

Leadership Training Design, Delivery, and Implementation: A Meta-Analysis

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Recent estimates suggest that although a majority of funds in organizational training budgets tend to be allocated to leadership training (Ho, 2016; O'Leonard, 2014), only a small minority of organizations believe their leadership training programs are highly effective (Schwartz, Bersin, & Pelster, 2014), calling into question the effectiveness of current leadership development initiatives. To help address this issue, this meta-analysis estimates the extent to which leadership training is effective and identifies the conditions under which these programs are most effective. In doing so, we estimate the effectiveness of leadership training across four criteria (reactions, learning, transfer, and results; Kirkpatrick, 1959) using only employee data and we examine 15 moderators of training design and delivery to determine which elements are associated with the most effective leadership training interventions. Data from 335 independent samples suggest that leadership training is substantially more effective than previously thought, leading to improvements in reactions ($\delta = .63$), learning ($\delta = .73$), transfer ($\delta = .82$), and results ($\delta = .72$), the strength of these effects differs based on various design, delivery, and implementation characteristics. Moderator analyses support the use of needs analysis, feedback, multiple delivery methods (especially practice), spaced training sessions, a location that is on-site, and face-to-face delivery that is not self-administered. Results also suggest that the content of training, attendance policy, and duration influence the effectiveness of the training program. Practical implications for training development and theoretical implications for leadership and training literatures are discussed.

Keywords: leadership training, leadership development, management, development, meta-analysis

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“Leadership and learning are indispensable to each other”

—(John F. Kennedy, 35th President of the United States).

In 2015, organizations in the United States spent an average of \$1,252 per employee on training, and the largest share of this training budget was allocated to leadership training, making leadership the greatest training focus for today's organizations (Ho, 2016). As such, leadership development is an essential strategic priority for organizations. Despite the number of organizations devoted to leadership training (e.g., Harvard Business Publishing

Corporate Learning, Dale Carnegie Training, Wilson Learning) and evidence suggesting that organizational funds spent on leadership training are increasing over time (Gibler, Carter, & Goldsmith, 2000), organizations continue to report a lack of leadership skills among their employees; only 13% of organizations believe they have done a quality job training their leaders (Schwartz et al., 2014). Similarly, some have pointed out a substantial leadership deficit (Leslie, 2009) and have noted that organizations are “. . . not developing enough leaders” and “. . . not equipping the leaders they are building with the critical capabilities and skills they need to succeed” (Schwartz et al., 2014, p. 26). This calls into question the general utility of current leadership development initiatives.

As Wakefield, Abbatiello, Agarwal, Pastakia, and van Berkel (2016) note “simply spending more money on leadership programs is unlikely to be enough. To deliver a superior return on investment (ROI), leadership spending must be far more focused on and targeted at what works . . . with a focus on evidence and results” (p. 32). In response to this call for a focused investigation of leadership training, the purpose of the current study is to provide scientists and practitioners with data-driven recommendations for effective leadership training programs that are based on a meta-analytic investigation of 335 leadership training evaluation studies. In doing so, we attempt to unpack the black box of what works in

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the design, delivery, and implementation of leadership training. That is, we attempt to answer the questions (a) How effective are leadership training programs? and (b) How should one design, deliver, and implement a leadership training program to maximize effectiveness?

The current study addresses these two questions by meta-analytically summarizing leadership training research. In our examination of the factors that contribute to leadership training program effectiveness, we offer several contributions to the science of leadership development and training. First, the current study provides a meta-analytic estimate of the effectiveness of leadership training across a wide span of years (1951–2014) and organizations. We note that this literature has been previously meta-analyzed (i.e., Avolio, Reichard, Hannah, Walumbwa, & Chan, 2009; Burke & Day, 1986; Collins & Holton, 2004; Powell & Yalcin, 2010; Taylor, Russ-Eft, & Taylor, 2009b); however, the Burke and Day (1986) meta-analysis, which is arguably the most comprehensive meta-analytic investigation of leadership training to date, only included studies published through 1982, which excludes the majority of available leadership training studies. Relatedly, Collins and Holton (2004) only added 13 additional studies to Burke and Day's (1986) meta-analytic database after conducting their own literature search. Powell and Yalcin's (2010) meta-analytic investigation only included private sector employees, thereby limiting the ability to generalize findings to other populations. Moreover, Avolio, Reichard, et al. (2009) meta-analysis was limited to 37 primary studies, and Taylor, Russ-Eft, and Taylor's (2009b) meta-analysis only included studies that assessed training transfer.¹ It is clear that a plethora of research within this area has yet to be meta-analyzed; thus, we have included more recent publications to obtain an accurate account of the current state of the field (i.e., our meta-analysis includes over three times the amount of primary studies than reported in the largest previously published meta-analysis).

Second, we empirically test moderators of leadership training that have yet to be investigated in order to identify characteristics of the most effective leadership training programs. Although existing work has investigated as many as eight moderators of leadership training program effectiveness, the current study examines 15 moderators of leadership training program effectiveness that will provide those who develop leadership training programs a comprehensive understanding of how to design, deliver, and implement effective programs.

Lastly, the current study makes use of updated meta-analytic techniques when combining across study designs to accommodate different types of primary study designs (Morris & De-Shon, 2002). Such methods were not used in previous meta-analyses; past authors either excluded certain design types (Burke & Day, 1986), or conducted separate meta-analytic investigations for each design type (Avolio, Reichard, et al., 2009; Collins & Holton, 2001; Powell & Yalcin, 2010). One exception to this is the meta-analytic investigation by Taylor et al. (2009b); however, this study only evaluated training transfer and did not include trainee reactions, learning, or results as outcomes. Using these updated techniques results in a more accurate estimate of the effect of leadership training, and also allows for stronger causal inferences than typical, cross-sectional meta-analyses (because all the studies included in the

meta-analysis are either repeated measures or experimental designs).

Leadership Training Defined

To begin, we define leadership training programs as programs that have been systematically designed to enhance leader knowledge, skills, abilities, and other components (Day, 2000). Parallel to previous investigations, we include all forms of leader, managerial, and supervisory training/development programs and/or workshops in our definition of leadership training programs (e.g., Burke & Day, 1986; Collins & Holton, 2004). Although we use the term "leadership training" as an umbrella term to refer to many forms of leader development/training, we discuss potential differences among various forms of leadership training below.

Leadership training is traditionally focused on developing "... the collective capacity of organizational members to engage effectively in leadership roles and processes" (Day, 2000, p. 582). Roles refer to both formal and informal authority positions, and processes represent those that facilitate successful group and organizational performance (Day, 2000). Beyond this approach, recent research has begun to distinguish between *leadership* development and *leader* development (Day, 2000). Leader development represents training initiatives aimed at individual-level concepts, whereas leadership development takes a more integrated approach that involves the interplay between leaders and followers and socially based concepts (Iles & Preece, 2006; Riggio, 2008). Although this difference is recognized, it is often the case that the terms are used interchangeably, and because of this, the current study incorporates leader and leadership training/development evaluation studies.

It is also important to address the distinction between managerial training and leadership development. Managerial training and development has been described as "the process by which people acquire various skills and knowledge that increases their effectiveness in a number of ways, which include leading and leadership, guiding, organizing, and influencing others to name a few" (Klein & Ziegert, 2004, p. 228). The objective of a managerial training or development program involves teaching or enhancing managerial skills with the purpose of improving job performance (Goldstein, 1980). Although, theoretically, there may be a distinction between managerial training and leadership training, the terms are often used interchangeably and in the current investigation, managerial training programs are included within our examination of leadership training programs. Executive coaching programs are also included in the current meta-analysis because these programs aid executives (who are leaders) in learning specific skills or behaviors (Witherspoon & White, 1996), which is consistent with our definition of leadership training. In summary, the current study takes a similar approach to prior work by including managerial, executive, leader, and leadership training/development programs in our meta-analytic summary.

¹ See Table A in the online supplementary material for more information regarding previous meta-analyses.

The Design, Delivery, and Implementation of Leadership Training

According to Kirkpatrick (1959), when evaluating training effectiveness, outcomes of training can be categorized into one of four criteria: reactions, learning, transfer, and results. This framework has been adopted in previous leadership training meta-analyses (e.g., Burke & Day, 1986) and other training meta-analyses (e.g., Arthur, Bennett, Edens, & Bell, 2003), and is used in the current study to evaluate training effectiveness. Below, we develop hypotheses based on the extant training, learning, and leadership literature.

Reactions

Reactions reflect the attitudinal component of effectiveness and consist of trainee attitudes toward the training (e.g., training utility and satisfaction with the training/instructors). As an example, Kohn and Parker (1972) evaluated the reactions of trainees to a management development meeting by asking trainees to rate the extent to which they felt the meeting was of value. According to Patel (2010), 91% of organizational training evaluations collect reaction data, although this is not necessarily reported in published literature nearly as often as it is used in practice. In addition to the popularity of reaction data, this evaluation technique is important to consider when evaluating training effectiveness because it can be a precursor to other desired training outcomes (Hughes et al., 2016; Sitzmann, Brown, Casper, Ely, & Zimmerman, 2008). According to social learning theory (Bandura, 1977; Bandura & Wood, 1989), an individual must be motivated to learn for actual learning to occur, and trainee reactions may serve as an indicator of motivation (i.e., if a trainee does not find a program to be useful, s/he may not be motivated to learn). Similarly, Hughes et al. (2016) tested a sequential model of general training outcomes using meta-analytic data and found support that reactions set the stage for more distal outcomes (i.e., transfer, results). Therefore, reactions may be an important component of a training evaluation because they signal trainee satisfaction, serve as indicators of trainee motivation to learn, and can lead to additional outcomes.

Given the popularity and importance of trainee reactions, it is critical to evaluate whether leadership training elicits positive changes in employee reactions (i.e., Does leadership training improve trainees' perceptions of satisfaction and utility?). Although the idea that employees typically dislike training has been prevalent in popular media (e.g., Kelly, 2012), training literature suggests training generally produces positive reactions (e.g., Brown, 2005) that may stem from employees perceiving training as a form of organizational support. Sitzmann, Brown, Casper, Ely, and Zimmerman (2008) suggest that this may translate into motivation and interest such that employees who perceive a high degree of organizational support will exhibit increased motivation and interest in training, as they believe the organization will subsequently provide the support they need to apply training to the job. Therefore, we argue that although employees' pretraining perceptions of training utility and satisfaction may be lower given that employees tend to think they will dislike training (Kelly, 2012), these perceptions will increase during training because of the organizational support that is reflected in training, resulting in positive prepost change in training reactions. Although primary studies have begun

to investigate the extent to which leadership training results in positive trainee reactions, meta-analytic work has yet to provide an estimate of this effect. As such, we examine this in the current effort and hypothesize:

Hypothesis 1a: Leadership training programs have a positive effect on trainee reactions.

Learning

Learning is "a relatively permanent change in knowledge or skill produced by experience" (Weiss, 1990, p. 172) and it represents what trainees *can do* following training. According to Kraiger, Ford, and Salas (1993), learning outcomes can be categorized as affective-, cognitive-, or skill-based. Affective learning reflects the acquisition or change in internally based states. Cognitive learning reflects a developmental change in intellectual or mental-based skills. Skill-based, or psychomotor learning, refers to the acquisition of technical or motor-skills.

By definition, leadership development programs are designed to produce changes in the ability of trainees to engage in leadership roles and processes by presenting new information (Day, 2000). According to adult learning theory, knowledge acquisition and learning during training may occur because training transforms preexisting schemas, or mental constructions of the world, and challenges assumptions (Mezirow & Taylor, 2009; see also Chen, 2014). For example, the leadership training program described in a study conducted by Unsworth and Mason (2012) involved identifying dysfunctional thinking biases; this strategy encouraged leaders to use more constructive thinking patterns to contend with management challenges and was ultimately found to enhance learning. Given the prior meta-analytic evidence supporting learning as an outcome of leadership training (i.e., Burke & Day, 1986; Collins & Holton, 2001; Powell & Yalcin, 2010), we hypothesize:

Hypothesis 1b: Leadership training programs have a positive effect on affective-, cognitive-, and skill-based learning outcomes.

Transfer

Transfer (behavior) outcomes represent what the trainee *will do*, and can be conceptualized as the extent to which trainees utilize the skills and abilities taught during training on-the-job, including job performance (Alliger et al., 1997; Baldwin & Ford, 1988; Kirkpatrick, 1959). For instance, Russell, Wexley, and Hunter (1984) evaluated the transfer of trained behaviors in supervisors by collecting ratings on a behaviorally anchored rating scale that involved the quality of the supervisor's work and how organized s/he was. An obvious primary goal of leadership training is to create a positive behavioral change in leaders on-the-job (Day, 2000). As such, transfer evaluation is critical for the assessment of leadership training effectiveness. Interestingly, some scholars have identified a "transfer problem" (Baldwin & Ford, 1988, p. 63) which refers to the tendency for targeted behaviors to fail to transfer to the work environment (Goldstein, 1986). Indeed, some studies have found that training in and of itself does not inherently lead to transfer (e.g., May & Kahnweiler, 2000). However, some degree of transfer is generally expected to occur as a function of training, and the extent to which trained behavior fully transfers to

on-the-job behaviors is argued to be contingent upon various training factors (e.g., the moderators discussed below; Baldwin & Ford, 1988). Moreover, empirical and meta-analytic evidence indicates that leadership training does, to some extent, generally evoke transfer of training (Avolio, Rotundo, & Walumbwa, 2009; Burke & Day, 1986). In line with this research, we hypothesize that:

Hypothesis 1c: Leadership training programs lead to the transfer of trained affective-, cognitive-, and skill-based concepts.

Results

According to Kirkpatrick (1959), results are evaluative methods that reflect the training program's effect on achieving organizational objectives, including costs, company profits, turnover, and absenteeism. Results are also often defined in terms of the benefit of the training compared to the program cost (e.g., ROI; Arthur et al., 2003). For the current investigation, we categorize results as either organizational outcomes or subordinate outcomes. For example, DiPietro (2006) analyzed the ROI of a leadership training program, which is an organizational result, whereas Kawakami, Takao, Kobayashi, and Tsutsumi (2006) evaluated the degree to which subordinates perceived the work environment as supportive following the implementation of leadership training, which is a subordinate result.

It is important to note that results represent the most distal of the Kirkpatrick (1959, 1994) criteria and it has been suggested that "most training efforts are incapable of directly affecting results level criteria" (Alliger et al., 1997, p. 6). Some studies have, in accordance with this suggestion, found no improvement in results criteria following leadership training. For instance, Lee and colleagues (2010) found that the self-reported emotional exhaustion of subordinates did not change following leadership training. Yet, this study is in the minority, as meta-analytic evidence indicates that leadership training has a positive effect on results (Burke & Day, 1986). Theoretically, scholars have long suggested that results are a by-product of improvements in learning and transfer (Kirkpatrick, 1959; Tharenou, Saks, & Moore, 2007; Wright, McCormick, Sherman, & McMahan, 1999) because positive changes in employee knowledge and behavior may trickle-down to affect subordinate performance and/or trickle-up to change organizational norms (e.g., a sales leader who undergoes training may increase his or her subordinate's performance and may provide other leaders with normative examples of effective performance behaviors to cause revenue increases in other sales leaders as well). Therefore, given our expectation that learning and transfer occur as a result of leadership training, we expect results to improve after training.

Hypothesis 1d: Leadership training programs positively influence organizational and subordinate outcomes.

Training Design, Delivery, and Implementation: Moderator Analyses

In 2010, Barling, Christie, and Hopton (2010) called for a rapprochement between the training and leadership development sciences. They noted that a lost opportunity for leadership development practitioners and scientists involves advancements within

the training domain that are not necessarily implemented within leadership literature and practice. The current study responds to this call by drawing on the sciences of learning and training to aid in the explanation of leadership training effectiveness. Below, we identify several design, delivery, and implementation features that have strong theoretical and empirical support as moderators of training effectiveness.

Training Design Characteristics

Needs analysis. A needs analysis is the process of identifying organizational, group, or individual training needs and aligning a program with these needs (Arthur et al., 2003). By conducting a thorough needs analysis, developers are better able to provide trainees with a program that parallels their training needs, thereby increasing the appeal of the training to the trainee and subsequently enhancing results. However, training developers may neglect to conduct a needs analysis because they feel as if it is a waste of time or that it will not reveal any new information (Goldstein & Ford, 2002). For example, the U.S. Merit Systems Protection Board (2015) reported that only 16 out of 23 surveyed federal government agencies conducted a needs analysis for the training and development of their senior executives.

Despite the infrequent use of needs analyses, the benefits of conducting a needs analysis have long been discussed within the training literature (e.g., Goldstein & Ford, 2002). Collins and Holton (2004) mention that a lack of a needs analysis can lead to a generic training program that may not be suitable for the organization. For example, a training program might emphasize transactional leadership style behaviors, which may not fit an organizational culture that values a transformational leadership style. In such a situation, trainees may feel the training program is not relevant to their job (i.e., reduced reactions), and subsequently, they may be less motivated to learn and transfer the training to the job. Although no previous meta-analysis has examined the use of a needs analysis as a moderator of leadership training effectiveness, given the aforementioned theoretical support for needs analyses, we hypothesize that:

Hypothesis 2: Leadership training programs that are based on a needs analysis exhibit greater improvements in trainee reactions (H2a), learning (H2b), transfer (H2c), and results (H2d) than programs that are not based on a needs analysis.

Training attendance policy. Generic training literature indicates that trainees who exhibit high motivation and perceive value in the training program are more likely to implement trained concepts on-the-job (Blume, Ford, Baldwin, & Huang, 2010; Chhabra & Marinova, 2005; Tziner, Fisher, Senior, & Weisberg, 2007), thereby increasing training utility and effectiveness. To increase trainees' motivation to transfer, some researchers have suggested creating voluntary training programs (Curado, Henriques, & Ribeiro, 2015). For example, in a cross-sectional study conducted on employees within an insurance company, results suggested that voluntary training programs enhanced transfer motivation to a greater degree than mandatory programs (Curado et al., 2015). These results may partially be explained by self-determination theory (Ryan & Deci, 2000), which suggests that autonomy fosters motivation; by providing trainees with the choice to participate in training, the need for autonomy is satisfied,

thereby increasing trainee motivation to learn and transfer trained concepts (Cohen, 1990). Despite the empirically validated benefits of voluntary training programs, some researchers argue that training programs should be mandatory, thereby signaling to trainees that the training is valued by their organization (Salas, Tannenbaum, Kraiger, & Smith-Jentsch, 2012). Although attendance policy has not been meta-analyzed in the leadership training literature, Blume, Ford, Baldwin, and Huang (2010) shed some light on this issue in the general training literature and found a positive meta-analytic correlation between transfer and voluntary attendance. The current study assesses these effects within the realm of leadership training, and we hypothesize:

Hypothesis 3: Voluntary leadership training programs enhance trainee reactions (H3a), learning (H3b), transfer (H3c), and results (H3d) to a greater degree than involuntary programs.

Spacing effect. Cognitive load theory (CLT) is a learning efficiency theory (e.g., Paas, Renkl, & Sweller, 2004; Sweller, van Merriënboer, & Paas, 1998; van Merriënboer & Sweller, 2005) positing that learners have a finite working memory capacity, and once this is met, processing and learning abilities are hindered or lost entirely. If an excessive amount of information is presented to a learner, although the information may enter working memory, it may not be processed into long-term memory, thus inhibiting the learners' ability to access the information in the future (van Merriënboer & Sweller, 2005). CLT highlights the need for training programs that are designed to reduce extraneous cognitive load while increasing learners' ability to process salient information and still presenting all of the relevant information. One way to do so is to temporally space training sessions, a technique known as spacing (Hintzman, 1974). For example, evidence suggests information may be remembered at an increased rate (increasing learning and transfer) if the stimulus presentation sessions are temporally spaced rather than presented at once (Janiszewski, Noel, & Sawyer, 2003). The consensus of research from the generic training literature shows that spaced training is superior to massed training (Lee & Genovese, 1988). Further, meta-analytic evidence also suggests that task performance is greater when individuals practice in spaced intervals as compared to a single massed practice session (Donovan & Radosevich, 1999). The current meta-analysis is the first to present a direct evaluation of how spaced training sessions can affect leadership training program effectiveness. We hypothesize:

Hypothesis 4: Leadership training programs spanning multiple training sessions result in greater effects on reactions (H4a), learning (H4b), transfer (H4c), and results (H4d) in comparison with training programs with one massed training session.

Trainees' level of leadership. Leadership training can be administered to low-, middle-, or high-level leaders. It is possible that the level of the leader can influence how receptive the individual is to training. Middle- and high-level leaders may be more resistant to change because they may feel that change is disruptive (Hall, 1986). Similarly, because they have higher status, these leaders might feel as if they do not require further development because they have already succeeded as a leader (Guinn, 1999). It has also been argued that leadership experience fosters leadership

skills (Arvey, Rotundo, Johnson, Zhang, & McGue, 2006; Arvey, Zhang, Avolio, & Krueger, 2007; Riggio, 2008); as such, it could be the case that low-level leaders who lack leadership experience enter training with fewer leadership skills, allowing greater room for improvement. Because of their reduced leadership skills, it might be easier to garner desired outcomes in low-level leaders, compared with high-level leaders who may experience a ceiling effect during leadership training. In line with this theory, Avolio, Reichard, et al.'s (2009) meta-analysis of leadership training conducted a post hoc analysis on leader level and found that leadership training had a greater effect on low-level leaders compared to middle- and high-level leaders. We aim to replicate this finding using Kirkpatrick's (1959) evaluation criteria, and hypothesize:

Hypothesis 5: Leadership training programs administered to low-level leaders will exhibit greater effects on reactions (H5a), learning (H5b), transfer (H5c), and results (H5d) than programs administered to middle- or high-level leaders.

Training instructor. According to Kalinoski et al. (2013), the trainer's background can influence trainee motivation such that a program with a trainer from the trainee's organization (i.e., internal trainer) will result in increased levels of trainee motivation in comparison to a program with a trainer outside of the organization (i.e., external trainer), especially if the trainer is a direct manager of the trainee. When participating in a leadership training program that is facilitated by an internal trainer, trainees may perceive the organization's support for the training to be greater because they have a dedicated person on staff who is responsible for the training program. Conversely, trainees participating in a leadership training program facilitated by an external trainer might also perceive the organization as valuing training because they have paid to bring in an expert (or paid to send the employee to a leadership center). Empirical support for the effectiveness of both internal (May & Dubois, 1963; McCormick, 2000; Teckchandani & Schultz, 2014) and external (e.g., Alsamani, 1997; Culpin, Eichenberg, Hayward, & Abraham, 2014; Jorgensen & Els, 2013) instructors exists; thus, internal and external trainers may be equally effective.

On the contrary, self-administered leadership training programs might signify to trainees that the organization does not fully support their training because they might perceive that fewer resources are needed in comparison to training programs with an instructor. Because trainees are required to complete the leadership training on their own, they may be less motivated to exert effort as they might believe the training is not valued by the organization, leading to a reduction in positive training outcomes (Blume et al., 2010). As such, we hypothesize that:

Hypothesis 6: Self-administered leadership training programs exhibit weaker effects on reactions (H6a), learning (H6b), transfer (H6c), and results (H6d) than programs facilitated by an internal or external trainer.

Training Delivery and Implementation Characteristics

Delivery method. Training delivery methods can be categorized into three broad categories based on their purpose: (a) to deliver information (i.e., information-based); (b) to demonstrate skills and abilities being trained (i.e., demonstration-based); or (c) to offer practice opportunities (i.e., practice-based; Salas &

Cannon-Bowers, 2000; Weaver, Rosen, Salas, Baum, & King, 2010). For example, lectures, presentations, and most text-based training materials are considered information-based methods, whereas demonstration-based methods provide trainees with either negative or positive examples of the trained competency via in-person, audio, video, or simulated mediums. Finally, practice-based methods include role-play, simulations, in-basket exercises, guided practice, and others.

Of the three methods, practice-based training methods are considered to be the most critical when influencing training outcomes as they enable trainees to fully conceptualize the material and implement it within a realistic environment (Weaver et al., 2010). Not only does generic training literature support the use of practice, but traditional learning theory also supports this delivery method. Specifically, constructivist learning theory (Piaget, 1952) suggests learning is enhanced when the learner develops constructions of the world through his or her experiences and reflects on these experiences (i.e., constructivism reflects learning by doing). For example, when leaders are provided with opportunities to practice certain leadership competencies, they are able to actively reflect on their leadership experience, encounter and solve problems within the training environment, and participate in the learning process, which accelerates the rate at which they learn from their experience (McCauley & Van Velsor, 2004).

Although training scientists tend to agree that practice-based methods are perhaps the most effective delivery method, it is important to note that meta-analytic research indicates information (e.g., lectures) can also be effective (Arthur et al., 2003). However, we argue training programs that solely involve practice-based methods are more effective than those that only utilize information-based methods because practice-based methods are more appropriate for leadership skills (e.g., given that leadership training often involves skills related to interacting with others, a training program that allows one to practice interacting with others should be the most effective; Adair, 1983; Wexley & Latham, 2002; see also Arthur et al., 2003). Supporting this notion, a meta-analysis conducted by Burke and Day (1986) found that the leadership training programs were more effective when they incorporated lecture/discussion and practice/role play when predicting objective learning criteria in comparison to those incorporating lecture alone. In line with research and theory, we hypothesize that:

Hypothesis 7: Leadership training programs incorporating only a practice-based method lead to greater effects on trainee reactions (H7a), learning (H7b), transfer (H7c), and results (H7d), as compared with programs incorporating only information- or demonstration-based methods.

However, researchers have suggested that the most effective training programs incorporate all three delivery methods (e.g., Salas et al., 2012). We posit that any disadvantages associated with one particular training technique may be overcome by utilizing multiple techniques. For example, demonstration does not generally provide a conceptual understanding of *why* certain behaviors are occurring whereas information can provide a foundation from which to understand demonstration (Salas & Cannon-Bowers, 2000), and practice allows for active experimental and reflection. Meta-analytic research investigating training effectiveness in gen-

eral has shown that most training programs incorporate multiple delivery methods and the effectiveness of training varies as a function of the training delivery method specified (Arthur et al., 2003). Thus, we hypothesize:

Hypothesis 8: Leadership training programs incorporating information-, demonstration-, and practice-based methods demonstrate greater effects on reactions (H8a), learning (H8b), transfer (H8c), and results (H8d) in comparison with programs implementing only one (e.g., information only) or two methods (e.g., demonstration and information).

Feedback. According to feedback theory, feedback outlines successes and failures and how to correct unsuccessful behavior (Kluger & DeNisi, 1996; Powers, 1973). Feedback is valuable to trainees because it allows them to gain insight into their current ability (Maurer, 2002), thereby signaling whether there is a discrepancy between actual and intended performance (Nadler, 1977). Additionally, feedback aids in learning and transfer because it encourages trainees to participate in metacognitive activities (i.e., planning, monitoring, and revising behavior; Brown, Bransford, Ferrara, & Campione, 1983) during training. Trainees that engage in such activities learn at an accelerated rate because they adjust their learning and behavior after determining problem areas, thereby leading to increased transfer (Ford, Smith, Weissbein, Gully, & Salas, 1998). Feedback also engenders affective responses (Kluger & DeNisi, 1996), and the provision of feedback may increase trainees' perceptions of utility, thereby increasing positive reactions toward the training program (Giangreco, Sebastiano, & Peccei, 2009). As an example of how feedback can enhance leadership training effectiveness, May and Kahnweiler (2000) incorporated feedback in their interpersonal skills training program for supervisors by asking participants to discuss their performance with a coach using a behavioral checklist after participating in a role-play exercise. Interestingly, although feedback is a popular training tool in leadership training programs, it has yet to be meta-analytically investigated within this area. The current study offers this investigation, hypothesizing:

Hypothesis 9: Leadership training programs reporting the use of feedback display a greater effect on trainee reactions (H9a), learning (H9b), transfer (H9c), and results (H9d), in comparison with programs that do not report the use of feedback.

Source of feedback. One approach to delivering feedback that is often utilized within leadership training programs is 360-degree feedback (Goldsmith, Lyons, & Freas, 2000). Compared with single-source feedback, 360-degree feedback involves the collection of information about the focal individual from several sources (e.g., supervisors, subordinates, customers; Wexley & Latham, 2002). Typically, all sources complete the same development instrument in reference to the leader, and then the leader is provided with a report summarizing the ratings. This process allows the leader to formulate comparisons among various rating sources, and provides the leader with a more holistic depiction of his or her areas for improvement because the results are not based on a single-source (Wexley & Latham, 2002) and because the results may be perceived as more reliable (Atkins & Wood, 2002; Greguras & Robie, 1998).

Although some researchers have raised questions about the validity of 360-degree feedback, believing that simply collecting feedback from multiple sources may not provide any additional information (Borman, 1998; DeNisi & Kluger, 2000), organizations utilizing 360-degree feedback tend to report increases in productivity and favorable reactions (Hazucha, Hezlett, & Schneider, 1993; Wexley & Latham, 2002). Because this specific type of feedback is quite popular (around 90% of large organizations report the use of 360-degree feedback; ETS, 2012), it is important to investigate its effectiveness via meta-analysis (existing meta-analyses have yet to compare 360-degree feedback to single-source feedback). Thus, we hypothesize:

Hypothesis 10: Leadership training programs reporting the use of 360-degree feedback compared to single-source feedback, display a greater effect on trainee reactions (H10a), learning (H10b), transfer (H10c), and results (H10d).

Training location. According to Baldwin and Ford's (1988) theory of identical elements, training transfer is maximized when training stimuli align with the actual work environment (Baldwin & Ford, 1988). This alignment can be assessed through fidelity, or the extent to which a training program accurately depicts reality by mirroring the real-world system (Alessi, 2000; Meyer, Wong, Timson, Perfect, & White, 2012). According to Rehmann, Mitman, and Reynolds (1995), fidelity is composed of three parts: equipment (i.e., alignment between tools, technology, and other system features utilized in training and those used on-the-job), environment (i.e., replication of the actual task environment in regard to sensory information, motion cues, and other features within the training program), and psychological fidelity (i.e., the degree to which task cues and consequences mirror those experienced on-the-job), all of which are important for simulating a trainee's job environment during a training program.

Within an on-site leadership training program, trainees are typically immersed within an environment that is similar, if not identical, to their work environment; as such, on-site training programs display high equipment, environment, and psychological fidelity. For example, during on-the-job leadership training (an on-site leadership training method), leaders participate in training and practice trained concepts during normal working conditions and while working on required work tasks (House & Tosi, 1963; Santrić Milicevic, Bjegovic-Mikanovic, Terzic-Supić, & Vasic, 2011). In contrast, off-site leadership training programs are housed within a facility other than the trainee's organization; as such, the level of equipment and environment fidelity is reduced, leading to a potential reduction in training outcomes. In addition, because on-site programs are conveniently located, we believe that stakeholders are more likely to be involved in on-site programs, which is posited to enhance motivation in both trainers and trainees (Salas et al., 2015). Further, on-site leadership training methods likely result in a greater ROI as compared with off-site training programs (Arthur et al., 2003; Avolio, Avey, & Quisenberry, 2010) because resource requirements associated with off-site training programs may constrain implementation of the training (i.e., the expense of off-site programs can be substantial, forcing some to choose shorter and/or less comprehensive off-site programs). Although some researchers and practitioners might note that on-site work can distract leaders attending the program (e.g., trainees

might be more tempted to leave training for work emergencies) and trainees may not have the opportunity to learn from individuals outside of their organization during on-site training, the benefits previously mentioned likely outweigh these concerns.

Though it has been assumed that on-site training methods have the "ability to minimize costs, facilitate and enhance training transfer" (Arthur et al., 2003, p. 243), no existing meta-analytic evidence has tested this assumption. As such, some have called for research on the effectiveness of on-site training methods in comparison with off-site training programs (e.g., Wexley & Latham, 1991). The current study responds to these calls, and we hypothesize:

Hypothesis 11: Programs hosted on-site display a greater effect on trainee reactions (H11a), learning (H11b), transfer (H11c), and results (H11d) compared with off-site programs.

Training setting. The setting of the leadership training program and whether it is face-to-face or virtually based might also play a key role in contributing to training effectiveness. We define virtually based training programs as interventions delivered via a computer or similar device with no facilitators physically present. To compare virtual and face-to-face training, we borrow theory from education on the advantages and disadvantages of e-learning (Garrison, 2011), which is quickly becoming a popular method of replacing traditional face-to-face instruction. E-learning is purported to offer several advantages over face-to-face instruction such as the capacity to provide self-paced and learner-centered experiences and archival access to learning materials (Zhang, Zhao, Zhou, & Nunamaker, 2004). In spite of these advantages, e-learning is more likely to involve a lack of immediate feedback unless it is embedded within the training program, discomfort experienced by users with limited technology experience, and the potential for increased frustration, anxiety, and confusion as a result of poorly equipped e-learning systems (e.g., technology issues; Zhang et al., 2004). We suggest these same problems may also plague virtually based leadership training programs, making such programs less effective than face-to-face programs. We further posit that a lack of fidelity may also contribute to virtually based programs being less effective than face-to-face interventions. For example, the high fidelity of face-to-face programs can incorporate dyadic interactions such as role-play to demonstrate and practice interpersonal leadership skills, whereas virtual environments make interpersonal interaction difficult.

Magerko, Wray, Holt, and Stensrud (2005) also note that face-to-face training can allow trainers to oversee each trainee's individual progress and adjust the learning experience as necessary. In contrast, virtual training programs are not typically designed in this manner (virtual training is more likely to involve asynchronous communication between the trainer and trainee), although recent initiatives are seeking to address this problem (Magerko et al., 2005). Because of this, we argue that trainees in a face-to-face environment may be more likely to receive an optimal level of training difficulty, as they have the benefit of interacting with a trainer who can modify the content or provide specific guidance that a virtual environment may lack. Although a meta-analysis has yet to formally compare virtual and face-to-face training environments, in line with the above theory and evidence we hypothesize:

Hypothesis 12: Face-to-face leadership training programs increase positive trainee reactions (H12a), learning (H12b), transfer (H12c), and results (H12d) to a greater degree than virtual programs.

Exploratory Moderators

There are several additional training design, delivery, and implementation features that might impact training effectiveness, despite a lack of theoretical support for how the moderator will affect program effectiveness. To provide scientists and practitioners with a robust meta-analytic investigation of leadership training programs, we incorporate the following moderators within our exploratory analyses: (a) training content, (b) program evaluator's affiliation, (c) training duration, and (d) publication date.

Training content. There are multiple ways to succeed as a leader, yet it is unclear which knowledge, skills, and abilities should be included in the content of a training program to maximize leadership training effectiveness. In a meta-analysis of 70 leadership training programs conducted by [Burke and Day \(1986\)](#), training that involved human relations content produced the largest effect on learning, and self-awareness training content had the greatest effect on transfer criteria; however, these analyses were based on a small number of primary studies ($k = 8$ and 7 , respectively), and only begin to scratch the surface as to what content should be incorporated within a leadership training program to maximize effects. The current study aims to examine the effect of training content in a greater pool of primary studies using [Hogan and Warrenfeltz's \(2003\)](#) domain model of managerial education. This theoretical model organizes leadership competencies into four competency domains: intrapersonal skills, interpersonal skills, leadership skills, and business skills. Ultimately, this exploratory analysis allows us to examine whether each type of training content is effective (e.g., Is interpersonal skills training effective?) and whether certain training content is more successful in producing improvements in reactions, learning, transfer, and results than other training content, giving decision makers knowledge of which type of training may be most valuable if a needs analysis does not specify a content focus.

Training evaluator affiliation. Additionally, we sought to identify whether evaluator affiliation (i.e., academic primary study authors only, practitioner authors only, or a mix of academics and practitioners) played a role in the effectiveness of the program. Although the author of a primary study is not always involved in the design, delivery, and evaluation of the training program, in many cases, the authors are involved, and thus, we examine whether a combination of academics and practitioners is more likely to produce highly effective training programs because of their diverse backgrounds that can rely on both science and practice. This has yet to be investigated in the training literature and poses an interesting question, as well as a test of the revered scientist-practitioner model ([Jones & Mehr, 2007](#)).

Training duration. Researchers have suggested that permanent cognitive and schematic changes are needed in order for leaders to fully understand how to transform and develop their followers over time ([Lord & Brown, 2004](#); [Wofford, Goodwin, & Whittington, 1998](#)), and this process takes time. Thus, longer training programs may be more effective. Contrastingly, longer leadership training programs may result in cognitive overload

([Paas, et al., 2004](#)) and thus less effective training. [Taylor et al.'s \(2009b\)](#) meta-analysis of leadership training also found no support for length of training as a continuous moderator of training effectiveness (i.e., transfer). As such, the current effort will shed light on this issue by meta-analytically testing the impact of training duration on leadership training effectiveness.

Publication date. The design, delivery, and implementation of leadership training programs has most likely changed over the years due to technological advancements and the dynamic nature of organizations today. We investigate whether this has led to a change in the effectiveness of training. Although [Powell and Yalcin \(2010\)](#) concluded that leadership training programs evaluated in the 1960s and 1970s produced greater effect sizes than other decades, this finding has yet to be corroborated while examining publication date as a continuous moderator using an updated meta-analytic database.

Method

Literature Search and Inclusion Criteria

Relevant empirical studies were extracted in several ways. First, literature searches in the databases PsycINFO (1887–December 2014), Business Source Premiere (1886–December 2014), and ProQuest Dissertations and Theses (1861–December 2014) were conducted. Although the search goes as far back as the late 1800s, the earliest usable study for the current meta-analysis was published in 1951. Published and unpublished studies were included in order to reduce the potential for publication bias. The following keywords were included in this initial search: *leadership*, *leader*, *manag** (utilizing the asterisk within searches allows for extraction of all keywords beginning with the root, e.g., *management*, and *manager*), *executive*, *supervisory*, *training*, and *development*. Google Scholar was also searched using the same keywords, with the addition of *method* (e.g., *leadership training AND method*). Lastly, reference lists from previous meta-analyses on pertinent topics ([Arthur et al., 2003](#); [Avolio, Reichard, et al., 2009](#); [Burke & Day, 1986](#); [Collins & Holton, 2001](#); [Keith & Frese, 2008](#); [Powell & Yalcin, 2010](#); [Taylor et al., 2009b](#)) were cross-checked. This initial search returned over 20,742 articles.

Each study was reviewed and included if the following conditions were met: (a) it included an empirical evaluation of a leadership, leader, managerial, supervisory, or executive training (development or coaching) program; (b) the study used a repeated measures design, independent groups design, or an independent groups design with repeated measures; (c) it involved an adult sample (i.e., over 18-years-old); (d) it was written in English; (e) it provided the sample size and enough information to calculate an effect size; and (f) the participants were employees (e.g., not MBAs/undergraduate students). Applying the above criteria resulted in a final sample of 335 independent studies ($N = 26,573$).

Coding Procedures

Three of the authors coded the studies, and coding discrepancies were resolved through discussion after each article was indepen-

dently coded.² Overall rater agreement was 96.2%. Studies were coded for sample size, evaluation measure utilized, reliability (i.e., Cronbach's alpha), experimental design (i.e., *repeated measures*, same subjects are assessed before and after training; *independent groups*, an experimental and control group are measured; and *independent groups with repeated measures*, an experimental and control group are tested before and after training), and effect size. A Cohen's *d* effect size was coded for each study, or the statistical information needed to compute a Cohen's *d* effect size (e.g., means and standard deviations, *t*-value). If a primary study reported multiple, nonindependent effect sizes (e.g., two separate measures of transfer were used), they were combined using the intercorrelations among the measures to create a linear composite (see the formula provided in Nunnally, 1978). If the information necessary for calculating a linear composite was not reported (i.e., the intercorrelations were not available), the effect sizes were averaged. The following definitions and descriptions were implemented when coding for additional moderators.

Evaluation criteria. To categorize effect sizes by training evaluation criteria, we followed the framework developed by Kirkpatrick (1959). *Reactions* represent trainees' perception of the training program as related to its utility and general likability (Alliger et al., 1997; Kirkpatrick, 1959, 1996). *Learning* measures represent quantifiable evidence that trainees' learned the knowledge, skills, and/or abilities represented during training (Alliger et al., 1997; Kirkpatrick, 1959, 1996). *Transfer* represents measures evaluating on-the-job behavior, as assessed by trainees, supervisors, peers, or subordinates (Alliger et al., 1997; Kirkpatrick, 1959, 1996). Both learning and transfer were further categorized as *cognitive learning/transfer* (i.e., verbal knowledge, knowledge organization, and cognitive strategies), *affective learning/transfer* (i.e., attitudinal and motivational elements), or *skill-based learning/transfer* (i.e., compilation elements and automaticity) based upon the framework identified by Kraiger et al. (1993). In addition to these three subcategories, transfer also included a *job performance* category reflecting studies evaluating training with regard to on-the-job performance. *Results* included changes in organizational objectives because of the training program (Alliger et al., 1997; Kirkpatrick, 1959, 1996). Effect sizes were further categorized as *organizational results* (e.g., turnover, absenteeism, ROI, profit) or *subordinate results* (e.g., subordinate job satisfaction, performance ratings of the leader's subordinates).

Delivery method. Training delivery method was classified as *information-based* (e.g., lectures, presentations, advanced organizers, text-based training materials), *demonstration-based* (e.g., case studies, in-person modeling, computer-generated avatars), *practice-based* (e.g., role-play, simulations, in-basket exercises; Salas & Cannon-Bowers, 2000; Weaver et al., 2010), or a combination of the above listed methods if more than one delivery method was implemented (i.e., *information and demonstration*, *information and practice*, *demonstration and practice*, or *information, demonstration, and practice*).

Training content. In order to determine the content trained within each leadership training program, we utilized the competency domain model developed by Hogan and Warrenfeltz (2003). Each study was coded as either: *intrapersonal* (i.e., internal, individual behaviors such as coping with stress, goal-setting, time management), *interpersonal* (i.e., behaviors associated with building relationships such as active listening and communication), *leadership* (i.e., behaviors concerned with team building, produc-

ing results, and influencing others), or *business* (i.e., behaviors related to content or technical skills such as analytical skills, financial savvy, decision-making, and strategic thinking).

Trainees' level of leadership. We coded each primary study according to the trainees' level of leadership. Specifically, each study was coded as either: *low-level* (i.e., those who interact directly with first-level employees), *middle-level* (i.e., managers in charge of multiple groups of subordinates and serve as a liaison between subordinate groups and other levels of the organization), or *high-level* (i.e., those that do not have any managers above them except for executives). This categorization scheme was based on that utilized by previous researchers (DeChurch, Hiller, Murase, Doty, & Salas, 2010).

Additional codes. Each primary study was also coded with regard to the presence of feedback, source of feedback (i.e., *single-source feedback* or *360-degree feedback*), publication status (i.e., *published* or *unpublished*), training length (in hours), presence of spacing effect (i.e., training sessions were temporally spaced daily/weekly/yearly/monthly, or massed), presence of a formal needs analysis, training setting (i.e., *face-to-face* or *virtual*), location (i.e., *on-site* or *off-site*; self-administered programs were not included in this moderator analysis), trainer's background (i.e., *internal*, *external*, or *self-administered*), attendance policy (*voluntary* or *involuntary*), label of training program (i.e., *leadership training*, *leadership development*, *management training*, *management development*, *supervisor training*, *supervisor development*, *executive training*, or *executive development*), evaluator affiliation (i.e., *academic*, *practitioner*, or a *mix of academics and practitioners*), and publication year.

Analyses

The current meta-analysis incorporated studies that had three experimental design types (i.e., repeated measures, independent groups, independent groups with repeated measures). Because estimated population parameters are dependent upon the design type of each study (Ray & Shadish, 1996), appropriate statistical adjustments were made when aggregating across effect sizes (Glass, McGaw, & Smith, 1981; Morris & DeShon, 1997; Morris & DeShon, 2002) using procedures outlined in Morris and DeShon (2002). This is warranted, in part, because the overall corrected meta-analytic effect sizes were not practically or significantly different across study designs ($t = 0.33$, $p > .05$; see Table 1). These procedures required the calculation of $r_{pre.Post}$ which is the correlation between pre- and posttraining scores. The majority of studies did not report this correlation; therefore, the inverse sampling error variance-weighted average $r_{pre.Post}$ across repeated measures studies was used, per recommendations by Morris and DeShon (2002). For the current meta-analytic investigation, $\bar{r}_{pre.Post} = .52$. After conversions, a repeated-measures *d* effect size was estimated by conducting a random effects meta-analysis that accounted for sampling error variance (Hedges & Olkin, 1985) and corrected for criterion-related unreliability (Hunter & Schmidt, 1990, 2004).

T tests of the mean effect sizes were used to compare moderator conditions, following Hunter and Schmidt (2004). The subgroup

² Detailed coding information for each primary study is located in Table B of the online supplementary material.

Table 1
Meta-Analytic Results: Overall

| Meta-analysis | <i>k</i> | <i>N</i> | <i>d</i> | δ | <i>SD</i> | %Var | 95% CI | | 80% CR | |
|---|----------|----------|----------|----------|-----------|------|--------|------|--------|------|
| | | | | | | | LL | UL | LL | UL |
| Overall | 335 | 26,573 | .73 | .76 | 1.17 | .20 | .64 | .89 | -.74 | 2.26 |
| Published | 214 | 17,219 | .78 | .81 | 1.40 | .10 | .63 | 1.00 | -.98 | 2.60 |
| Unpublished | 121 | 9,354 | .66 | .69 | .66 | .96 | .57 | .80 | -.16 | 1.53 |
| Study design | | | | | | | | | | |
| Repeated measures | 208 | 18,182 | .75 | .78 | 1.19 | .17 | .62 | .94 | -.74 | 2.30 |
| Independent groups | 62 | 3,901 | .74 | .76 | 1.13 | .26 | .48 | 1.05 | -.69 | 2.22 |
| Independent groups and Repeated measures | 58 | 4,490 | .46 | .48 | .90 | .99 | .25 | .71 | -.67 | 1.63 |

Note. *k* = number of independent studies; *N* = sample size; *d* = repeated measures Cohen's *d*; δ = Cohen's *d* corrected for unreliability in the criterion; *SD* = corrected standard deviation; %Var = percent of variance accounted for by sampling error; CI = confidence interval; LL = lower limit; UL = upper limit; CR = credibility interval.

meta-analytic technique was also used to test for moderators (Arthur, Bennett, & Huffcutt, 2001), and a separate artifact distribution was applied for each criterion (i.e., reactions, learning, results, transfer, and overall). In line with recommendations from previous researchers, the meta-analytic effect sizes were corrected for unreliability using artifact distributions (Hunter & Schmidt, 2004); the artifact distributions were created from averaging the internal consistency estimates reported in the primary studies. The mean reliability for the overall analysis was .97, and the mean reliabilities for reaction, learning, transfer, and results were as follows: .92, .95, .96, and .93, respectively.

Results

Results are presented in Tables 1–7. Table 1 presents the overall meta-analytic *d* combined across evaluation criteria, and Tables 2, 3, 4, and 5 present specific outcome effect sizes (reactions, learning, transfer, and results). Effect sizes are presented as both the corrected average δ value (corrected for unreliability in the criterion and sampling error variance; Hunter & Schmidt, 2004) and the observed *d* value. To test for the statistical significance of the effect size, 95% confidence intervals were reported. Continuous

moderator analyses (i.e., training duration and publication year) are reported in Tables 6 and 7.

Multiple techniques were implemented to test for publication bias. First, we visually inspected a funnel plot for asymmetry constructed on the overall effect (Sterne, Becker, & Egger, 2005). Second, we conducted a trim and fill analysis based on procedures identified by Duval and Tweedie (2000); results from a fixed effects model on the overall effect suggest that zero studies were imputed to the left of the mean, suggesting that publication bias is not present. Lastly, a moderator analysis was conducted by comparing published and unpublished studies (see Table 1), and results indicated that there were no significant differences between meta-analytic effect sizes, $t = 1.08$, $p > .05$. Taken together, these results suggest that there is no evidence of publication bias.

In support of Hypothesis 1, results suggest leadership training programs are effective. Specifically, the overall effect size was significant and positive ($\delta = .76$, 95% CI [.64, .89]). Comparing across criteria, the strongest effect was found for transfer ($\delta = .82$, 95% CI [.58, 1.06]), followed by learning ($\delta = .73$, 95% CI [.62, .85]), results ($\delta = .72$, 95% CI [.60, .84]), and reactions ($\delta = .63$, 95% CI [.12, 1.15]). However, these values were not significantly

Table 2
Meta-Analytic Results: Reactions Criteria

| Meta-analysis | <i>k</i> | <i>N</i> | <i>d</i> | δ | <i>SD</i> | %Var | 95% CI | | 80% CR | |
|--|----------|----------|----------|----------|-----------|--------|--------|------|--------|------|
| | | | | | | | LL | UL | LL | UL |
| Reactions | 7 | 620 | .58 | .63 | .73 | 1.05 | .12 | 1.15 | -.30 | 1.57 |
| Training method | | | | | | | | | | |
| Information and practice | 2 | 115 | 1.31 | 1.47 | 1.57 | .40 | -.58 | 3.52 | -.54 | 3.48 |
| Information, demonstration, and practice | 2 | 257 | .11 | .12 | .28 | 10.03 | -.27 | .50 | -.24 | .48 |
| Feedback | | | | | | | | | | |
| Feedback | 3 | 145 | 1.02 | 1.13 | 1.28 | .00 | -.24 | 2.50 | -.51 | 2.77 |
| No feedback | 4 | 475 | .52 | .57 | .57 | 1.56 | .04 | 1.09 | -.17 | 1.30 |
| Evaluator's affiliation | | | | | | | | | | |
| Academic | 3 | 363 | .16 | .17 | .32 | 8.21 | -.18 | .53 | -.23 | .58 |
| Practitioner | 2 | 118 | .59 | .65 | .00 | 100.00 | .64 | .66 | .65 | .65 |
| Mix | 2 | 139 | 1.42 | 1.61 | .73 | 3.08 | .64 | 2.59 | -.68 | 2.54 |

Note. *k* = number of independent studies; *N* = sample size; *d* = repeated measures Cohen's *d*; δ = Cohen's *d* corrected for unreliability in the criterion; *SD* = corrected standard deviation; %Var = percent of variance accounted for by sampling error; CI = confidence interval; LL = lower limit; UL = upper limit; CR = credibility interval.

Table 3
Meta-Analytic Results: Learning Criteria

| Meta-analysis | <i>k</i> | <i>N</i> | <i>d</i> | δ | <i>SD</i> | %Var | 95% CI | | 80% CR | |
|--|----------|----------|----------|----------|-----------|-------|--------|------|--------|------|
| | | | | | | | LL | UL | LL | UL |
| Learning | 153 | 9,716 | .69 | .73 | .74 | .83 | .62 | .85 | -.22 | 1.68 |
| Affective learning | 55 | 4,630 | .51 | .54 | .39 | 4.16 | .44 | .65 | .04 | 1.04 |
| Cognitive learning | 48 | 3,206 | .99 | 1.05 | .93 | .00 | .79 | 1.30 | -.14 | 2.24 |
| Skill-based learning | 103 | 5,437 | .49 | .51 | .72 | 2.25 | .37 | .65 | -.41 | 1.43 |
| Training method | | | | | | | | | | |
| Information | 21 | 1,568 | .57 | .60 | .66 | 1.37 | .31 | .89 | -.24 | 1.44 |
| Practice | 10 | 302 | .27 | .28 | .13 | 47.21 | .13 | .44 | .11 | .45 |
| Information and demonstration | 5 | 177 | 1.07 | 1.14 | .78 | .10 | .44 | 1.85 | .14 | 2.15 |
| Information and practice | 46 | 2,164 | .57 | .60 | .68 | 2.18 | .40 | .79 | -.28 | 1.47 |
| Information, demonstration, and practice | 29 | 1,913 | 1.16 | 1.24 | .74 | .35 | .97 | 1.51 | .29 | 2.19 |
| Feedback | | | | | | | | | | |
| Feedback | 44 | 2,437 | .75 | .79 | .69 | .78 | .59 | .99 | -.09 | 1.67 |
| No feedback | 108 | 7,279 | .68 | .71 | .75 | .83 | .57 | .85 | -.25 | 1.68 |
| Single-source feedback | 6 | 363 | .63 | .66 | .28 | 6.53 | .42 | .91 | .31 | 1.02 |
| 360-feedback | 8 | 430 | .54 | .57 | .49 | 3.48 | .20 | .93 | -.06 | 1.20 |
| Needs analysis | | | | | | | | | | |
| Needs analysis | 30 | 1,218 | 1.05 | 1.12 | .98 | .03 | .76 | 1.47 | -.14 | 2.38 |
| No needs analysis | 123 | 8,498 | .64 | .68 | .68 | 1.15 | .56 | .80 | -.19 | 1.54 |
| Spacing effect | | | | | | | | | | |
| Spaced | 116 | 7,526 | .70 | .74 | .76 | .73 | .61 | .88 | -.23 | 1.72 |
| Massed | 17 | 1,344 | .86 | .92 | .74 | 1.16 | .57 | 1.26 | -.03 | 1.86 |
| Setting | | | | | | | | | | |
| Virtual | 10 | 620 | .52 | .55 | .31 | 7.45 | .34 | .76 | .16 | .94 |
| Face-to-face | 116 | 6,916 | .74 | .78 | .82 | .55 | .63 | .93 | -.27 | 1.83 |
| Location | | | | | | | | | | |
| On-site | 27 | 2,001 | .95 | 1.01 | 1.09 | .01 | .62 | 1.41 | -.38 | 2.40 |
| Off-site | 31 | 2,493 | .80 | .84 | .39 | 1.07 | .70 | .98 | .35 | 1.34 |
| Attendance | | | | | | | | | | |
| Voluntary | 47 | 3,038 | .65 | .69 | .64 | 1.29 | .50 | .87 | -.13 | 1.50 |
| Involuntary | 25 | 2,323 | .88 | .94 | .76 | .10 | .64 | 1.23 | -.04 | 1.91 |
| Leader level | | | | | | | | | | |
| High-level | 16 | 627 | .49 | .52 | .72 | 2.91 | .17 | .87 | -.40 | 1.45 |
| Middle-level | 32 | 1,784 | .63 | .67 | .82 | 1.02 | .39 | .95 | -.38 | 1.71 |
| Low-level | 25 | 1,692 | .93 | .99 | .83 | .04 | .66 | 1.31 | -.08 | 2.05 |
| Evaluator's affiliation | | | | | | | | | | |
| Academic | 106 | 6,692 | .65 | .68 | .65 | 1.33 | .56 | .81 | -.15 | 1.51 |
| Practitioner | 19 | 785 | .25 | .26 | .62 | 5.84 | -.02 | .53 | -.53 | 1.05 |
| Mix | 24 | 1,774 | 1.14 | 1.21 | .90 | .15 | .86 | 1.56 | .06 | 2.36 |
| Content | | | | | | | | | | |
| Intrapersonal | 4 | 265 | .69 | .73 | .18 | 8.21 | .50 | .95 | .50 | .95 |
| Interpersonal | 9 | 263 | .36 | .38 | .29 | 17.92 | .13 | .64 | .02 | .75 |
| Leadership | 21 | 1,232 | .62 | .66 | .57 | 2.03 | .42 | .90 | -.06 | 1.38 |
| Business | 16 | 1,370 | .91 | .97 | .34 | .27 | .79 | 1.14 | .53 | 1.41 |
| Trainer | | | | | | | | | | |
| External | 51 | 2,744 | .70 | .74 | .55 | 1.57 | .58 | .89 | .03 | 1.45 |
| Internal | 23 | 2,396 | .92 | .98 | .98 | .02 | .60 | 1.36 | -.27 | 2.23 |
| Self-administered | 9 | 604 | .50 | .53 | .30 | 7.91 | .31 | .74 | .15 | .91 |

Note. *k* = number of independent studies; *N* = sample size; *d* = repeated measures Cohen's *d*; δ = Cohen's *d* corrected for unreliability in the criterion; *SD* = corrected standard deviation; %Var = percent of variance accounted for by sampling error; CI = confidence interval; LL = lower limit; UL = upper limit; CR = credibility interval.

different from one another, indicating that leadership training programs tend to be equally effective across criteria. Positive effect sizes were also found across more specific evaluation criteria (i.e., cognitive learning/transfer, affective learning/transfer, skill-based learning/transfer, job performance, organizational results, and subordinate results; see Tables 2–5). Upon comparing these more specific criteria, we found that training programs resulted in significantly greater cognitive learning gains ($\delta = 1.05$) than affective learning gains ($\delta = .54$, $t = 3.91$, $p < .05$) and skill-based learning outcomes ($\delta = .51$, $t = 3.84$, $p < .05$; other

comparisons among specific learning outcomes were not significant). For transfer of training, training programs resulted in significantly greater skill-based transfer outcomes ($\delta = .89$) than affective transfer gains ($\delta = .24$, $t = 4.49$, $p < .05$) and job performance gains ($\delta = .56$, $t = 2.02$, $p < .05$). Further, affective transfer ($\delta = .24$) was also significantly lower than cognitive transfer ($\delta = .68$, $t = -2.70$, $p < .05$) and job performance gains ($\delta = .56$, $t = -3.26$, $p < .05$). Training programs also displayed significantly greater improvements in organizational outcomes ($\delta = .75$) than subordinate outcomes ($\delta = .22$, $t = 6.08$, $p < .05$).

Table 4
Meta-Analytic Results: Transfer Criteria

| Meta-analysis | <i>k</i> | <i>N</i> | <i>d</i> | δ | <i>SD</i> | %Var | 95% CI | | 80% CR | |
|--|----------|----------|----------|----------|-----------|--------|--------|------|--------|------|
| | | | | | | | LL | UL | LL | UL |
| Transfer | 190 | 12,124 | .78 | .82 | 1.75 | .09 | .58 | 1.06 | -1.42 | 3.05 |
| Affective transfer | 34 | 1,463 | .23 | .24 | .34 | 14.88 | .11 | .37 | -.19 | .67 |
| Cognitive transfer | 21 | 844 | .65 | .68 | .75 | .75 | .36 | 1.00 | -.27 | 1.64 |
| Skill-based transfer | 155 | 10,233 | .85 | .89 | 1.87 | .04 | .61 | 1.18 | -1.50 | 3.28 |
| Job performance | 35 | 1,686 | .53 | .56 | .48 | 4.09 | .39 | .73 | -.06 | 1.17 |
| Training method | | | | | | | | | | |
| Information | 23 | 1,648 | .43 | .45 | 1.06 | .88 | .03 | .87 | -.91 | 1.81 |
| Practice | 28 | 1,613 | .37 | .39 | .41 | 7.11 | .23 | .55 | -.13 | .91 |
| Information and practice | 43 | 2,548 | .41 | .43 | .39 | 6.61 | .31 | .56 | -.07 | .94 |
| Demonstration and practice | 4 | 270 | .68 | .71 | .00 | 11.58 | .52 | .90 | .71 | .71 |
| Information, demonstration, and practice | 45 | 2,600 | 2.02 | 2.20 | 3.02 | 1.97 | 1.35 | 3.05 | -1.66 | 6.07 |
| Feedback | | | | | | | | | | |
| Feedback | 68 | 4,250 | 1.32 | 1.40 | 2.64 | .13 | .79 | 2.00 | -1.98 | 4.78 |
| No feedback | 122 | 7,648 | .48 | .50 | .51 | 1.90 | .37 | .63 | -.43 | 1.41 |
| Single-source feedback | 7 | 265 | .50 | .52 | .79 | 2.51 | -.06 | 1.10 | -.50 | 1.54 |
| 360-feedback | 16 | 1,015 | .24 | .25 | .27 | 15.84 | .11 | .40 | -.09 | .60 |
| Needs analysis | | | | | | | | | | |
| Needs analysis | 34 | 1,628 | 3.02 | 3.51 | 3.60 | 11.63 | 2.34 | 4.68 | -1.09 | 8.12 |
| No needs analysis | 156 | 10,496 | .40 | .42 | .45 | 5.09 | .34 | .49 | -.16 | .99 |
| Spacing effect | | | | | | | | | | |
| Spaced | 133 | 9,113 | .87 | .92 | 1.89 | .03 | .61 | 1.23 | -1.50 | 3.33 |
| Massed | 24 | 1,149 | .43 | .45 | .65 | 3.25 | .18 | .71 | -.39 | 1.28 |
| Setting | | | | | | | | | | |
| Virtual | 11 | 562 | .21 | .22 | .12 | 27.79 | .06 | .37 | .06 | .37 |
| Face-to-face | 139 | 8,378 | 1.04 | 1.10 | 2.11 | .00 | .76 | 1.43 | -1.59 | 3.80 |
| Location | | | | | | | | | | |
| On-site | 38 | 2,490 | .35 | .37 | .30 | 10.98 | .26 | .47 | -.02 | .76 |
| Off-site | 32 | 3,476 | .51 | .54 | .57 | 1.61 | .34 | .73 | -.19 | 1.26 |
| Attendance | | | | | | | | | | |
| Voluntary | 43 | 2,688 | 1.99 | 2.17 | 3.14 | 1.57 | 1.27 | 3.08 | -1.85 | 6.20 |
| Involuntary | 46 | 3,653 | .36 | .38 | .66 | 2.22 | .18 | .57 | -.48 | 1.21 |
| Leader level | | | | | | | | | | |
| High-level | 19 | 995 | .36 | .37 | .32 | 10.92 | .21 | .54 | -.04 | .78 |
| Middle-level | 44 | 2,413 | .52 | .54 | 1.20 | .72 | .20 | .89 | -1.00 | 2.08 |
| Low-level | 58 | 3,140 | 1.84 | 1.99 | 3.05 | 1.23 | 1.23 | 2.74 | -1.91 | 5.89 |
| Evaluator's affiliation | | | | | | | | | | |
| Academic | 150 | 8,767 | .45 | .47 | .59 | 3.21 | .38 | .56 | -.28 | 1.22 |
| Practitioner | 11 | 697 | 1.28 | 1.35 | 2.07 | .16 | .17 | 2.54 | -1.29 | 4.00 |
| Mix | 29 | 2,660 | 1.88 | 2.04 | 3.26 | .72 | .90 | 3.18 | -2.14 | 6.21 |
| Content | | | | | | | | | | |
| Intrapersonal | 6 | 231 | .21 | .21 | .00 | 100.00 | .09 | .33 | .21 | .21 |
| Interpersonal | 10 | 279 | .26 | .28 | .28 | 23.14 | .04 | .51 | -.09 | .64 |
| Leadership | 35 | 1,289 | .53 | .55 | .65 | 3.22 | .33 | .77 | -.28 | 1.38 |
| Business | 19 | 2,876 | 1.56 | 1.67 | 2.94 | .17 | .39 | 2.94 | -2.10 | 5.44 |
| Trainer | | | | | | | | | | |
| External | 70 | 4,678 | .49 | .52 | .58 | 2.53 | .38 | .65 | -.23 | 1.26 |
| Internal | 18 | 1,172 | .43 | .45 | .54 | 3.63 | .20 | .70 | -.24 | 1.13 |
| Self-administered | 10 | 534 | .21 | .22 | .14 | 25.95 | .05 | .38 | .03 | .40 |

Note. *k* = number of independent studies; *N* = sample size; *d* = repeated measures Cohen's *d*; δ = Cohen's *d* corrected for unreliability in the criterion; *SD* = corrected standard deviation; %Var = percent of variance accounted for by sampling error; CI = confidence interval; LL = lower limit; UL = upper limit; CR = credibility interval.

Concerning Hypothesis 2, programs that included a needs analysis displayed significantly stronger effects for both learning and transfer than those reporting no needs analyses ($t = 2.57, p < .05$; $t = 16.14, p < .05$, respectively). However, this pattern was not found for results, as there was no significant difference between programs that did and did not conduct a needs analysis, $t = -1.59, p > .05$, and this could not be tested for reactions due to a small amount of available primary studies.³ Thus, Hypothesis 2 was supported for two of the three outcomes investigated.

Hypothesis 3c was supported such that voluntary training programs displayed a significantly stronger effect for transfer than involuntary programs, $t = 6.26, p < .05$. However, contrary to

³ Because there were so few studies involving reactions as a criterion, many moderators could not be tested on this criterion. In the analyses that follow, we only discuss moderators of reactions when there were enough primary studies available to conduct the moderator analysis.

Table 5
Meta-Analytic Results: Results Criteria

| Meta-analysis | <i>k</i> | <i>N</i> | <i>d</i> | δ | <i>SD</i> | %Var | 95% CI | | 80% CR | |
|--|----------|----------|----------|----------|-----------|--------|--------|------|--------|------|
| | | | | | | | LL | UL | LL | UL |
| Results | 78 | 11,640 | .66 | .72 | .56 | .76 | .60 | .84 | .01 | 1.43 |
| Organizational outcomes | 53 | 10,466 | .69 | .75 | .56 | .51 | .61 | .89 | .03 | 1.46 |
| Subordinate outcomes | 30 | 2,507 | .21 | .22 | .27 | 11.19 | .11 | .34 | -.13 | .58 |
| Training method | | | | | | | | | | |
| Information | 9 | 1,136 | .10 | .11 | .00 | 67.39 | .04 | .18 | .11 | .11 |
| Practice | 11 | 688 | .35 | .38 | .00 | 24.40 | .25 | .51 | .38 | .38 |
| Information and practice | 22 | 1,208 | .55 | .60 | .63 | 2.20 | .33 | .86 | -.21 | 1.40 |
| Information, demonstration, and practice | 17 | 1017 | .42 | .45 | .58 | 3.71 | .19 | .72 | -.28 | 1.19 |
| Feedback | | | | | | | | | | |
| Feedback | 34 | 2,027 | .76 | .84 | .73 | .61 | .60 | 1.07 | -.09 | 1.77 |
| No feedback | 44 | 9,653 | .64 | .70 | .52 | .64 | .55 | .84 | .04 | 1.36 |
| Single-source feedback | 10 | 364 | .51 | .56 | .80 | 2.60 | .08 | 1.03 | -.47 | 1.58 |
| 360-feedback | 7 | 276 | .72 | .79 | 1.06 | .58 | .04 | 1.54 | -.57 | 2.15 |
| Needs analysis | | | | | | | | | | |
| Needs analysis | 20 | 689 | .40 | .43 | .75 | 3.81 | .11 | .76 | -.52 | 1.39 |
| No needs analysis | 58 | 10,991 | .67 | .73 | .54 | .60 | .60 | .87 | .04 | 1.43 |
| Spacing effect | | | | | | | | | | |
| Spaced | 50 | 8,173 | .45 | .48 | .42 | 2.46 | .37 | .60 | -.05 | 1.02 |
| Massed | 10 | 335 | .17 | .18 | .00 | 59.42 | .05 | .32 | .18 | .18 |
| Setting | | | | | | | | | | |
| Face-to-face | 62 | 8,308 | .43 | .47 | .41 | 3.23 | .37 | .56 | -.05 | .99 |
| Location | | | | | | | | | | |
| On-site | 15 | 1,075 | 1.12 | 1.25 | .76 | .18 | .88 | 1.61 | .28 | 2.21 |
| Off-site | 13 | 1,028 | .37 | .40 | .29 | 7.87 | .21 | .59 | .03 | .77 |
| Attendance | | | | | | | | | | |
| Voluntary | 24 | 1,523 | .48 | .52 | .54 | 3.22 | .30 | .74 | -.17 | 1.21 |
| Involuntary | 12 | 2,846 | 1.24 | 1.39 | .42 | .78 | 1.16 | 1.62 | .85 | 1.93 |
| Leader level | | | | | | | | | | |
| High-level | 6 | 383 | .34 | .36 | .31 | 8.75 | .06 | .67 | -.03 | .76 |
| Middle-level | 24 | 1,217 | .33 | .36 | .62 | 4.15 | .11 | .61 | -.43 | 1.15 |
| Low-level | 18 | 1,303 | .27 | .29 | .00 | 53.60 | .22 | .36 | .29 | .29 |
| Evaluator's affiliation | | | | | | | | | | |
| Academic | 57 | 6,364 | .94 | 1.04 | .61 | .03 | .89 | 1.19 | .26 | 1.83 |
| Practitioner | 6 | 4,211 | .36 | .39 | .21 | 2.67 | .23 | .55 | .11 | .66 |
| Mix | 14 | 1,098 | .53 | .58 | .36 | 4.76 | .39 | .78 | .13 | 1.04 |
| Content | | | | | | | | | | |
| Intrapersonal | 4 | 244 | .62 | .67 | .00 | 100.00 | .61 | .74 | .67 | .67 |
| Interpersonal | 4 | 410 | .37 | .40 | .09 | 31.85 | .25 | .55 | .29 | .50 |
| Leadership | 17 | 5,115 | .45 | .49 | .40 | 1.51 | .31 | .66 | -.03 | 1.00 |
| Business | 8 | 953 | .16 | .18 | .10 | 23.75 | .05 | .30 | .05 | .30 |
| Trainer | | | | | | | | | | |
| External | 37 | 3,186 | .64 | .69 | .65 | 1.06 | .49 | .90 | -.14 | 1.53 |
| Internal | 6 | 173 | .63 | .69 | 1.37 | .64 | -.45 | 1.82 | -1.07 | 2.44 |
| Self-administered | 4 | 363 | .48 | .52 | .21 | 8.74 | .25 | .79 | .25 | .79 |

Note. *k* = number of independent studies; *N* = sample size; *d* = repeated measures Cohen's *d*; δ = Cohen's *d* corrected for unreliability in the criterion; *SD* = corrected standard deviation; %Var = percent of variance accounted for by sampling error; CI = confidence interval; LL = lower limit; UL = upper limit; CR = credibility interval.

Hypothesis 3d, involuntary training programs exhibited a significantly stronger effect for results than voluntary programs, $t = 5.30$, $p < .05$. There was no significant difference between involuntary and voluntary training programs for learning, $t = -1.44$, $p > .05$.

Regarding Hypothesis 4, for results, training programs that spanned across multiple sessions displayed a significantly larger effect size than training programs including one massed training session, $t = 5.26$, $p < .05$. This same pattern was also found for transfer, $t = 2.28$, $p < .05$ but there was no significant difference for learning, $t = -0.97$, $p > .05$, providing support for Hypothesis 4c and 4d, but no support for Hypothesis 4b (Hypothesis 4a could not be investigated).

Our analysis for Hypothesis 5 indicates that training programs provided to a sample of low-level leaders were associated with significantly stronger transfer effect sizes than those provided to high-level leaders, $t = 6.59$, $p < .05$ or middle-level leaders, $t = 4.11$, $p < .05$. There was no significant difference in transfer between high-level leaders and middle-level leaders, $t = -0.89$, $p > .05$. Moreover, for learning, there were no significant differences between high-level and middle-level leaders, $t = -0.65$, $p > .05$, high-level and low-level leaders, $t = -1.90$, $p > .05$, and middle-level and low-level leaders, $t = -1.47$, $p > .05$. This same pattern was found for results, as there were also no significant differences between high-level and middle-level leaders, $t = 0.00$,

Table 6
Meta-Analytic Regression Results: Duration

| Variable | <i>k</i> | β | R^2 | ΔR^2 |
|---------------------------------|----------|---------|-------|--------------|
| Reactions | | | | |
| Model 1: Duration | 6 | .79 | .62 | |
| Model 2: Duration | 6 | 34.95 | | |
| Duration ² | 5 | -34.16 | .68 | .06 |
| Learning | | | | |
| Model 1: Duration | 113 | -.07 | .01 | |
| Model 2: Duration | 113 | -.12 | | |
| Duration ² | 113 | .04 | .01 | .00 |
| Transfer | | | | |
| Model 1: Duration | 145 | -.04 | .00 | |
| Model 2: Duration | 145 | -.20 | | |
| Duration ² | 145 | .17 | .00 | .00 |
| Results | | | | |
| Model 1: Duration | 54 | .32* | .10 | |
| Model 2: Duration | 54 | 2.58* | | |
| Duration ² | 54 | -2.31* | .33 | .23 |
| Model 3 (no outliers): Duration | 52 | .57 | | |
| Duration ² | 52 | -.02 | .30 | .20 |

Note. *k* = number of independent studies; β = standardized estimate; R^2 = variance explained; ΔR^2 = change in R^2 above and beyond Model 1; Duration² is the squared duration term.

* $p < .05$.

$p > .05$, high-level and low-level leaders, $t = 0.56$, $p > .05$, and middle-level and low-level leaders, $t = 0.56$, $p > .05$. Thus, support for Hypothesis 5 was found for one of the three outcomes investigated.

Our analysis for Hypothesis 6 indicates that programs delivered via internal instructors displayed significantly stronger effects for learning than those that were self-administered, $t = 2.12$, $p < .05$. However, there were no significant differences between programs delivered by external and internal trainers, $t = -1.16$, $p > .05$ or self-administered and externally delivered programs, $t = -1.65$, $p > .05$ for learning. Moreover, programs delivered by external instructors were associated with significantly stronger effects for transfer than self-administered programs, $t = 3.72$, $p < .05$ but there was no significant difference between programs which were self-administered and provided by internal trainers, $t = -1.75$, $p > .05$. There was also no significant difference in transfer between programs provided by external trainers and those provided by internal trainers, $t = 0.48$, $p > .05$. Finally, regarding result outcomes there were no significant differences between self-administered training programs and those administered by an internal, $t = -0.31$, $p > .05$ or external, $t = -1.14$, $p > .05$ trainer. There was also no difference for results between programs delivered by external and internal trainers, $t = 0.00$, $p > .05$.

When testing Hypothesis 7, we found that programs utilizing information-based methods exhibited significantly stronger effects for learning than those using practice-based methods, $t = 2.24$, $p < .05$. The opposite pattern occurred for results, and significant differences were not found for transfer, $t = 0.26$, $p > .05$.

Results for Hypothesis 8 show that training programs incorporating information, demonstration, and practice-based methods displayed a significantly larger effect size for learning than programs incorporating only information, $t = 3.15$, $p < .05$ or practice-based methods, $t = 8.32$, $p < .05$. Similarly, programs utilizing all three delivery methods displayed stronger effects for

learning when compared with programs incorporating both information and practice-based methods, $t = 3.93$, $p < .05$. However, no significant differences in learning were found when programs incorporating information, demonstration, and practice were compared with those utilizing information and demonstration, $t = 0.26$, $p > .05$. For transfer, programs including information, demonstration, and practice-based methods displayed significantly stronger effects when compared with programs incorporating only practice, $t = 7.06$, $p < .05$ and information-based methods, $t = 4.22$, $p < .05$. This same pattern was also found for transfer when programs using all three delivery methods were compared to programs incorporating combinations of information and practice-based methods, $t = 7.16$, $p < .05$ and demonstration and practice-based methods, $t = 5.92$, $p < .05$. For the results criterion, programs incorporating all three delivery methods displayed stronger effect sizes when compared to programs using only information-based methods, $t = 2.52$, $p < .05$. However, there was no significant difference between programs utilizing information, demonstration, and practice compared with interventions using information and practice for this outcome, $t = -0.77$, $p > .05$ as well as those using practice only, $t = 0.50$, $p > .05$.

When testing Hypothesis 9, we found programs that included feedback had a significantly stronger effect size for transfer than those with no feedback, $t = 5.69$, $p < .05$. However, there was no significant difference between interventions using feedback and those not incorporating feedback for reactions, $t = 0.79$, $p > .05$, learning, $t = 0.56$, $p > .05$ and results, $t = 0.86$, $p > .05$. Thus, Hypothesis 9 was only supported for one of the four outcomes. No support was found for Hypothesis 10, as there were no significant differences between programs using 360-degree feedback compared to programs using single source feedback for learning, $t = 0.43$, $p > .05$, transfer, $t = 0.92$, $p > .05$, or results, $t = 0.50$, $p > .05$.

Regarding Hypothesis 11, training programs conducted on-site displayed significantly stronger effects for results than programs completed off-site, $t = 4.71$, $p < .05$. However, this effect was not significant for learning, $t = 0.80$, $p > .05$ or transfer, $t = -1.55$, $p > .05$. Our analysis for Hypothesis 12 further indicated that face-to-face programs exhibited a significantly stronger effect size for transfer than virtual programs, $t = -5.94$, $p < .05$. However, there were no significant differences between face-to-face and virtual programs for learning, $t = -1.83$, $p > .05$ and this hypothesis could not be assessed for results or reactions results due to a low number of primary studies. Therefore, Hypothesis 11 and 12 received support for only one criterion.

Table 7
Meta-Analytic Regression Results: Publication Year

| Variable | <i>k</i> | β | R^2 |
|----------|----------|---------|-------|
| Reaction | 7 | .31 | .10 |
| Learning | 150 | -.01 | .00 |
| Transfer | 190 | -.00 | .01 |
| Results | 76 | .34* | .12 |

Note. *k* = number of independent studies; β = standardized estimate; R^2 = variance explained.

* $p < .05$.

Exploratory analyses were conducted to provide further insight into additional factors influencing leadership training effectiveness.⁴ When investigating training content, findings indicate that programs including certain competency domains produced significantly greater effects than others; however, all trained competencies were effective (i.e., exhibited significant, nonzero effect sizes). For learning, those incorporating business competencies displayed greater effects than interpersonal competencies, $t = 3.31, p < .05$ intrapersonal competencies, $t = 2.11, p < .05$. Those with intrapersonal competencies were also greater than interpersonal competencies, $t = 2.36, p < .05$. All other content comparisons, in regard to learning, were not significant. Similar findings were found for transfer. Programs that trained business competencies produced the greatest effects compared with intrapersonal, interpersonal, and leadership ($t = 3.52, 3.17, 2.34$, respectively, $p < .05$), while those incorporating leadership produced significantly greater effects than intrapersonal competencies, $t = 3.26, p < .05$. For results, programs with leadership content produced significantly greater effects than business content, $t = 3.11, p < .05$. Those including intrapersonal content were significantly more effective than programs including interpersonal and business content, $t = 5.73$ and $13.06, p < .05$, and programs including interpersonal content were more effective than business content, $t = 3.87, p < .05$.

Interestingly, results suggested that studies with both academic and practitioner evaluators produced the greatest learning improvements when compared to studies evaluated only by academics, $t = 3.08, p < .05$ or practitioners, $t = 4.31, p < .05$ (see Table 3). Larger learning effect sizes were also associated with solely academic evaluators as compared to practitioners, $t = 2.60, p < .05$. The same was found for transfer, as a mixed set of evaluators was associated with a significantly larger effect size than solely academic evaluators, $t = 4.57, p < .05$. However, for transfer, the difference between a mixed set of evaluators and practitioner evaluators was not significant, $t = -0.75, p > .05$ and neither was the difference between academic and practitioner evaluators, $t = -1.85, p > .05$. Studies with only academic evaluators displayed the largest effects for result outcomes when compared to practitioner evaluators, $t = 5.47, p < .05$ and a mix of evaluators, $t = 3.58, p < .05$ (see Table 5). The difference between a mix of evaluators and practitioner evaluators for results outcomes was not significant, $t = -1.48, p > .05$.

We also ran exploratory analyses for duration of training and publication year as continuous moderators, which are presented in Tables 6 and 7. Training duration exhibited a positive, significant relationship with results ($\beta = 0.32, SE = 0.00, t = 2.43, p = .02$) and nonsignificant relationships with other criteria. To examine whether the relationship between training program length and each outcome is better explained as a curvilinear effect, we tested the curvilinear relationship between duration and each criterion. Results indicated a significant contribution of the quadratic term over and above the linear term ($\beta = -2.31, R^2 = 0.33, \Delta R^2 = 0.23, p < .01$) for result criteria; however, after two influential outliers were removed, the curvilinear effect disappeared ($\beta = -0.02, R^2 = 0.30, \Delta R^2 = 0.20, p > .05$) indicating that longer programs are more effective. The curvilinear relationship was also nonsignificant for reactions, learning, and transfer. Publication year displayed a positive, significant relationship with results ($\beta = 0.34, SE = 0.01, t = 3.14, p = .002$), but there was no significant effect of publication year on any other criteria.

Discussion

The guiding purpose of the current study was to answer the following questions: (a) How effective are leadership training programs? and (b) How should one design, deliver, and implement a leadership training program to maximize effectiveness? To accomplish this objective, we conducted a meta-analytic review of 335 leadership training evaluation studies and investigated whether the effectiveness of training (as measured by positive changes in reactions, learning, transfer, and results; Kirkpatrick, 1959) was significantly affected by the inclusion of several training design, delivery, and implementation features. We elaborate on our findings by answering both questions below.

Question 1: How Effective Are Leadership Training Programs?

Overall, our findings are more optimistic about the effectiveness of leadership training than popular press articles that suggest most leadership training programs are minimally effective (Nelson, 2016) and that leadership cannot be taught because “managers are created, leaders are born” (Morgan, 2015). Specifically, the current results indicate that leadership training is effective in improving reactions ($\delta = .63$), learning ($\delta = .73$), transfer ($\delta = .82$), and results ($\delta = .72$). Moreover, this study is the first to demonstrate that leadership training improves trainee reactions, in contrast to the idea often perpetuated in the popular press that individuals generally dislike training (Kelly, 2012).

Interestingly, not only do the current results suggest inaccuracies in some popular press conclusions about the effectiveness of leadership training, but our results also suggest that previous meta-analyses may have underestimated the effectiveness of leadership training. For example, the current study’s effect sizes are substantially larger than what was previously reported in Burke and Day (1986; $\delta_{learning} = .38; \delta_{transfer} = .49; \delta_{results} = .67$), and although the current results are difficult to compare with meta-analytic effect sizes for learning and transfer provided by Collins and Holton (2004; $\delta_{learning} = .35-.1.36; \delta_{transfer} = .38-1.01$), Powell and Yalcin (2010; $\delta_{learning} = .37 - 1.32; \delta_{transfer} = .30-.63$), and Taylor et al. (2009b; $\delta_{transfer} = .13-.64$), because each

⁴ An additional exploratory analysis was conducted for program label to investigate whether the effectiveness of a training program is related to its label. Leadership researchers and practitioners tend to use several terms interchangeably when referring to leadership training programs (i.e., training, development, leader, leadership, and managerial). Our exploratory analyses showed that the label given to the training program did not impact effectiveness in regard to learning. For transfer, programs labeled “training” resulted in greater outcomes compared with those labeled “development” ($t = 4.72, p < .05$), while the opposite was found for results ($t = -9.82, p < .05$). To investigate this further, we conducted t -test comparisons on programs including “leadership,” “supervisory,” or “management” in their program label. Most labels were not significantly different from one another except for the following: programs labeled “leadership development” produced significantly weaker transfer than those named “leadership training” ($t = -4.88, p < .05$) and “management development” labels were associated with significantly weaker effect sizes than those entitled “leadership training,” “supervisory training,” and “management training” ($t = -5.80, -4.96, -2.33$, respectively; $p < .05$). Regarding results as a criterion, all labels displayed similar effect sizes except programs labeled “leadership development,” as programs with this label were significantly more effective than “leadership training” ($t = 5.68, p < .05$) and “management training” ($t = 10.03, p < .05$).

of these presented a wide range of effect sizes depending on the study design or the rater source, our findings do suggest substantially larger effect sizes for the results criterion than previous meta-analyses (Collins & Holton, 2004: $\delta = .39$; Powell & Yalcin, 2010: $\delta = .35$). Moreover, the current results are generated from more than triple the amount of primary studies included in previous meta-analyses. In answer to the question posed above, our results not only suggest that leadership training is effective, but they also suggest that leadership training is more effective than popular press and previous meta-analyses indicate.

The present effort also indicates that leadership training is effective at improving affective, cognitive, and skill-based outcomes, corroborating prior meta-analytic findings (Avolio, Reichard, et al., 2009). Similarly, results echoed prior work by indicating that affective outcomes are typically lower than cognitive and skill-based outcomes (i.e., affective learning; Avolio, Reichard, et al., 2009; Kalinoski et al., 2013). In most leadership training evaluation studies, the affective outcomes involve emotional states like anxiety (e.g., Eary, 1997). In this context, criteria such as anxiety might be difficult to change because the training content provided to trainees does not necessarily train the leader on how to reduce his or her anxiety, but instead, is designed to improve leadership behaviors (which ideally reduces one's anxiety). For example, Eary (1997) exposed trainees to material related to military leadership, such as communication and team building, but included anxiety levels as an affective outcome. Perhaps if leadership training programs involved more content devoted to the improvement of affective criteria, these programs would be equally effective across affective, cognitive, and learning criteria. Future research should examine whether affective content can improve affective outcomes to a greater extent.

Results also indicate that both organizational and subordinate outcomes increase as a result of leadership training. Interestingly, however, our findings show that leadership training improved organizational outcomes to a greater degree than subordinate outcomes, suggesting that the trickle-up effect (i.e., leadership improvements aggregate up to the organizational-level) is stronger than the trickle-down effect (i.e., leadership improvements flow down to subordinates). We find this surprising given that leadership is a dyadic interaction between leader and follower; thus, the direct network tie between a leader and a follower should naturally allow improvements in leadership to be relayed to followers, whereas the process by which leadership improvements influence organizational outcomes is not as direct (e.g., a leader who has taken transformational leadership training can use the training in daily, direct interactions with her subordinates, but the process via which this training influences ROI is not as direct). Therefore, future research could benefit from a stronger understanding of how to maximize subordinate outcomes of leadership training.

Question 2: How Should One Design, Deliver, and Implement a Leadership Training Program to Maximize Effectiveness?

To address this question, we evaluated 15 training design, delivery, and implementation features through a series of moder-

ator tests. These findings are discussed below along with theoretical implications and areas of focus for future research.

Does a needs analysis enhance the effectiveness of leadership training? Arthur, Bennett, Edens, and Bell's (2003) meta-analysis of the general training literature did not find a clear pattern of results for studies incorporating a needs analysis; however, the current study found support for known training recommendations (Salas et al., 2012; Tannenbaum, 2002) by showing that programs developed from a needs analysis result in greater transfer and learning. Not only does this support longstanding generic training theory and recommendations for training, but it also supports popularly held beliefs in organizations that leadership training is not one size fits all (Gurdjian, Halbeisen, & Lane, 2014). Thus, we recommend leadership training developers conduct a needs analysis before designing a program as the current meta-analytic data suggests this benefits learning and transfer (and is no more/less effective than programs that have not conducted a needs analysis for the results criterion).

Are voluntary leadership training programs more effective than mandatory programs? Our findings suggest voluntary attendance may be a double-edged sword, whereby it increases transfer, yet decreases organizational results (there was no effect on learning). We offer one possible interpretation for these results: Whereas voluntary attendance may increase transfer because it increases trainee motivation, it may also result in lower attendance, and thus, a reduced number of trainees whose leadership improvements can influence higher-level, organizational results. When looking at the average sample size within our meta-analytic database, categorized by outcome type and attendance policy, we found some support for this explanation. The average sample size for mandatory programs evaluating organizational outcomes was 263 trainees but only 41 trainees for voluntary programs. Therefore, perhaps mandatory programs foster organizational outcomes to a greater degree because the number of participants is larger.

Are temporally spaced training sessions more effective than massed training sessions? Interestingly, the current results suggest that distributed leadership training sessions do not result in an increase in learning outcomes, despite the noted importance of this method across learning theories (Hintzman, 1974; Paas et al., 2004; Sweller et al., 1998). Learning seems to occur regardless of the timing of training, suggesting that leadership content can be cognitively retained following a massed session. However, transfer and results criteria did produce findings that varied across temporal spacing; programs with multiple sessions spaced temporally resulted in greater transfer and results than massed training sessions. Therefore, although spacing did not directly impact learning in this context, it appears that spacing is nevertheless beneficial for the downstream outcomes of transfer and results. A number of leadership training programs hold spaced training sessions (e.g., the Rockwood Leadership Institute, National Seminars Training's Management & Leadership Skills for First-Time Supervisors & Managers, Academy Leadership's Leadership Boot Camp), and due to their popularity, we sought to determine whether the time interval between sessions affects outcomes (i.e., weekly vs. daily). We conducted an exploratory, follow-up analysis and found no significant differences regarding learning and transfer between programs with sessions spaced daily or weekly; however, programs with sessions spanned weekly ($\delta = 1.14$) produced larger

effects in the results criterion compared to those spaced daily ($\delta = .44$; $t = 3.97$, $p < .05$).

Is leadership training more effective for low-level leaders than high-level leaders? Previous meta-analytic work found that leadership training results in greater gains for low-level leaders compared with middle- and high-level leaders (Avolio, Reichard, et al., 2009); however, in this previous meta-analysis, outcome criteria were combined into a single outcome variable, obscuring an understanding of whether this apparent ceiling effect for higher-level leaders exists for all training criteria. In the current study, our results demonstrate that this ceiling effect is present only for transfer. High-, middle-, and low-level leaders experienced similar learning gains and similar improvements in the results criterion, suggesting that higher-level leaders are as equally motivated to learn as lower-level leaders and equally likely to improve organizational and subordinate outcomes. Thus, the current study suggests that middle- and high-level leaders can benefit from training (i.e., they can acquire new knowledge, skills, and abilities from training and improve organizational and subordinate outcomes), despite recent arguments that propose the expenditure of resources on developing senior leaders is wasteful because they are set in their ways (Lipman, 2016). In contrast, our findings showed stark differences in the transfer criterion across leader level such that transfer effects were approximately four times weaker for high-level leaders, perhaps indicating that the greater experience of high-level leaders has led to entrenched behaviors that are difficult to change. Thus, our results also suggest that higher-level leaders may require training that specifically focuses on enhancing transfer. In summary, the current results appear to indicate that previous findings were not due to a ceiling effect (i.e., wherein high-level leaders have no room to improve) or a motivational deficit (i.e., wherein high-level leaders are not motivated to learn), but rather a “transfer problem” (Baldwin & Ford, 1988, p. 63) that is perhaps caused by well-established behaviors that are difficult to change on-the-job, although this needs to be confirmed with future research.

Are self-administered leadership training programs less effective than those administered by someone from the trainee’s organization (i.e., internal), or by someone outside of the organization (i.e., external)? The current results indicate that self-administered leadership training programs are less effective than training administered by an internal or external trainer. Although self-administered training programs still exhibited nonzero improvements, because their effectiveness compared to other training programs was substantially reduced, we caution practitioners from using self-administered leadership training programs and we urge academics to examine why these programs are less effective (e.g., Do self-administered trainees perceive the training to be less valuable? Are these trainees subsequently less motivated?).

Are practice-based training delivery methods more effective than information-based and demonstration-based delivery methods? Does the use of multiple training delivery methods increase the effectiveness of leadership training programs? Supporting previous meta-analytic research (Burke & Day, 1986; Taylor et al., 2009b) and basic learning theories that include practice as an essential component of learning (Kolb, 1984; Piaget, 1952), practice-based methods tend to be more effective than other delivery methods (i.e., practice was more effective than other methods for results, and equally effective for transfer). Also par-

allel to recommendations, we found that programs incorporating multiple methods were significantly more effective than programs using either a single delivery method or two delivery methods (Salas et al., 2012). In fact, by adding one or two methods to a single delivery method, transfer can be increased by more than one standard deviation. These results were consistent across outcome criteria; therefore, we recommend training developers utilize practice if only one delivery method can be used, but employ multiple delivery methods whenever possible.

Does feedback enhance the effectiveness of leadership training? Is 360-degree feedback more effective than feedback from a single source? The current results suggest that feedback significantly improves the onset of transfer following a leadership training program, further bolstering the argument for the use of feedback within training programs (e.g., Ford et al., 1998; Kluger & DeNisi, 1996; Smith-Jentsch, Campbell, Milanovich, & Reynolds, 2001). The same pattern was found for reactions, learning, and results such that the meta-analytic effect size for programs reporting the use of feedback were greater than those without—albeit this effect was nonsignificant. These findings indicate that there is utility in providing trainees with feedback during a leadership training intervention, with an emphasis on effectively designed feedback. Perhaps the nonsignificant difference in reactions, learning, and results stems from not implementing effective feedback designs. For instance, feedback provided within the context of leadership training may be focused more on characteristics of the self instead of task activities, as feedback intervention theory suggests (Kluger & DeNisi, 1996; Kluger & DeNisi, 1998), leading to a decrease in feedback effectiveness. Our findings also illustrate the use of 360-degree feedback in leadership training programs, as compared with not using 360-degree feedback, is related to higher results, but lower levels of learning and transfer. As these differences were not statistically significant and the effect sizes were generated from a relatively low number of primary studies (due to a lack of information available), it highlights the need for future research surrounding the use of 360-degree feedback in the leadership development domain. The current results prove to be surprising given the widespread use of 360-degree feedback (i.e., approximately 90% of large organizations report the use of this feedback method; ETS, 2012), and may lend initial support to DeNisi and Kluger’s (2000) argument that multisource feedback might not be universally useful. For example, in the context of leadership training, increasing the number of feedback sources may not result in additional information received by the leader beyond feedback from a single-source (Borman, 1998; DeNisi & Kluger, 2000) and perhaps when negative feedback is received from multiple sources, this information could thwart improvement in one’s learning or behavioral transfer because it threatens one’s self-view. As such, the current findings indicate that the effect of 360-degree feedback on training outcomes might be more complex than originally concluded (i.e., potentially inhibiting learning and transfer, while improving organizational and subordinate outcomes), highlighting a need for more research on this training method.

Are on-site training programs more effective than off-site training programs? Arthur et al. (2003) noted there was an extreme paucity of research on training location in their meta-analysis of the generic training literature. Over a decade later, we are able to provide meta-analytic evidence that supports the use of

on-site training as it improves results to a greater degree than off-site training (on-site training is equally effective as off-site training for learning and transfer criteria). Employees learn and transfer material from off-site programs adequately; however, these programs may be less applicable to a trainee's work environment, leading to a decrease in result outcomes. Specifically, off-site programs may feature less involvement from organizational insiders, relying instead on personnel who lack familiarity with the training needs of the employees and the organization. Consequently, the program utilized may have more of a one-size fits all nature. This is problematic, as a one-size fits all approach has been criticized for not addressing the specific needs of the organization; specifically, within the context of assessment centers, Krause and Gebert (2003) suggested that custom-made programs may be "more sensitive and more precise in depicting a company's environment and dynamics, as well as individual jobs" (Krause & Gebert, 2003, p. 396) than off-the-shelf interventions. We argue that this idea can also be applied to leadership training, as custom-made leadership training programs may better address the organization's leadership needs. However, we further note that the decreased organizational results associated with off-site training, as compared with on-site training programs, may also stem from additional sources, such as reduced fidelity or reduced convenience for attendees. Given this, we recommend that leadership training programs use on-site training and we note that future research would benefit from an examination of why on-site programs tend to be more effective than off-site programs.

Are leadership training programs that are virtually based less effective than face-to-face programs? Despite the recent surge of interest in virtually based leadership programs (e.g., Harvard Business Publishing, 2013), no meta-analytic comparisons among these programs and face-to-face leadership training programs have been made, until now. In contrast to meta-analytic research suggesting that web-based programs are more effective than face-to-face programs in the generic training literature (Sitzmann, Kraiger, Stewart, & Wisher, 2006), our results suggest the opposite to be true. Specifically, we found greater transfer increases after face-to-face leadership training compared to virtually based leadership training (and no difference between modalities for learning criteria). It may be the case that virtually based courses can be less effective for some criteria because this modality involves fewer opportunities for demonstration and practice (i.e., the effect of modality may be spurious) and future work should examine whether virtually based programs that use the same delivery method as face-to-face programs are equally effective.

Does some leadership training program content result in greater outcomes than other content? Previous meta-analyses suggest that leadership training outcomes are affected by the content trained (Burke & Day, 1986; Taylor et al., 2009b), and the current results support this claim. Regarding both learning and transfer, programs that trained business skills (e.g., problem-solving, data analysis, monitoring budgets) were the most effective, paralleling Hogan and Warrenfeltz's (2003) theory that business skills are the easiest to train out of the four competency domains. In contrast, we found that soft skills (i.e., leadership, interpersonal, intrapersonal competencies) improved organizational and subordinate outcomes (i.e., results) more than hard skills (i.e., business), supporting leadership theories that highlight the importance of softer skills (e.g., leader-member exchange, Dan-

sereau, Graen, & Haga, 1975; transformational leadership, Burns, 1978). Thus, these results appear to suggest that although hard skills are the easiest to learn and transfer, soft skills matter the most for organizational and subordinate results. These results run counter to the anticipated demand for hard skills among employers (Schawbel, 2014), suggesting that softer skills are more important in predicting desired organizational and subordinate outcomes.

Do leadership training programs evaluated by a team of practitioners and academics result in greater outcomes compared with those evaluated by either academics or practitioners? Management literature has long acknowledged the gap between science and practice and has noted that bridging this gap would provide mutual enrichment in the field (Hodgkinson & Rousseau, 2009). In support of this, our findings indicate that leadership training programs evaluated by a team of academics and practitioners exhibited significantly greater learning and transfer outcomes compared to those evaluated by academics or industry experts only. This finding supports the argument that the scientist-practitioner model is necessary for producing superior work (Jones & Mehr, 2007). Although it is unclear whether mixed scientist and practitioner author teams worked together to design and deliver the training, results suggest that academics and practitioners who work together to evaluate (and possibly design/deliver) leadership training programs are producing more effective programs, suggesting academics and practitioners should collaborate on leadership training ventures whenever possible.

Are longer leadership training programs more effective? Although Taylor et al.'s (2009b) meta-analysis of leadership training did not find support for training length as a continuous moderator of training effectiveness, we found some evidence that length of training has an impact on effectiveness. Specifically, we found a linear relationship between training duration and the results criterion, indicating that longer training programs lead to improved organizational and subordinate outcomes (a curvilinear relationship was not supported after outliers were removed). These results are counterintuitive as they do not fully support CLT (which suggests that information overload causes strain on working memory capacity reduced learning; Paas et al., 2004), which would predict a negative relationship between training duration and effectiveness. Future research would benefit from an examination of whether the increased effectiveness associated with longer programs is due to increased knowledge transfer, more time for multiple delivery methods, or perhaps increases in trainee perceptions of training program value.

Has the effectiveness of leadership training increased over time? Current results suggest that over time, the effect of leadership training on results has increased; however, this was not the case for learning or transfer (i.e., improvements in learning and transfer have been relatively steady over time). This bolsters the common theme across the current data that leadership training is more valuable than previously thought (cf. Zimmerman, 2015; Myatt, 2012). In fact, the leadership training industry has improved its impact on results over the years.

Limitations

The current study provides several noteworthy contributions to the literature; however, there are several limitations. First, we note that we were only able to include evaluations of leadership training

programs reported in available unpublished and published literature. It is probable that effective leadership training programs are published more often than ineffective leadership training programs. Although our publication bias analyses indicated no bias, we note that ineffective leadership training programs might also be disproportionately excluded from unpublished work (i.e., organizations with ineffective programs do not give researchers access to data about the effectiveness of these programs). Thus, despite a lack of publication bias evident in the current article, our results may still be upwardly biased because our meta-analytic database can only reflect existing studies, which are more likely to have been conducted on effective rather than ineffective training programs. Moreover, our results may not represent trends evident in practice that are not documented within available literature. For example, many leadership training programs have focused on emotional intelligence since Goleman's (1998) widely read commentary on emotional intelligence in leadership, but we did not have enough data to specifically analyze emotional intelligence training for leaders separately from other forms of training. Second, despite the noted popularity of measuring training effectiveness with reactional data (Patel, 2010), the current search effort only identified seven experimental studies reporting trainee reaction data. We found that studies reporting reactions tend to utilize a post-only study design instead of a prepost or independent groups experimental design, excluding the vast majority of primary studies that report reactions from meta-analytic examination. Although the current results indicate that leadership training improves trainee reactions, because of the lack of reaction data, any moderator analyses conducted within this criterion should be interpreted with caution (we provide several moderated effect sizes in Table 2 as initial evidence that should be confirmed with future research). Given that most organizations include reaction data in

their evaluation efforts (Patel, 2010), we urge scholars to interpret this lack of available primary data as a signpost for future research in this area.

Practical Implications

The current meta-analytic evidence stands in direct opposition to the recent argument posed by Myatt (2012), a popular press contributor, that leadership training "is indeed the #1 reason leadership development fails." This study provides substantial evidence from 335 leadership training evaluation studies that these programs are effective and should be used across a variety of domains. In fact, results suggest that leadership training programs can lead to a 25% increase in learning, 28% increase in leadership behaviors performed on-the-job (i.e., transfer), 20% increase in overall job performance, 8% increase in subordinate outcomes, and a 25% increase in organizational outcomes (percent increase is equal to Cohen's $U_3 - 50$; Cohen, 1988). The results also suggest that the extent to which a program is effective is related to various design, delivery, and implementation elements. As such, this study is meant to serve as a guide for practitioners when developing a leadership training program, and in this vein, we provide a summary of our recommendations to practitioners in Table 8.

The current results suggest that practitioners should identify intended outcomes before developing a leadership training program because training design characteristics affect each outcome differently. As such, questions for practitioners to ask at the early stages of development include: *Who are my stakeholders and what outcome(s) are they trying to obtain? Am I interested in multiple outcomes, and if so, are some outcomes more important than others?* If developers do not have a clear objective, the current results suggest a needs analysis may not only guide the develop-

Table 8
Evidenced-Based Best Practices for Designing a Leadership Training Program

1. Resist the temptation to think that leaders cannot be trained; evidence suggests leadership training programs are effective.
2. Conduct a needs analysis and identify the desired outcome(s) based on stakeholder goals before designing the program.
3. Use multiple delivery methods when possible (e.g., information, demonstration, and practice) and if limitations prevent this, choose practice instead of other delivery methods.
4. Use caution when spending additional resources on 360-degree feedback (evidence indicates that it might not be more effective than single-source feedback).
5. Provide multiple training sessions that are separated by time rather than a single, massed training session.
6. Use caution when implementing self-administered training and instead, choose an internal or external trainer (evidence shows no differences in the effectiveness of internal and external trainers but indicates that self-administered training is less effective).
7. Consult with others outside of your field to ensure the program is both evidence-based and practically relevant (e.g., if you are a practitioner, collaborate with an academic).
8. Ensure the program is designed appropriately according to the desired outcome using the guidelines provided below.

| Learning | Transfer | Results |
|--|--|---|
| <ul style="list-style-type: none"> • Use multiple delivery methods • Conduct a needs analysis • Include hard skills (i.e., business skills) | <ul style="list-style-type: none"> • Use multiple delivery methods • Conduct a needs analysis • Provide feedback • Use a face-to-face setting • Make attendance voluntary • Have multiple sessions • Include hard (i.e., business skills) and soft skills (i.e., leadership skills) | <ul style="list-style-type: none"> • Use multiple delivery methods • Hold on-site • Require mandatory attendance • Have multiple sessions • Provide as much training as possible (longer programs are more effective) • Include soft skills (i.e., intrapersonal, interpersonal, and leadership skills) |

Table 9
Examples of Effective Training Programs

| Moderator | Citation | Example | Effect size |
|-------------------------------|---------------------------------|---|-------------------------------------|
| Needs analysis | Porras et al. (1982) | “Targeted supervisory skills were selected from a problem list created during the needs-assessment portion of the organizational diagnosis” (p. 437). | .74 _T |
| | Baron et al. (1984) | The content was “developed by examining the responsibilities, activities, and interactions of child care administrators and by adapting the teaching and social interaction technology that is used in Teaching-Family programs to managerial interactions” (p. 264). | .64 _L |
| | Santríc Milicevic et al. (2011) | “The project began with manager competency needs assessment. Assessment results were used to design training and supervision so that each management team had a long term strategy, a business case plan and an implementation plan for total quality management of the work process at the end of the project” (p. 248). | 1.34 _T |
| | Morin and Latham (2000) | “Prior to conducting this study, all supervisors had attended a one-day training programme on interpersonal communication skills. A needs analysis revealed that the participants had thorough knowledge of the requisite communication behaviours, but lacked confidence in applying them on the job. Hence, a one-day refresher training programme was conducted” (p. 569). | .95 _T |
| | Osborne (2003) | “In addition to program participant needs assessments completed prior to the commencement of each program module, I requested that executive committee members also complete a general needs assessment. Such information enabled me to focus program design on the needs of those sponsoring the program as well as on the needs of individual participants. The anonymous responses to this needs assessment were combined and analyzed. I highlighted frequent comments and used the information gained to guide program design and implementation. For example, several committee members expressed a concern for measurement of program impact. Once I determined that this was a need, I incorporated the pre and post program testing as well as interim and final benchmark statement comparisons into the study design” (p. 71). | .81 _T |
| | House (2001) | “The program was designed and developed after an extensive six month needs assessment was conducted to identify the skills and competencies new managers needed to be successful in the company’s environment. The needs assessment included interviewing and conducting focus groups with new and experienced managers in the company, executives of the company and human resources professionals. In addition, the needs assessment included benchmarking with other high technology companies to assess their management training practices” (p. 14). | 2.02 _L |
| Attendance policy | Fitzgerald and Schutte (2010) | “They participated voluntarily and were free to withdraw from the study at any time” (p. 499). | .76 _T |
| | Suwandee (2009) | “The consent forms for program participation were provided to the middle executives of Kasem Bundit University in order to select volunteers to attend the program. Consequently, the participants were willing to enhance their knowledge and insights toward their organizational leadership potential” (p. 80). | .72 _T |
| Spacing effect | Alexander (2014) | The training was mandatory. | 1.34 _{RE} |
| | Green (2002) | “The training program is seven days in length, but the training sessions do not run consecutively. The training program design provides that participants attend three days of training, return to the workplace for three weeks, and then return to attend two days of training. There is another three-week break before participants return for the final two days of training. During the periods between the training sessions, participants are asked to apply the skills learned and to return to the course with prepared assignments about their learning experiences” (pp. 53–54). | .86 _T |
| | Parry and Sinha (2005) | There was a 2-day intervention, followed by 3 months of implementing the leadership development program at work, and then another 2-day intervention. | .74 _T .98 _{RE} |
| Trainees’ level of leadership | Hassan, Fuwad, and Rauf (2010) | “Training was divided into four modules that were offered with a lag of 7 days” (p. 126). | .78 _T 1.28 _{RE} |
| | Allen (2010) | Participants were from nursing unit teams that rotate team leadership on a yearly basis. | 1.25 _T |
| | Latham and Saari (1979) | Trained first-line supervisors. | 1.18 _T |
| Internal vs. External trainer | Bostain (2000) | Trained first-line supervisors. | 4.17 _T |
| | May and Kahnweiler (2000) | Trained first-line supervisors. | 1.13 _T |
| | Birkenbach et al. (1985) | “The second author was asked to train personnel from the training department of the company in the use of behaviour modelling . . . After the initial training course, the author worked with company training staff in developing the in-company programme. The major inputs were, however, made by the company’s own trainers” (p. 13). | 1.44 _L |

(table continues)

Table 9 (continued)

| Moderator | Citation | Example | Effect size |
|--|--|--|---|
| Practice-based method | Donohoe et al. (1997) Nemeroff and Cosentino (1979) | The Employee Assistance Programs (EAPs) coordinator trained the supervisors. "Two research associates from the Life Office Management Association served as 'trainers' and administered the feedback and feedback plus goal setting treatments" (p. 569). | 1.94 _L .71 _T .61 _{RE} |
| | Bozer, Sarros, and Santora (2013) | "The coaching process included 10 to 12 sessions with weekly interventions. All coaching activities commenced with an assessment and identification of a developmental issue, followed by a feedback session, goal setting, action planning, and follow-up sessions, and concluded with an evaluation of outcomes, consistent with established coaching procedures" (p. 282). | .94 _{RE} |
| | Nemeroff and Cosentino (1979) | Goal setting was used in the training. | .61 _{RE} |
| Information-, demonstration-, and practice-based methods | Yirga (2011) | The Basic Leadership Development Program involved reading material, class lectures, a coaching experience, and a team project. | 1.12 _L |
| | Hassan, Fuwad, and Rauf (2010) | "Importance of setting specific, difficult but attainable, goals was discussed in a lecture setting. Afterwards, a day long interactive session was conducted to identify appropriate goals and objectives for all participants according to their work requirements. Role playing and in basket exercises were conducted. The session concluded with a case study situation requiring transformational leadership exhibition by participants. Participants were then asked to come up with their goals and objectives in the next session" (p. 126). The other sessions included an assessment on what the leaders knew about transformational leadership, role playing, and self-reports on their behavioral changes. | .78 _T 1.28 _{RE} |
| | Donohoe, Johnson, and Stevens (1997) | The training program included a discussion, a training film, and an activity for the supervisors to assess employee behavior and then re-assess the employee using a handbook's evaluation criteria. | 1.94 _L 1.07 _T |
| Feedback | House (2001) | "Methods used to teach the program included a business simulation, lecture and discussion sessions, interactive role playing, case studies and skill building exercises. In addition, the program hosted four executive guest speakers throughout the week long training program" (p. 14). | 2.02 _L |
| | Engelbrecht and Fischer (1995) | "Feedback is given by the assessors to the senior of the participant, detailing strengths and weaknesses and also focusing on developmental action plans for the participant. A detailed and lengthy feedback is also given to the participant in an interactive (facilitative) manner" (p. 395). | .61 _T |
| | Nemeroff and Cosentino (1979) | "One-hour interviews were held with each manager, and specific feedback on subordinate's perceptions of 43 interview behaviors was reviewed and discussed. Feedback was given at one point in time by an external source other than the manager's boss (trainer), in a face-to-face oral transmission session. In terms of content, the feedback given was in the form of means and standard deviations from the questionnaire responses of the manager's subordinates. Norms were also provided in the form of scale and item mean and standard deviations for the total sample of managers in the company. The feedback, together with the norms, permitted managers to determine their own strengths and weaknesses on specific interview behaviors and to determine areas in which improvements might be needed. The meaning of the feedback data and sample norms was carefully explained to each manager by the trainers. Moreover, during the feedback sessions, great care was taken to insure a minimum of threat to the managers. They were asked to view the feedback as diagnostic rather than evaluative. The trainers pointed out that the feedback information would have developmental implications only to the extent that the managers used it to increase their repertoire of effective appraisal interview skills" (p. 569). | .71 _T |
| On-site | Barling, Weber, and Kelloway (1996) Knox, (2000) | "The study took place in one region of one of the five largest banks in Canada" (p. 828). | .84 _{RE} |
| | Neck and Manz (1996) | The training took place at a facility within the corporation and "established trainers currently employed or contracted by the company were used to facilitate the courses" (p. 34). | .70 _{RE} .61 _{RE} |
| | Allen (2010) | "The setting for the training study was the Agency Accounting Department of America West Airlines. America West is an international commercial airline employing approximately 12,100 people. America West Airlines is a major carrier based in Phoenix, Arizona with hubs in Phoenix, Las Vegas, and Columbus, Ohio" (p. 448). | |
| Face-to-face | Allen (2010) | Coaching, instruction, reflection, and team meetings were face-to-face. | 1.25 _T |

Note. R = reactions; L = learning; T = transfer; RE = results.

ment of the program, but may also result in a more effective program. Interestingly, our results also suggest voluntary training programs seem to be a double-edged sword, which is of concern for practitioners because most are hoping to increase both transfer and results. As previously mentioned, an explanation of this finding is that mandatory programs increase employee participation, thereby increasing the onset of higher-level, organizational results. Because more employees are in attendance, the effects are more likely to disseminate throughout the organization; greater attendance equals greater results. From this, we argue that training developers and researchers should identify ways in which voluntary training programs can be more appealing to employees. Within the marketing literature, many researchers have identified effective promotional methods (e.g., Goldsmith & Amir, 2010; Grönroos, 1982; Khan & Dhar, 2010) such as bundling, in which two or more products are packaged together (Stremersch & Tellis, 2002), and research suggests this practice increases sales (e.g., Chakravarti, Krish, Paul, & Srivastava, 2002; Yadav & Monroe, 1993). Leadership training programs that are advertised as a “bundled” program (e.g., programs teaching leadership skills and providing exposure to a new technology) may also have greater “sales” (i.e., voluntary attendance) than training interventions advertised as targeting a single leadership competency.

In addition to the list of recommendations provided in Table 8, we also provide specific examples of highly effective training design, delivery, and implementation elements in Table 9, which were gathered by examining the primary studies within each hypothesized moderator that exhibited strong effect sizes (e.g., if a practitioner wanted to develop a training program with feedback, s/he may use Table 9 for examples of how feedback has been successfully incorporated into leadership training in previous work).

Conclusion

The current meta-analysis offers several contributions to the leadership and training literatures. First, our results suggest that leadership training is substantially more effective than previously thought, leading to improvements in perceptions of utility and satisfaction, learning, transfer to the job, organizational outcomes, and subordinate outcomes. Moreover, all but seven of the 120 effect sizes were positive and significantly different from zero, indicating that leadership training likely improves outcomes, regardless of its design, delivery, and implementation elements (i.e., leadership training is rarely a “failure;” cf. Myatt, 2012). Second, the current results suggest that leadership training is most effective when the training program is based on a needs analysis, incorporates feedback, uses multiple delivery methods (especially practice), uses spaced training sessions, is conducted at a location that is on-site, and uses face-to-face delivery that is not self-administered. Third, our results also have a variety of practical implications for the development of training programs, which we have summarized in Table 8 and provided examples of in Table 9 in order to guide scientists and practitioners in the development of evidence-based leadership training programs. Finally, we note that although the current meta-analysis suggests leadership training is effective, it does not promote a one-size fits all approach; many of the moderators of leadership training effectiveness investigated in the current study were important for some criteria but not all,

indicating that training program developers should first choose their desired criterion (or criteria) and then develop the training program based on this criterion.

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