal attributes.* Interpersonal attributes is a general category of leader traits that relate to how individuals approach social interactions (Bass & Bass, 2008). These traits include the interpersonal plane of personality (i.e., Extraversion, Agreeableness; Costa & McCrae, 1992), as well as skills and abilities related to social functioning (e.g., communication skills; Klimoski & Hayes, 1980). The most commonly studied interpersonal attributes of leaders are Extraversion and Agreeableness, with prior meta-analyses finding that both Extraversion ( $r_c = .24$ ) and Agreeableness ( $r_c = .21$ ) were positively related to leadership effectiveness (Judge et al., 2002).

*Relative validity of leader traits.* Research suggests that leader traits related to task competence and interpersonal attributes are important predictors of leadership effectiveness. Yet, we expect that the relative validity of these leader traits will vary depending on the effectiveness criterion. In particular, to the degree that the content of leadership effectiveness criteria focuses on execution and performance, we expect that leader traits related to task competence will be particularly important. Highly intelligent and conscientious leaders, for example, will be especially adept at ensuring their followers have sufficient role clarity, structure, and goals to help facilitate task performance. In contrast, to the degree leadership effectiveness criteria focus on affective and relational elements, we expect that the interpersonal attributes of leaders, namely Extraversion and Agreeableness, will be important. For example, leaders who are especially extraverted or

are highly agreeable are more likely to invoke strong emotional ties and build high-quality relationships with followers (Nahrgang, Morgeson, & Ilies, 2009), which should lead to improved scores on affective criteria such as follower satisfaction with the leader.

*Hypothesis 1:* Leader traits related to task competence will exhibit a stronger, positive relationship with task performance dimensions of leadership effectiveness than leaders' demographics or interpersonal attributes.

*Hypothesis 2:* Leader traits related to interpersonal attributes will exhibit a stronger, positive relationship with affective and relational dimensions of leadership effectiveness than leaders' demographics or traits related to task competence.

Following this same logic, to the degree that leadership effectiveness criteria rely on a more general or global assessment of effectiveness, we expect that leader traits related to task competence and the interpersonal attributes of the leader will both be important in predicting leadership effectiveness. This is because overall effectiveness criteria encompass the degree to which leaders facilitate task performance but also the degree to which leaders develop relationships with and consider the welfare of followers (Yukl, 2006).

*Hypothesis 3:* Leader traits related to (a) task competence and (b) interpersonal attributes will both be positively related to overall leader effectiveness and more so than demographics.

### *The Leader Behavior Paradigm*

In their narrative review of the leader behavior literature, Fleishman and colleagues (1991) identified 65 distinct classifications of leader behavior, and subsequent reviews have only further highlighted the proliferation of leader behavior typologies and theories (Avolio et al., 2003; Pearce et al., 2003). Unfortunately, new leader behavior theories continue to be conceived without explicit comparison to or falsification of existing leader behavior theories.

One consistent theme in the literature is that behaviors can be fit into four categories: task-oriented behaviors, relational-oriented behaviors, change-oriented behaviors, and what we refer to as passive leadership. In this section, we illustrate how two of the most studied theories of leader behavior, initiating structure-consideration (IS-C; Halpin, 1957; Stogdill, 1963) and transformational-transactional (T-T; Bass, 1985; Burns, 1978),

can be arranged along these behavioral dimensions. We also discuss how these theories of leader behavior overlap conceptually in ways that inform our understanding of their relative validities in predicting leadership effectiveness.

*Task-oriented behaviors.* Initiating structure and select transactional leader behaviors, namely contingent reward and management by exception-active (MBEA), represent task-oriented behaviors. Initiating structure describes behaviors such as defining task roles and role relationships among group members, coordinating group members' actions, determining standards of task performance, and ensuring group members perform up to those standards. Similarly, transactional leaders make clear what is expected in terms of task performance and the rewards for meeting those expectations (contingent rewards), anticipate task-oriented problems, and take corrective action (MBEA). Both initiating structure and contingent reward describe leaders as being clear about expectations and standards for performance, and using these standards to shape follower commitment, motivation, and behavior. Moreover, initiating structure and MBEA discuss dealing with deviations from those standards via the use of structure and routines.

*Relational-oriented behaviors.* Relative to initiating structure and transactional leadership, consideration leader behaviors describe more relational-oriented behaviors. In particular, leaders high on consideration show concern and respect for individual group members, are friendly and approachable, are open to input from others, and treat all group members as equals (Bass, 1990). Similar relational-oriented behaviors are described in research on empowering (Conger, 1989; Srivastava, Bartol, & Locke, 2006), participative (Kahai, Sosik, & Avolio, 1997), and democratic (Gastil, 1994) leadership. A common theme among these relational-oriented behaviors is that the leader acts in ways that build follower respect and encourage followers to focus on the welfare of the group. It should be noted that certain aspects of transformational leader behaviors (e.g., individualized consideration) also consist of a relational orientation, which is a point we revisit later in the manuscript. However, broadly speaking, transformational leadership is conceptualized as a set of behaviors designed to create and facilitate change in organizations, which brings us to our third category of leader behaviors.

*Change-oriented behaviors.* Leader behaviors oriented toward facilitating and driving change in groups and organizations represent a third category of leader behaviors that is conceptually distinct from task and relational-oriented behaviors. According to Yukl et al. (2002), change-oriented leader behaviors encompass actions such as developing and communicating a vision for change, encouraging innovative thinking, and risk taking. For example, transformational leaders

(inspirational motivation) focus on communicating a compelling vision for the future; in addition, transformational leaders (intellectual stimulation) seek different perspectives from group members, challenge assumptions, and take risks. These dimensions of transformational leadership conceptually distinguish it from the research on task and relational-oriented leader behaviors.

*Passive leadership.* In addition to task, relational, and change-oriented leader behaviors, many leader behavior taxonomies also include reference to leader inaction or passive leadership. For example, as part of the transactional model of leader behaviors, MBEP refers to how leaders only engage their followers when task-related problems or challenges emerge (Bass, 1990). When a problem does not exist or is not apparent to the leader, the leader does not actively engage. Similarly, a common dimension of leader behaviors is laissez-faire, which describes the absence of leader behaviors (Avolio, Bass, & Jung, 1999).

*Relative validity of leader behaviors.* These models of leader behavior, IS-C and T-T, have developed and evolved largely independent of each other. However, given the conceptual similarities between these models, there is reason to question the independence of their effects and their relative validity as predictors of leadership effectiveness. Similar to our discussion of leader traits, we expect that task-oriented leader behaviors will ensure that followers have specific goals, an established group structure with clear roles, and transparent metrics upon which to compare their performance. As a result, task-oriented leader behaviors should promote greater task productivity in follower or group performance. We also expect change-oriented leader behaviors to be important predictors of task performance. By establishing a vision for the future and challenging followers to not settle for the status quo, change-oriented leader behaviors should facilitate improvements in task productivity. Thus, to the degree that the content of leadership effectiveness criteria focuses on task execution and performance, we expect task-oriented and change-oriented leader behaviors will be important.

*Hypothesis 4:* Task-oriented and change-oriented leader behaviors will exhibit a stronger, positive relationship with task performance dimensions of leadership effectiveness than relational-oriented or passive leader behaviors.

In contrast, leaders who engage in relational-oriented behaviors are empathetic and skilled at sensing the needs of their followers; likewise, these leaders show concern for others and appeal to followers' emotions. These leader behaviors should invoke a strong interpersonal connection with followers and ultimately higher levels of follower satisfaction. Likewise, change-oriented behaviors can also enhance the attitudes and

satisfaction of followers. Prior research shows that individuals who feel that they are growing, developing, and making improvements over time feel more satisfied at work (Hackman & Oldham, 1980). We expect that change-oriented leader behaviors will enhance these feelings of growth and development. Thus, to the degree that leadership effectiveness criteria focus on affective and relational elements, we expect relational-oriented and change-oriented leader behaviors to be important.

*Hypothesis 5:* Relational-oriented and change-oriented leader behaviors will exhibit a stronger, positive relationship with affective and relational dimensions of leadership effectiveness than task-oriented or passive leader behaviors.

As noted above, global assessments of leadership effectiveness reflect a leader's ability to facilitate task performance as well as manage relationships and interpersonal concerns within the group. Therefore, task-oriented, relational-oriented, and change-oriented leader behaviors should be important predictors of overall leader effectiveness.

*Hypothesis 6:* Task-, relational-, and change-oriented leader behaviors will be positively related to overall leader effectiveness and more so than passive leader behaviors.

With respect to passive leader behaviors, namely MBEP and laissez-faire leadership, it is clear that there is a negative relationship between these leader behaviors and leadership effectiveness (Judge & Piccolo, 2004). In terms of relative (absolute) validity, however, it is unclear how these passive leader behaviors compare to more active task- and relational-oriented behaviors—and how this relative validity might differ across leadership effectiveness criteria.

Most research on leader traits and behaviors is embedded within a formal social structure whereby leaders hold formal positions that come with an expected set of role behaviors (Biddle, 1979). When leaders do not actively engage in behaviors consistent with these role behaviors, the inaction becomes symbolic (Pfeffer, 1981) and likely renders the person a nonleader in the eyes of followers. Thus, to the degree leadership effectiveness criteria focus on the leader as the target of evaluation, we expect passive leadership behaviors to be important predictors of effectiveness. Thus, we expect passive leadership to be a more important predictor for outcomes such as leader effectiveness and satisfaction with leader, as opposed to group performance or follower job satisfaction. In fact, given the importance of action in leadership, even if that action is purely symbolic (Pfeffer, 1981), we propose that passive leadership will be as important

in predicting leader effectiveness and satisfaction with leader as will the active forms of leader behaviors.

*Hypothesis 7:* In comparison to more active forms of leader behavior, the relative validity of MBEP and laissez-faire leadership will be greater for criteria that have the leader as the target of evaluation than for criteria that do not focus specifically on the leader.

*Leader Traits Versus Behaviors: A Test of Relative Validity*

Thus far, we have focused purely on the predictive validities of leader traits relative to other leader traits and leader behaviors relative to other leader behaviors. However, in order to progress toward an integrative understanding of leadership, we must simultaneously consider alternative trait and behavioral explanations. It is this direct comparison of alternative explanations of leadership effectiveness that is absent from the current literature.

We offer several theoretical explanations for why leader behaviors will have greater validity than leader traits in predicting leadership effectiveness. First, consistent with recent literature on the distal and proximal antecedents to leadership effectiveness (Van Iddekinge, Ferris, & Heffner, 2009), we submit that leader behaviors are more proximal to the act of leadership than are traits and, thus, will be more predictive of leadership effectiveness. Second, although traits reflect behavioral tendencies in people, the manifestation of those traits into behaviors can be affected by the situation. Drawing from trait activation theory (Tett & Guterman, 2000; Tett & Burnett, 2003) and related research (Mischel & Shoda, 1995), traits manifest into the expected set of behaviors only when the situation makes the need for that trait behavior salient. When situations do not call for a particular trait, the trait does not manifest and its impact on outcomes is marginalized. Given the complexity and ambiguity of leadership contexts (Pfeffer, 1977), it is likely that leadership situations vary with respect to trait relevance. In other words, leaders' traits will not always manifest in ways that impact leadership effectiveness. Contrast this with assessments of leader behavior, where the assessment measures actual, observed behavior that has already manifested during the act of leadership, and we would expect that leader behaviors will be more predictive of leadership effectiveness than leader traits.

*Hypothesis 8:* Leader behaviors will predict more variance in leadership effectiveness than leader traits.

*Traits, Behaviors, and Leadership Effectiveness: An Integrated Model*

As illustrated in Figure 1, we propose that there are two mechanisms through which individual traits affect leadership effectiveness. The first involves actual behaviors that result as a function of the leader's traits. The current literature on leadership has treated leader traits and behaviors as independent explanations of leader effectiveness. However, if leader traits and behaviors are not entirely independent, an alternative model is that leader behaviors serve as one mediational mechanism. The second mechanism through which leader traits might impact effectiveness is not through actual behavior but rather how followers attribute and identify with the leader's traits. Specifically, we propose that certain traits, especially those that are highly salient to followers, have symbolic meaning and can be the basis upon which followers make judgments about that leader that are independent of any actual behavior.

*Leaders behaviors.* The notion that leader behaviors mediate the relationship between traits and effectiveness seems especially plausible considering the conceptual and empirical links between individual traits and behaviors that are apparent in much of the personality literature (Barrick & Mount, 1993) and research on gender in leadership (Eagly & Johnson, 1990). In particular, the interpersonal attributes of leaders, such as Extraversion and Agreeableness, should predict the degree to which leaders engage in relational-oriented and change-oriented behavior. For example, extraverted individuals will be more inclined to seek input from followers, talk enthusiastically about the work, and be more comfortable setting a direction and vision for the group. Similarly, agreeable individuals will be more friendly and approachable, likely to help followers develop their strengths, and respectful to followers. All of these behaviors are akin to those articulated in the consideration and transformational theories of leader behavior.

Likewise, the traits related to task competence (intelligence, Conscientiousness, Openness to Experience, and Emotional Stability) should predict how leaders approach behaviors such as structuring task work, challenging assumptions, risk taking, and solving problems. For example, conscientious leaders, due to their preference for planned rather than spontaneous behavior, will be inclined to initiate structure in leadership contexts (Humphrey, Hollenbeck, Meyer, & Ilgen, 2007). They will also be more inclined to actively monitor and intervene when problems arise, which are behaviors associated with MBEA. Similarly, leaders who are high in Openness to Experience are more likely to monitor their environment, challenge assumptions, recognize the possible implications of external forces, and then intervene as appropriate. Finally, leaders who are emotionally stable will be more likely to remain calm, maintain order and

structure, and be more comfortable with taking risks during challenging situations.

*Hypothesis 9:* Relational-oriented and change-oriented leader behaviors will mediate the relationship between leadership effectiveness and the interpersonal attributes of leaders.

*Hypothesis 10:* Task-oriented and change-oriented leader behaviors will mediate the relationship between leadership effectiveness and leader traits related to task competence.

*Attributions and identification processes.* Drawing on leadership categorization theory (Lord, 1985) and related research on attributional and identification processes in leadership (Conger & Kanungo, 1987; Hogg, Hains, & Mason, 1998), we submit that leader traits can influence leadership effectiveness by way of attributions that followers make about the leader and perceived identification and similarity with the leader. For example, independent of leader behaviors, Cherulnik, Turns, and Wilderman (1990) found that physical appearance in terms of maturity and attractiveness influenced attributions of leadership emergence and effectiveness. Similarly, numerous studies have found that gender is an important factor in shaping followers' attributions of leadership and effectiveness (e.g., Sczesny, Bosak, Neff, & Schyns, 2004). Finally, drawing from the similarity attraction paradigm (Byrne, 1971), research has consistently shown that followers who perceive a leader to be similar to themselves report stronger identification with the leader and grant that leader more favorable evaluations (Engle & Lord, 1997; Liden, Wayne, & Stilwell, 1993; Turban & Jones, 1988).

*Hypothesis 11:* Follower attributions and identification processes will mediate the relationship between leader traits and effectiveness.

As noted earlier, we present our conceptual model of leader traits, behaviors, and effectiveness to help organize and integrate the existing literature. In our empirical analyses and hypothesis testing, we examine an exemplary set of relationships from this model. Specifically, we focus on those relationships where meta-analytic data already existed or there were sufficient primary studies for us to conduct our own meta-analyses. In some cases, such as with leader attributions and identification processes, there was insufficient data for us to examine these relationships. In our Discussion section, we return to these relationships, discuss the implications of our findings for these other variables and processes, and outline an agenda for future research that will be critical for developing a more integrative understanding of leadership.

### *Methods*

To examine these hypotheses, we use previously published meta-analytic estimates, update previously published meta-analytic estimates, and conduct our own meta-analyses of primary studies. Table 1 provides the sources of the intercorrelations among all study variables. In total, 59 studies consisting of 13 existing meta-analyses and 46 primary studies were included in our final analysis. Of the 143 bivariate relationships estimated in Table 2, 90 of the estimates were drawn from previously published meta-analyses, and 53 were estimated via our own meta-analyses of primary studies or via updating previously published meta-analyses.

The correlation matrix used as an input for our analyses (Table 2) was constructed via a two-step process. First, where meta-analytic estimates of a relationship were available, those data were used directly. In some cases, it appeared the authors of the original study had meta-analytic estimates relevant to our study that were not reported in the original meta-analysis. In such cases, we contacted the authors directly and obtained the meta-analytic estimates. Second, where previous meta-analytic estimates were published before 2003, we updated the existing meta-analyses with recent primary studies. Third, where meta-analytic estimates were unavailable, we conducted our own meta-analyses by collecting and examining primary studies.

#### *Literature Search*

To identify previous meta-analyses, we searched the online databases *PsycINFO (1887–2008)* and *Web of Science ISI (1970–2008)* using combinations of the terms *leader*, *leadership*, or *manager* with the terms *meta-analysis* or *quantitative review*. Our search was supplemented with a reference search of key articles in the area of leadership (e.g., Avolio et al., 2003; Day, 2000; Yukl, 1989). We identified 919 articles in our initial search but narrowed this down to 79 studies based on a review of the abstracts. We then examined each of these studies to determine whether the study should be included in our analysis. To be included, a study had to be a meta-analysis, contain a variable of interest per our hypotheses, and the effect size for the bivariate relationship had to be reported in the study. In some cases, we identified multiple studies that reported meta-analytic estimates for the same bivariate relationship. In these cases, we used the meta-analytic estimate that was the most recent and had the largest sample size.

For bivariate relationships where meta-analytic estimates were not already available, we conducted our own meta-analyses of primary data. To identify the relevant primary studies, an additional literature search was

TABLE 1  
Sources of Intercorrelations Among Study Variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Gender														
2. Intelligence	LI04													
3. Emotional Stability	LI05	JJ07												
4. Agreeableness	LI05	JJ07	OV96											
5. Conscientiousness	LI05	JJ07	OV96	OV96										
6. Extraversion	LI05	JJ07	OV96	OV96	OV96									
7. Openness	LI05	JJ07	OV96	OV96	OV96	OV96								
8. Initiating structure	DP86(U)	New	New	New	New	New	New							
9. Consideration	DP86(U)	New	New	New	New	New	New	JP104						
10. Transformational	EJ03	New	BJ04	BJ04	BJ04	BJ04	BJ04	New	New					
11. MBE-active	EJ03	New	BJ04	BJ04	BJ04	BJ04	BJ04	New	New	JP04				
12. MBE-passive	EJ03	New	BJ04	BJ04	BJ04	BJ04	BJ04	New	New	JP04	JP04			
13. Contingent reward	EJ03	New	BJ04	BJ04	BJ04	BJ04	BJ04	New	New	JP04	JP04	JP04		
14. Laissez-faire	EJ03	New	BJ04	BJ04	BJ04	BJ04	BJ04	New	New	JP04	JP04	JP04	JP04	
15. Leader effectiveness	EJ03	JC04	JB02(U)	JB02(U)	JB02(U)	JB02(U)	JB02(U)	JP104	JP104	JP04	JP04	JP04	PB06	JP04
16. Group performance	–	New	New	New	New	New	New	JP104	JP104	BS06	JP04	JP04	PB06	–
17. Follower job satisfaction	DP86(U)	–	New	New	New	New	New	JP104	JP104	JP04	New	New	JP04	JP04
18. Satisfaction with leader	EJ03	–	New	New	New	New	New	JP104	JP104	JP04	JP04	JP04	JP04	JP04

BJ04 = Bono and Judge (2004), BS06 = Burke et al. (2006), DP86(U) = Updated Dobbins and Platz (1986), EJ03 = Eagly, Johannesen-Schmidt, and van Engen (2003), JB02(U) = Updated Judge, Bono, Ilies, and Gerhardt (2002), JC04 = Judge et al. (2004), JJ07 = Judge, Jackson, Shaw, Scott, and Rich (2007), JP04 = Judge and Piccolo (2004), JP104 = Judge, Piccolo, and Ilies (2004), LI04 = Lynn and Irwing (2004), LI05 = Lipka (2005), OV96 = Ones, Viswesvaran, and Reiss (1996), PB06 = Podsakoff, Bommer, Podsakoff, and MacKenzie (2006).

TABLE 2  
 Meta-Analytic Estimates of Intercorrelations Among Study Variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Gender	—													
90% CI														
K, N														
2. Intelligence	.16	—												
90% CI	.15, .18													
K, N	10, 9631													
3. Emotional Stability	.24	.09	—											
90% CI	.22, .27													
k, N	4, 4746	61, 21404												
4. Agreeableness	-.11	.00	.25	—										
90% CI	-.14, -.09													
K, N	4, 4753	38, 11190	18, 3690											
5. Conscientiousness	-.09	-.04	.26	.27	—									
90% CI	-.12, -.06													
k, N	4, 4746	56, 15429	26, 5380	344, 162975										
6. Extraversion	-.10	.02	.19	.17	.02	—								
90% CI	-.13, -.07													
k, N	4, 4738	61, 21602	60, 10926	243, 135529	61, 21602									
7. Openness	.11	.22	.16	.11	.22	.17	—							
90% CI	.08, .13													
k, N	4, 4738	46, 13182	21, 4870	236, 144205	46, 13182	418, 252004								
8. Initiating structure	-.01	.14	.10	-.01	.24	.19	.02	—						
90% CI	-.02, .02	-.24, .52	-.03, .23	-.27, .25	.13, .36	.11, .26	-.16, .19							
k, N	9, 5315	2, 184	4, 635	4, 635	4, 635	4, 635	5, 843							

continued

TABLE 2 (continued)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
9. Consideration	-.02	-.07	.15	.26	.30	.33	.05	.17	—	—	—	—	—	—
90% CI	-.02, .02	-.07, —	.01, .30	-.08, .59	.20, .40	.13, .52	-.06, .16	.12, .22	—	—	—	—	—	—
k, N	9, 5315	1, 68	4, 635	4, 635	4, 635	4, 635	181, 26295	—	—	—	—	—	—	—
10. Transformational	-.06	.16	.17	.14	.13	.24	.15	.44	.71	—	—	—	—	—
90% CI	-.07, -.05	.10, .23	.14, .20	.08, .20	.08, .18	.21, .27	.08, .22	.33, .55	.62, .81	—	—	—	—	—
k, N	44, 29806	6, 826	18, 3380	20, 3916	18, 3516	20, 3692	19, 3887	10, 1308	8, 1074	—	—	—	—	—
11. MBE-Active	.07	-.08	-.02	-.11	-.02	-.03	-.04	.31	.04	.17	—	—	—	—
90% CI	.05, .09	-.18, .08	-.07, .03	-.15, -.07	-.06, .02	-.08, .02	-.08, .00	.11, .52	-.18, .26	.06, .27	—	—	—	—
k, N	16, 11993	2, 371	7, 1532	6, 1469	6, 1469	5, 1215	6, 1469	2, 84	2, 84	60, 12600	—	—	—	—
12. MBE-passive	.16	-.07	-.05	-.12	-.11	-.09	.04	-.26	-.11	-.20	-.05	—	—	—
90% CI	.15, .17	-.17, .03	-.09, -.01	-.17, -.07	-.17, -.05	-.16, -.02	.00, .08	-.26	-.11	-.30, -.10	-.23, .12	—	—	—
k, N	18, 12249	2, 371	8, 1627	7, 1564	7, 1564	6, 1310	7, 1564	1, 50	1, 50	50, 10928	13, 2762	—	—	—
13. Contingent reward	-.08	.11	.10	.17	.02	.14	.03	.28	.58	.80	.19	-.05	—	—
90% CI	-.09, -.06	.01, .21	.04, .16	.06, .28	-.02, .06	.09, .19	-.01, .07	.07, .48	.40, .76	.78, .83	.07, .31	-.21, .11	—	—
k, N	21, 15227	2, 371	7, 1532	7, 1622	6, 1469	5, 1215	6, 1469	2, 84	2, 84	87, 22369	20, 4795	17, 4253	—	—
14. Laissez-faire	.09	-.16	-.05	-.12	-.11	-.09	.04	-.30	-.47	-.65	-.05	.24	-.038	—
90% CI	.08, .11	-.26, .06	-.09, -.01	-.17, -.07	-.17, -.05	-.16, -.02	.00, .08	-.43, -.16	-.59, -.34	-.73, .57	-.76, -.26	.09, .39	-.45, -.32	—
k, N	16, 12947	2, 371	8, 1627	7, 1564	7, 1564	6, 1310	7, 1564	2, 186	2, 186	25, 5674	5, 1075	3, 690	6, 1293	—
15. Leader effectiveness	-.03	.15	.24	.08	.28	.31	.24	.39†	.52†	.64†	.21	-.019	.51	-.054
90% CI	-.06, .01	.11, .19	.23, .26	.07, .10	.26, .29	.30, .32	.22, .26	—	—	—	.11, .31	-.37, -.01	.43, .59	-.68, -.40
k, N	10, U	34, 3369	51, 8960	45, 10507	39, 10056	63, 12640	39, 7762	20, 1960	20, 1605	27, 5415	14, 2117	8, 2627	26, 4418	11, 1920
16. Group performance	—	.04	-.03	.20	.31	.00	.13	.35†	.28†	.38	.16	-.018	.24	—
90% CI	—	-.07, .16	—	-.02, .41	.13, .49	-.17, .17	-.05, .32	—	—	.32, .44	.06, .26	-.29, -.08	.15, .33	—
k, N	—	6, 291	1, 50	2, 84	5, 203	3, 135	2, 117	17, 1242	11, 1019	25, 1291	7, 1180	5, 1115	19, 1361	—
17. Follower job satisfaction	-.04	—	.02	.01	-.08	.07	.00	.22†	.46†	.58†	.02	-.031	.64	-.028
90% CI	-.03, .03	—	-.10, .13	-.15, .17	-.19, .03	-.04, .18	-.11, .11	—	—	—	-.18, .22	-.48, -.15	.47, .80	-.44, -.12
k, N	8, 3824	—	2, 300	2, 300	2, 300	2, 300	2, 300	72, 11374	18, 5279	3, 414	3, 414	6, 1933	2, 392	—
18. Satisfaction with leader	.00	—	.08	.22	-.03	.03	.03	.33†	.78†	.71†	.24	-.014	.55	-.058
90% CI	-.03, .03	—	.02, .15	.11, .33	-.09, .03	-.03, .09	-.07, .13	—	—	—	.11, .36	-.37, .10	.44, .67	-.79, -.37
k, N	7, U	—	3, 1078	2, 300	3, 1078	3, 1078	3, 400	49, 8070	49, 7871	23, 4349	11, 2272	8, 3255	14, 4076	5, 838

Note. †Confidence interval of correlation does not cross zero.

U = sample size unspecified in the original meta-analysis.

conducted using *PsycINFO* (1887–2008) and *Web of Science ISI* (1970–2008). The search terms used to identify primary studies for each bivariate relationship where meta-analytic estimates were not available included the following key words: *gender, cognitive ability, intelligence, mental ability, Big Five, five factor model, Openness, Emotional Stability, Neuroticism, Agreeableness, Conscientiousness, Extraversion, extroversion, introversion, initiating structure, consideration, transformational, management by exception, contingent reward, laissez-faire, group performance, group effectiveness, team performance, team effectiveness, satisfaction, leadership, leader, and manager*. Our searches yielded 729 articles, which were reviewed for inclusion in the meta-analysis.

### *Procedures for Meta-Analytic Estimates*

We created a comprehensive list of codes for the variables reported across all studies. The studies were divided among the authors who then coded the meta-analytic estimates for the variables of interest from each study. When an individual was not clear about what code to assign to a specific variable, the authors reviewed the study and discussed the variable in question until consensus was reached regarding the appropriate code.

Where possible, we coded the meta-analytic estimate that had been corrected for measurement error in both the predictor and criterion scores. For some relationships, a corrected meta-analytic estimate was not available (e.g., gender–personality). In these cases, we took the uncorrected meta-analytic estimate and corrected for measurement error based on existing reliability data. For example, for the gender–personality relationships, we corrected for error in the measurement of the personality dimensions using existing reliability data from the NEO Manual (Costa & McCrae, 1992). We assumed perfect reliability in the measurement of gender.

Some studies selected for inclusion reported effects in terms of the statistics rather than correlations. For these studies, the data were transformed from effect sizes into correlations (see Lipsey & Wilson, 2001). We also coded the 90% confidence interval from previous meta-analyses based on information provided in the meta-analyses. For 11 relationships (e.g., initiating structure–leader effectiveness), the previous meta-analyses did not provide enough information for us to calculate the 90% confidence interval but did indicate that the 90% confidence interval did not cross zero. We have noted this in Table 2.

For meta-analytic estimates that were published before 2003, we updated the estimates using procedures outlined by Schmidt and Raju (2007). For conducting our own meta-analyses of primary studies, we used the Schmidt–Hunter psychometric meta-analysis method (Hunter & Schmidt,

2004). We first corrected the primary estimates for measurement error in both the predictor and criterion scores. The majority of primary studies provided the reliabilities of the measured scores. However, for studies missing this coefficient, we used the average reliability coefficient from the other studies also reporting data for those variables of interest (Hunter & Schmidt, 2004) or from publishers of the measures (e.g., NEO Manual; Costa & McCrae, 1992). For each of these estimates, we calculated 90% confidence intervals using a random effects estimate of the standard error of the mean corrected correlation (Burke & Landis, 2003). All of the primary studies used in our meta-analysis are marked with an asterisk in the reference section.

#### *Testing Relative Importance and Validity*

To determine the relative importance of predictors, researchers often examine regression coefficients or zero-order correlations with the criterion. When predictors are uncorrelated, these indices are appropriate because they are equivalent, and the squares of the indices sum to  $R^2$ . Thus, relative importance can be expressed as the proportion of variance each variable explains. When predictor variables are correlated, however, these indices are considered inadequate for determining the relative importance of predictor variables because the indices are no longer equivalent, do not sum to  $R^2$ , and take on different meanings (Budescu, 1993; Johnson, 2001; Tabachnick & Fidell, 2001).

The use of epsilon is one way of determining relative importance when predictors are correlated (Johnson, 2000). The estimates derived from epsilon, often labeled relative weights, sum to the model  $R^2$ . Thus, the relative weights represent the proportionate contribution each predictor makes to  $R^2$ , considering the predictor's direct effect and its effect when combined with other predictors. Researchers can also calculate the percentage of  $R^2$  explained by each predictor by dividing the relative weight of each predictor by the total  $R^2$ . Because of these attributes, epsilon is the preferred statistic for computing relative importance (Johnson & LeBreton, 2004; LeBreton, Binning, Adorno, & Melcher, 2004). Thus, we use the epsilon statistic in the current study to examine the relative predictive validity of leader traits and behaviors.

#### *Testing the Full Model*

For testing Hypotheses 9–10, we utilized EQS 6.1 (Bentler, 1995) to model the relationships among the leader traits, leader behaviors, and leadership effectiveness. We created a complete mediation model, which

tested the extent to which the leader traits were completely mediated by the leader behaviors specified in the hypotheses.

After examining the results of this model, we also used a fully saturated model where the leader traits were directly related to all of the leader behaviors and leadership effectiveness, whereas the leader behaviors were also directly related to leadership effectiveness. We chose to use a fully saturated model because doing so allowed us to examine the extent to which all leader traits were mediated by each behavior. Using this approach, we were able to identify any nonhypothesized relationships that should be explored in future research. Because the model is fully saturated, the model fit statistics are not informative and thus are not reported.

### *Results*

Table 2 provides the meta-analytic estimates of the intercorrelations among the study variables. In this table, we present several pieces of information about the population correlation estimates, including the corrected correlation ( $r_c$ ) estimates, the 90% CI for the corrected correlation ( $r_c$ ), the number of studies included in determining the correlation ( $k$ ), and the total number of participants in the studies ( $n$ ). It is important to note that a few of our estimated effects are based on a relatively small number of studies (e.g., the relationship between intelligence and leader behaviors). Although other meta-analyses both inside and outside of the leadership domain have relied on similar numbers of original studies (e.g., Baas, De Dreu, & Nijstad, 2008; Balkundi & Harrison, 2006; Bono & Judge, 2004; De Dreu & Weingart, 2003; Gerstner & Day, 1997; Ng & Feldman, 2009), it is important that we address this potential threat to the validity of our results. To address this concern for the relationships where we claim statistical support, we conducted a series of fail-safe  $k$  analyses, which indicate how many similarly sized studies with null findings would need to be conducted before the estimated effect would lose statistical support (Hunter & Schmidt, 2004). The average fail-safe  $k$  for the relationships between leader traits and effectiveness outcomes is 145, 186 for the relationships between leader behaviors and effectiveness outcomes, and 26 for the intercorrelations between leader traits and behaviors. Based on these results, a substantial number of studies with null findings would have to be conducted before our reported effects would lose statistical support.

### *Testing Relative Validity*

Hypotheses 1–3 were concerned with the relative validity of leader traits. Table 3 presents the direction of the relationship (positive or negative) and the percentage of  $R^2$  explained by the specific leader trait for

TABLE 3  
*Relative Importance of Leader Traits in Predicting Leadership Effectiveness Outcomes*

Leader traits	Leader effectiveness		Group performance		Follower job satisfaction		Satisfaction with leader	
	+/-	% $R^2$	+/-	% $R^2$	+/-	% $R^2$	+/-	% $R^2$
Gender	-	1.4			-	13.6	Null	0.4
Intelligence	+	8.2	+	1.5				
Emotional Stability	+	14.3	-	7.6	+	7.2	+	7.4
Agreeableness	+	.9	+	22.0	+	1.8	+	81.0
Conscientiousness	+	27.0	+	61.5	-	50.6	-	9.4
Extraversion	+	35.1	Null	.3	+	25.9	+	0.6
Openness to Experience	+	13.2	+	7.1	Null	1.0	+	1.2
Total $R^2$		.22		.14		.02		.06

each leadership effectiveness criteria. Overall, leader traits explain between 2% and 22% of the variance in leadership effectiveness criteria. For group performance, a task performance dimension of leadership effectiveness, the most important predictor is Conscientiousness, which is positively related to group performance and accounts for 61.5% of the total explained  $R^2$ . This percentage is almost three times that of the next most important predictor of Agreeableness, which accounts for 22.0% of total explained  $R^2$ . Overall, the leader traits explain 14% of the variance in group performance, and traits related to task competence account for 77.7% of the total explained  $R^2$ . Thus, Hypothesis 1 was supported.

For the affective and relational dimensions of leadership effectiveness, Extraversion and Agreeableness are both positively related to follower job satisfaction and account for 25.9% and 1.8% of total explained  $R^2$ , respectively, whereas Conscientiousness accounts for 50.6% of total explained  $R^2$ . Leader traits only explain 2% of the total variance in follower job satisfaction, and interpersonal attributes account for only 27.7% of the total explained variance. For satisfaction with leader, Agreeableness is the most important trait predictor, is positively related to satisfaction with leader, and accounts for 81.0% of total explained  $R^2$ . Overall, leader traits explain 6% of the variance in satisfaction with leader, with traits related to interpersonal attributes accounting for 81.6% of the total explained  $R^2$ . Thus, Hypothesis 2 was supported for follower satisfaction with leader but not follower job satisfaction.

Finally, for overall leader effectiveness, the most important leader traits are Extraversion and Conscientiousness. These traits, which span across task competence and interpersonal attributes, are both positively related to effectiveness and account for 35.3% and 27.6% of the total explained  $R^2$ , respectively. In total, leader traits explain 22% of the variance in overall leader effectiveness, and traits related to task competence and interpersonal attributes explain 98.6% of the total explained  $R^2$ . Thus, Hypothesis 3 was supported.

Hypotheses 4–7 were concerned with the relative validity of leader behaviors. As shown in Table 4, leader behaviors explain between 20% and 70% of the variance in leadership effectiveness criteria. The most important leader behavior for predicting group performance is initiating structure, which is positively related to group performance and accounts for 32.9% of total explained  $R^2$ . Combined with contingent reward and MBE-active, which are also positively related to group performance, task-oriented leader behaviors account for 47.6% of total explained variance. Next, change-oriented transformational leader behaviors account for 28.5% of the total explained variance in group performance. In contrast, consideration behaviors and passive leader behaviors account for 16.6% and 7.3% of total explained variance, respectively. Thus, Hypothesis 4 was

TABLE 4  
*Relative Importance of Leader Behaviors in Predicting Leadership Effectiveness Outcomes*

Leader behaviors	Leader effectiveness		Group performance		Follower job satisfaction		Satisfaction with leader	
	+/-	% $R^2$	+/-	% $R^2$	+/-	% $R^2$	+/-	% $R^2$
Initiating structure	+	12.9	+	32.9	+	2.5	+	4.8
Consideration	+	19.5	+	16.6	+	13.6	+	44.9
Transformational	+	22.8	+	28.5	+	21.0	+	19.8
MBE-active	+	3.0	+	5.7	+	1.1	+	3.3
MBE-passive	-	2.3	-	7.3	-	14.1	-	0.6
Contingent reward	+	17.4	+	9.0	+	43.9	+	12.0
Laissez-faire	-	22.1	-		-	3.8	-	14.6
Total $R^2$		.47		.20		.51		.70

supported in that task and change-oriented behaviors were most important for performance-related criteria, whereas relational-oriented and passive leader behaviors were less important predictors of group performance. In total, leader behaviors explain 20% of the variance in group performance.

For follower job satisfaction, contingent reward is the most important behavioral predictor, accounting for 43.9% of total explained  $R^2$ . Transformational and consideration behaviors are positively related to follower job satisfaction and explain 21.0% and 13.6% of total variance in follower job satisfaction, respectively. In comparison, passive leader behaviors (MBE-passive, laissez-faire) combine to account for 17.9% of total variance explained. Overall, leader behaviors explain 51% of the variance in follower job satisfaction. In predicting satisfaction with leader, consideration leader behaviors account for 44.9% of total variance explained, whereas transformational behaviors account for 19.8% of total variance explained. Collectively, task-oriented and passive leader behaviors account for 20.1% and 15.2% of total explained variance. In total, leader behaviors explain 70% of the variance in satisfaction with leader. Thus, Hypothesis 5, which predicted that relational-oriented behaviors would be most important for affective criteria, was supported for follower satisfaction with leader but not follower job satisfaction.

Finally, task-oriented leader behaviors are positively related to overall leader effectiveness and account for 33.3% of total explained  $R^2$ . Transformational and consideration behaviors are also positively related to overall leader effectiveness and account for 22.8% and 19.5% of total explained  $R^2$ , respectively. Passive leader behaviors are negatively related to leader effectiveness and explain 24.4% of total explained  $R^2$ . In total, leader behaviors explain 47% of the variance in leader effectiveness. Thus, Hypothesis 6 was supported in that task, relational, and change-oriented leader behaviors were important predictors of overall leader effectiveness.

For leader effectiveness and satisfaction with leader, which both have the leader as the target of evaluation, passive leader behaviors account for 24.4% and 15.2% of total explained  $R^2$ , respectively. For criteria that do not focus specifically on the leader, passive leader behaviors account for 7.3% and 17.9% of total explained variance in group performance and follower job satisfaction, respectively. In general, the portion of total variance explained by passive leader behaviors is less than the variance explained by more active leader behaviors. Thus, although there is evidence suggesting that laissez-faire behaviors are an important predictor of leader-centric criteria, Hypothesis 7 was generally unsupported.

Table 5 provides the results of our analyses examining the relative importance of leader traits and behaviors concurrently. In Hypothesis 8, we predicted leader behaviors would be more predictive of leadership effectiveness than leader traits. Combined, leader traits and behaviors

TABLE 5  
*Relative Importance of Leader Traits and Behaviors in Predicting Leadership Effectiveness Outcomes*

Leader traits and behaviors	Leader effectiveness		Group performance		Follower job satisfaction		Satisfaction with leader	
	+/-	% $R^2$	+/-	% $R^2$	+/-	% $R^2$	+/-	% $R^2$
Gender	+	.3			-	.2	+	0.1
Intelligence	+	1.2	+	.4				
Emotional Stability	+	3.9	-	4.7	+	.2	+	0.4
Agreeableness	+	1.0	+	9.1	+	1.3	+	3.3
Conscientiousness	+	6.0	+	17.9	-	3.7	-	6.3
Extraversion	+	7.0	Null	2.3	+	.7	+	4.3
Openness to Experience	+	6.2	+	3.3	Null	.2	+	.5
Initiating structure	+	7.8	+	19.6	+	3.0	+	6.3
Consideration	+	11.9	+	8.4	+	15.5	+	41.7
Transformational	+	14.5	+	19.6	+	17.7	+	15.1
MBE-active	+	2.8	+	4.4	+	1.5	+	2.4
MBE-passive	-	1.7	-	4.1	-	13.6	-	0.5
Contingent reward	+	15.8	+	6.3	+	38.7	+	8.3
Laissez-faire	-	20.0			-	3.7	-	10.7
Total $R^2$		.58		.31		.56		.92

explain between 31% and 92% of the variance in leadership effectiveness criteria. For leader effectiveness, leader behaviors account for 74.5% of total explained  $R^2$ . In total, leader traits and behaviors explain 58% of the variance in leader effectiveness. For group performance, leader behaviors account for 62.4% of total explained  $R^2$ . Overall, leader traits and behaviors explain 31% of the variance in group performance. For follower job satisfaction, leader behaviors account for 93.7% of total explained  $R^2$ . Overall, leader traits and behaviors explain 56% of the variance in follower job satisfaction. Finally, leader behaviors account for 85.0% of total explained  $R^2$  in satisfaction with leader. Together, leader traits and behaviors explain 92% of the variance in satisfaction with leader. Thus, Hypothesis 8 was supported.

### *Testing an Integrated Model*

Hypothesis 9–11 predicted the validity of an integrated model whereby leader behaviors and follower attributions and identification processes mediate the relationship between leader traits and the four leadership effectiveness criteria. Because there was insufficient data on follower attributions and identification, we were unable to test Hypothesis 11.

Table 6 presents the path coefficients for the completely mediated model. First examining Hypothesis 9 (i.e., relational and change-oriented behaviors will mediate the effect of interpersonal traits), we find that Agreeableness was mediated by consideration (but not transformational) behaviors, whereas Extraversion was mediated by both consideration and transformational behaviors. Thus, the results show partial support for Hypothesis 9.

Turning to Hypothesis 10, which predicted that task and change-oriented leader behaviors would mediate the effect of task competence-related leader traits, the results demonstrate that the effect of intelligence on leadership effectiveness was mediated by initiating structure, transformational leadership, and contingent reward. Similarly, Conscientiousness was mediated by initiating structure and transformational leadership. In contrast, Emotional Stability was only mediated by contingent reward, whereas openness was only mediated by initiating structure. Thus, the results show partial support for Hypothesis 10.

We next examined a fully saturated model relating all of the traits in our model to all of the behaviors and ultimately leadership effectiveness. Examining a fully saturated model allows us to observe the full extent to which leader behaviors mediate the relationships between leader traits and effectiveness, as well as identify nonhypothesized relationships that are present in our data. Table 7 presents the direct, indirect, and total effects for the full model among leader traits, behaviors, and leadership

TABLE 6  
*Path Coefficients for Hypothesized Completely Mediated Model*

Variable	Initiating structure	Consideration	Transformational	MBE-active	Contingent reward	Leadership effectiveness
Intelligence →	.164 (.100, .228)		.142 (.078, .206)	-.044 (-.111, .023)	.104 (.037, .171)	
Emotional Stability →	.031 (-.033, .095)		.074 (.010, .138)	-.008 (-.075, .059)	.091 (.024, .158)	
Agreeableness →		.210 (.147, .273)	.058 (-.006, .122)			
Conscientiousness →	.256 (.192, .320)		.086 (.022, .150)	-.014 (-.081, .053)	.002 (-.065, .069)	
Extraversion →		.294 (.231, .357)	.203 (.139, .267)			
Openness to Experience →	-.077 (-.141, -.013)		.047 (-.017, .111)	-.026 (-.093, .041)	-.008 (-.075, .059)	.121 (.072, .170)
Initiating structure →						.157 (.106, .208)
Consideration →						.497 (.446, .548)
Transformational →						.087 (.036, .138)
MBE-active →						-.049 (-.100, .002)
Contingent reward →						

*Note.* Statistics provided are path coefficients with 90% confidence intervals in parentheses.



effectiveness. The direct effect reflects the variance explained by each leader trait through some mechanism other than leader behaviors, whereas the indirect (mediated) effect represents the variance explained by leader behaviors in the relationship between leader traits and leader effectiveness. The total effect is the summation of the direct and indirect effects.

In terms of nonhypothesized effects that emerged from the fully saturated model, the most striking finding was the extent to which laissez-faire leader behaviors mediated the relationship between leader traits and leadership effectiveness. For example, laissez-faire explained almost half of the variance in the relationships for gender and intelligence with leadership effectiveness, and to a lesser extent Agreeableness and Openness to Experience. In addition, contingent reward was one of the strongest mediators of Agreeableness and Extraversion.

### *Discussion*

In this study, we addressed the lack of integration in the leadership literature by meta-analytically examining the relative predictive validity of leader traits and behaviors across a range of leadership effectiveness criteria. In addition, we developed and tested an integrated trait-behavioral model of leadership. Within the trait paradigm, leader traits predicted affective and relational criteria more so than performance-related criteria. Although there was variation across the criteria, Conscientiousness was the most consistent trait predictor of leadership effectiveness. Within the behavioral paradigm, transformational leadership was the most consistent predictor across the criteria. Other behaviors contributed to effectiveness, but their relative validity was contingent on the particular outcome of interest. Overall, we found that leader behaviors had a greater impact on leadership effectiveness criteria than did leader traits.

Our results provide support for an integrated trait-behavioral model of leadership effectiveness. In general, leader traits associated with task competence related to task-oriented leader behaviors, which improve performance-related leadership outcomes. In contrast, leaders' interpersonal attributes were associated with relational-oriented behaviors, which improve affective criteria such as follower satisfaction with leader. As predicted, both task competence and interpersonal attributes predicted, at least marginally, leaders' change-oriented behaviors. Finally, passive leader behaviors were negatively associated with effectiveness and mediated some of the key relationships.

### *Theoretical Implications*

The results of this study provide some confirmation that the leadership literature suffers from construct proliferation. Our narrative review

revealed that many supposedly distinct leadership traits and behaviors overlap theoretically and empirically. In fact, our findings indicate that certain leader traits and behaviors lose much of their predictive validity when considered in conjunction with other leadership traits and behaviors. These findings have three implications for leadership research.

First, as leadership scholars, we must commit to integrating our research both within and across research paradigms. For example, behavioral theories of leadership should include discussions and empirical tests of which traits contribute to individuals being especially adept at the specified leadership behaviors. The second implication is that the bar for the acceptance of “new” leadership theories needs to be raised. Proponents of a new leadership theory should explicitly compare and contrast their theory with existing theories and design empirical tests to demonstrate that an emerging theory of leadership explains incremental variance in leadership effectiveness. Far from inhibiting future leadership research, such an approach would highlight the specific contribution of a new theory, prevent construct proliferation, and allow the body of knowledge on leadership to accumulate more efficiently. Finally, given the empirical similarities between leader behaviors found in this study, we encourage scholars to develop new or revise existing measures of leader behaviors such that we can better capture the conceptual distinctions among leader behaviors.

Based on our findings, one area that is especially in need of integration is the conceptualization and measurement of transformational leadership. Consistent with original theories of transformational leadership (Bass, 1985), we initially conceptualized transformational leadership as a change-oriented behavior. However, our results clearly indicate that transformational leadership has a significant relational component to it and overlaps conceptually and empirically with both initiating structure and consideration. For example, both consideration and transformational (individualized consideration) describe behaviors such as showing concern and respect for followers, looking out for follower welfare, and expressing appreciation and support (Bass, 1990). In addition, transformational leaders (idealized influence) focus on the interests of the group and act in ways that build follower respect, which is akin to how considerate leaders focus on the welfare of the group and treat all group members as their equal. These conceptual similarities are mirrored in the measures most commonly used to assess consideration and transformational leadership (see Table 8). Likewise, there are also strong similarities between measures for the two task-oriented leader behaviors, initiating structure and transactional leadership. Although the LBDQ and MLQ are popular measures of leader behaviors, our empirical data strongly suggest that these and other existing measures are

TABLE 8  
*Measurement of Task and Relational-Oriented Leader Behaviors*

	Initiating structure-consideration (LBDQ; Halpin, 1957)	Transformational-transactional (MLQ; Bass & Avolio, 1995)
Task-oriented leader behavior	<p>Initiating structure</p> <ul style="list-style-type: none"> <li>• Asks group members to follow standard rules and regulations</li> <li>• Assigns group members to particular tasks and roles</li> <li>• Maintains definite standards of performance and criticize mistakes</li> </ul>	<p>Transactional</p> <ul style="list-style-type: none"> <li>• Clarifies performance targets and who is responsible for achieving those targets (contingent reward)</li> <li>• Focuses on mistakes and deviations from performance standards (management by exception-active)</li> </ul>
Relational-oriented leader behavior	<p>Consideration</p> <ul style="list-style-type: none"> <li>• Finds time to listen to group members</li> <li>• Treats group members as his/her equal</li> <li>• Looks out for the personal welfare of individual group members</li> <li>• Consults the group when making decisions</li> <li>• Gets group approval in important matters before going ahead</li> </ul>	<p>Transformational</p> <ul style="list-style-type: none"> <li>• Emphasizes the greater good of the group and acts in ways that build respect (idealized influence)</li> <li>• Considers the needs and aspirations of individuals, and looks after the welfare of group members (individualized consideration)</li> </ul>
Change-oriented leader behavior		<p>Transformational</p> <ul style="list-style-type: none"> <li>• Obtains input from group members when solving problems (intellectual stimulation)</li> <li>• Develops and communicates a compelling vision for the future (inspirational motivation)</li> </ul>

*Note.* Actual survey items not replicated here due to copyright restrictions.

limited in their ability to distinguish between different categories of leader behaviors.

Our finding that leader behaviors tend to predict more variance across a variety of effectiveness criteria than do leader traits also provides guidance for future researchers. Specifically, our results suggest that although having certain traits may predispose individuals to certain behaviors, behaviors are the more important predictor of leadership effectiveness. Given that behaviors can be learned and developed, this finding highlights the need for more research on what individuals and organizations can do to develop leaders' ability to exhibit such behaviors (e.g., Day, 2000; DeRue & Wellman, 2009; Dragoni, Tesluk, Russel, & Oh, 2009). In particular, one question that scholars might ask is whether different leadership behaviors require different approaches to learning and development.

Finally, we encourage scholars to explore a variety of meditational mechanisms and effectiveness criteria. Our results indicate that leader behaviors mediate the effect of some leader traits but not others. Moreover, even when behaviors do mediate the effect of leader traits on leadership effectiveness, that mediation is far from complete. One way to extend our model would be to specify mechanisms that explain the effect of leader traits such as Emotional Stability, which influence effectiveness but not through the behaviors specified. In addition, our results suggest that the nature of the leadership effectiveness criteria plays an important role in determining which traits and behaviors are most important. For example, highly extraverted leaders achieve superior effectiveness scores as rated by others, but Extraversion has little influence on group performance. Based on these findings, scholars should be wary about drawing wide-ranging conclusions about leadership effectiveness, especially if those conclusions are based on narrowly defined criteria.

### *Practical Implications*

Understanding the relative importance of specific leader traits and behaviors as predictors of leadership effectiveness can help organizations improve their leader selection and development practices. Although contemporary organizations use a wide variety of trait-based assessments for leader selection (Dobbins & Platz, 1986; Fulmer & Conger, 2004; Phillips & Schmidt, 2004), our results suggest that the traits of Conscientiousness, Extraversion, and Agreeableness are particularly important predictors of success in leadership positions. Individuals who are high in Conscientiousness and Extraversion are more likely to be evaluated as effective leaders, and individuals high in Conscientiousness and

Agreeableness tend to improve the performance of the groups they lead. Although we acknowledge that there are traits not included in this study (e.g., motivation to lead; Chan & Drasgow, 2001) that could likely also be used to select effective leaders, our data suggest that organizations might benefit by focusing on certain key aspects of personality, rather than gender or intelligence, when selecting individuals for leadership roles.

In addition, our findings can stimulate and guide organizational leadership development programs. Day (2000) reviews a variety of practices, such as 360-degree feedback, mentoring, networks, job assignments, and action learning, that can shape the behavior of individuals in leadership positions and hence serve as the building blocks of leadership development. Although a further review of these practices is outside the scope of this study, we draw on our findings regarding leadership behaviors to make two suggestions about the appropriate content for leadership development programs.

First, our results suggest that leadership development programs should emphasize the importance of actively and assertively occupying the leadership role. The large negative relationship we found between passive leadership behaviors and effectiveness suggests that even engaging in suboptimal leadership behaviors is better than inaction. Thus, leadership development initiatives should encourage individuals to proactively assume their leadership responsibilities rather than passively waiting to act until problems develop. Development programs that encourage individuals to see themselves as leaders should help facilitate leadership action (DeRue, Ashford, & Cotton, 2009). Moreover, considering that passive leadership was often the strongest mediator of the leader trait-effectiveness relationship, leadership development programs will have to actively work to overcome the *laissez-faire* tendencies associated with specific traits.

Second, our results suggest that leadership development programs should touch on all three dimensions of leadership behavior: task, relational, and change. Effective leaders must successfully plan and schedule work (task-oriented behaviors), support and help their followers (relational-oriented behaviors), and encourage and facilitate change (change-oriented behaviors). Based on our results, leader behaviors that focus on one of these dimensions are predictive of certain effectiveness criteria but not others. In contrast, transformational leadership, which seems to span across relational- and change-oriented behaviors, was a relatively strong predictor across all effectiveness criteria. We recommend that organizations design their development programs such that each dimension of leader behavior is sufficiently covered and promoted.

*Strengths and Limitations*

Our study has several limitations that should be noted. Because a sufficient number of primary studies are needed to obtain a meta-analytic estimate, we were limited by the extant body of leadership research. Specifically, we could not test all of the components of our conceptual model due to a lack of research on specific leader traits, behaviors, and attributional processes. For example, we were forced to omit behavioral leadership theories such as ethical leadership (Brown, Trevino, & Harrison, 2005), servant leadership (Greenleaf, Spears, & Covey, 2002), and empowering leadership (Arnold, Arad, Rhoades, & Drasgow, 2000), as well as research on attribution-based accounts of leadership (e.g., implicit leadership theory; Lord, 1985).

Another limitation is that we rely on a hierarchical, leader-centric view of leadership, which is necessary considering that most of the existing research assumes that leadership is structured as a top-down, hierarchical process. In contrast, recent theories of leadership have conceptualized the concept as a collective process that gets enacted through mutual influence among social actors at all levels of a group or organization (Day, Gronn, & Salas, 2004; Pearce & Conger, 2003; Morgeson, DeRue, & Karam, 2010). Moreover, existing research frequently approaches leadership as a singular, undifferentiated effect. Yet, recent research has begun to examine how the effect of the leadership traits and behaviors discussed herein differ across followers (Wu, Tsui, & Kinicki, 2010), across organizations (Aime, Johnson, Ridge, & Hill, 2010), and across jobs (Morgeson & Humphrey, 2008). We encourage leadership scholars to continue pursuing this line of research but also to explicitly compare and contrast these emerging forms of leadership with the traditional, hierarchical view of leadership so that we continue to move toward an integrative understanding of leadership processes in organizations.

A final limitation of this study is that we were not able to explore boundary conditions that might apply to our integrated trait-behavioral model. We recognize there may be situational factors that moderate the effect of traits and behaviors on the various leadership effectiveness outcomes, particularly in light of how traits and behaviors impact behavior in the presence of specific critical roles (Humphrey, Morgeson, & Mannor, 2009). This is evident in contingency theories of leadership (e.g., Fiedler, 1967; Hersey & Blanchard, 1969; House & Mitchell, 1974), although it is worth noting that empirical support for existing contingency approaches has been weak (Avolio et al., 2003; Graeff, 1997; Vroom & Jago, 2007). Based on our model and findings, we highlight two boundary conditions that seem relevant. First, interactionist approaches to the study of personality (Mischel & Shoda, 1995; Tett & Burnett, 2003) suggest that aspects

of the work context can “activate” the expression of a given trait by suggesting that behaviors associated with that trait are necessary, appropriate, and desirable. Thus, the relationship between leader traits, namely personality, and leadership behaviors and effectiveness would be expected to be influenced by the structure of work (Humphrey, Nahrgang, & Morgeson, 2007) and, therefore, should be strongest when the situation calls for that particular trait to be activated. Second, we expect time to be an important moderator. For example, the amount of prior experience followers have with leaders should be important for determining the relative validity of leader traits and behaviors. For relatively “new” leadership relationships, the impact of traits on outcomes will most likely be mediated by attributions and identification processes. Over time, followers will have more exposure to leaders’ behaviors, and thus behaviors will likely become a more important explanation for the effect of leader traits on effectiveness.

Beyond these limitations, this study also has several strengths that bolster its contribution to the current literature. First, this study represents the most comprehensive meta-analysis of the leadership literature to date. Whereas other meta-analyses have focused within the trait (e.g., Judge et al., 2002, 2004) or behavioral (Judge & Piccolo, 2004; Judge, Piccolo, & Ilies, 2004) paradigm, our study is the first to span across and compare leadership paradigms. Second, our study examines the relative validity of leader traits and behaviors across a wide range of effectiveness criteria and, in contrast to prior studies, develops theory for and tests how the nature of the criterion influences substantive relationships. Finally, our study directly responds to calls for more integrative approaches to the study of leadership (Avolio, 2007) and, given our findings, provides the motivation for such research.

### *Concluding Remarks*

This study integrates popular trait and behavioral perspectives of leadership and tests how different traits and behaviors combine to predict leadership effectiveness criteria. Our hope is that this study begins to reverse the trend of construct proliferation in the leadership literature, and thus provides some clarity to leadership studies. We call on others to follow this work with additional research that compares and contrasts other theories and perspectives on leadership, all with the goal of developing an integrative understanding of leadership in organizations.

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## APPENDIX

Source of meta-analytic estimate	Type of estimate	Method of estimation
Bono and Judge (2004)	$r$	<ul style="list-style-type: none"> <li>• Sample size weighted mean correlation</li> <li>• Corrected for measurement error in both the predictor and criterion</li> </ul>
Burke, Stagl, Klein, Goodwin, Salas, and Halpin (2006)	$r$	<ul style="list-style-type: none"> <li>• Weighted by inverse of effect size sampling error</li> <li>• Did not correct for unreliability</li> </ul>
Dobbins and Platz (1986)	d statistic	<ul style="list-style-type: none"> <li>• Weighted by study sample size</li> <li>• No other corrections noted</li> <li>• Updated using Schmidt and Raju (2007) method</li> </ul>
Eagly, Johannesen-Schmidt, and van Engen (2003)	d statistic	<ul style="list-style-type: none"> <li>• <math>g</math> (difference between leadership style of male and female leaders, divided by pooled standard deviation) converted to d statistic by correcting them for bias</li> <li>• Each d weighted by reciprocal of its variance in the analysis</li> </ul>
Judge, Bono, Ilies, and Gerhardt (2002)	$R$	<ul style="list-style-type: none"> <li>• Sample size weighted mean correlation</li> <li>• Corrected for measurement error in both the predictor and criterion</li> <li>• Updated using Schmidt and Raju (2007) method</li> </ul>
Judge et al. (2004)	$R$	<ul style="list-style-type: none"> <li>• Corrected for measurement error in both the predictor and criterion</li> </ul>
Judge and Piccolo (2004)	$r$	<ul style="list-style-type: none"> <li>• Sample size weighted mean correlation</li> <li>• Corrected for measurement error in both the predictor and criterion</li> </ul>
Judge, Piccolo, and Ilies (2004)	$r$	<ul style="list-style-type: none"> <li>• Sample size weighted mean correlation</li> <li>• Corrected for measurement error in both the predictor and criterion</li> </ul>
Judge, Jackson, Shaw, Scott, and Rich (2007)	$r$	<ul style="list-style-type: none"> <li>• Estimated population (corrected) correlations</li> </ul>
Lynn and Irwing (2004)	d statistic	<ul style="list-style-type: none"> <li>• Weighted by sample size</li> <li>• Corrected for measurement error</li> </ul>
Lippa (2005)	d statistic	<ul style="list-style-type: none"> <li>• Weighted by study sample size</li> <li>• No other corrections noted</li> </ul>
Ones, Viswesvaran, and Reiss (1996)	$r$	<ul style="list-style-type: none"> <li>• Estimated population (corrected) correlations</li> </ul>
Podsakoff, Bommer, Podsakoff, and MacKenzie (2006)	$r$	<ul style="list-style-type: none"> <li>• Weighted mean correlations</li> <li>• Corrected for measurement error</li> </ul>

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