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## Leader Self and Means Efficacy: A multi-component approach

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## ABSTRACT

Leader Self and Means Efficacy (LSME) is conceptualized as leaders' level of perceived capability to self-regulate their thoughts and motivation, draw from means in their environment, and act successfully across a span of leader challenges and tasks in their current context. We demonstrate the construct validity of LSME and test its relationship with outcomes over five studies and five diverse samples. In four of these samples we demonstrated validity in predicting leader motivation, contingent reward and transformational leadership behaviors, and performance in periods spanning up to 8-weeks in duration. Implications for future research on Leader Self and Means Efficacy and developing and testing the LSME construct and its application to practice are discussed.

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## Introduction

Organizations are often dynamic and complex, creating a broad range of challenges for leaders (Marion & Uhl-Bien, 2001). To meet these demands, leaders must not only hold sufficient knowledge, skills and abilities, but also self-concepts that provide the psychological resources needed to successfully employ those capabilities across dynamic and changing contexts (Hannah, Woolfolk, & Lord, 2009; Lord & Hall, 2005). Psychological resources such as self-efficacy have been shown to promote flourishing, positive affectivity, and a broadened perspective on possible thought and behavior choices during times of change and stress in general (Fredrickson, 2001). Leader self-efficacy specifically has been linked to outcomes such as ratings of leader potential and motivation to lead (Chan & Drasgow, 2001), organizational commitment (Paglis & Green, 2002), simulated organizational performance (Wood & Bandura, 1989b), and perceived leader performance (Chemers, Watson, & May, 2000).

Hannah, Avolio, Luthans, and Harms (2008) reviewed the research which had assessed leader or manager self-efficacy since Wood and Bandura (1989a, 1989b) first linked Bandura's (1986, 1997) self-efficacy construct to management. Hannah et al. (2008) noted that despite the general recognition of the importance of leader efficacy to leader effectiveness, much further work is needed concerning construct development and measure valida-

tion, and that major theoretical and empirical gaps remain. First, from a theoretical perspective, all prior studies have focused on leader self-efficacy and have neglected to account for leaders' beliefs in the extent that people, resources and other means in their environment can enhance or deter their leadership (Eden, 2001). As Eden states, "self-efficacy is only half of the efficacy story" (Eden, Ganzach, Granat-Flomin, & Zigman, 2010, p. 688), as research has shown that means efficacy operates along with self-efficacy to separately and distinctly influence performance (e.g., Eden & Granat-Flomin, 2000; Eden et al., 2010; Walumbwa, Avolio, & Zhu, 2008; Walumbwa, Cropanzano, & Goldman, 2011). As has been suggested, leadership is inherently a social phenomenon requiring recognition of the leader's context (Osborn, Hunt, & Jauch, 2002; Porter & McLaughlin, 2006) and therefore means efficacy (Eden, 2001) should be incorporated with leader self-efficacy to capture the influences of external resources and people such as superiors and peers on leaders' perceived capability.

Additionally, although there have been some efforts to develop concise measures of leader self-efficacy (LSE) (e.g., Kane & Baltes, 1998; Paglis & Green, 2002), previous research has been narrowly focused on leaders' self-efficacy for what they believe they can do, and often in narrowly defined tasks and contexts, which likely underestimates the complex and dynamic contexts that most leaders and followers operate in. For example, Gist (1989) assessed leaders' self-efficacy to promote idea generation, while Taggar and Seijts (2003) focused on measuring leaders' self-efficacy for initiating behaviors. Advocating a broader approach, Hannah et al. (2008) suggest that conceptualizations of leader efficacy

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should incorporate not just leaders' perceived capability to execute a span of leader acts (i.e., leader action self-efficacy); but also their perceived capability to effectively interpret the context and generate novel leadership solutions, while also producing the required motivation to act (i.e., leader self-regulatory efficacy), and as stated, to orchestrate the resources to succeed (i.e., leader means efficacy). Our first intended contribution is to further develop and test the theorizing of Hannah et al. (2008) by developing and testing a multi-component leader efficacy construct that more fully represents what constitutes leader agency.

Based on the primary focus of social cognitive theory (Bandura, 1986), human agency emerges through the interactions of the person (e.g., their thoughts and motivations), their actions, and the context they are operating in; with each element creating bidirectional influence on the other elements. The components of leader self-regulatory efficacy, action self-efficacy and means efficacy map onto these three facets of human agency. The approach we advocate recognizes that leaders draw from various components and forms of efficacy when facing tasks (Gist & Mitchell, 1992), which is consistent with Bandura's (1997) differentiation of self-efficacy related to behavioral actions and performance from domains of efficacy for self-regulation. Our position is also consistent with Eden's (2001) distinctions between internal (i.e., self) and external (i.e., means) forms of efficacy.

Our second intended contribution is empirical validation. Based on a comprehensive review of the leader self-efficacy literature, we found that only 5 of 23 studies had conducted deliberate construct validation work with new measures of LSE (Chemers et al., 2000; Hadley, Pittinsky, Sommer, & Zhu, 2009; Ng, Ang, & Chan, 2008; Paglis & Green, 2002; Taggar & Seijts, 2003), with each of these studies using different measures of LSE and very limited tests of construct validity (see Table 1). Thus we found little consistency in LSE measures, and relatively little construct validation work completed. In sum, it appears that no LSE measure has been assessed across the full range of convergent, discriminant, predictive, and nomological-related construct validity that has been recommended as necessary steps in validating a new measure (Hinkin, 1995, 1998).

Therefore, the purpose of this paper and set of five studies described below is twofold. First, we further refine and operationalize the conceptual framework provided by Hannah et al. (2008) to create a multidimensional measure of Leader Self and Means Efficacy (LSME) that spans an expanded domain of leaders' perceived capabilities. Second, we validate that measure across five different representative samples to confirm the factor structure of the construct and to provide evidence of convergent, discriminant, predictive, and nomological-related validity of LSME, to include various externally rated performance outcomes.

## Overview of LSME and its components

Our multi-component approach to LSME is informed through an understanding that leaders' self-concepts are complex and comprised of multiple selves (Lord, Hannah, & Jennings, 2011). The leader's self concept represents numerous domains of knowledge about their self, their context, and their capabilities as leaders (Hannah, Woolfolk, et al., 2009; Wood, 2007). Our approach also extends from Gist and Mitchell's (1992) position that individuals "orchestrate" various antecedents when forming their overall assessments of their capabilities. Thus, we suggest that LSME represents a higher order formative construct.

When developing a multi-component construct, researchers follow one of two strategies, depending upon their conceptualization of the construct (Edwards & Bagozzi, 2000): reflective (treating the unobservable construct as giving rise to observable indicators, or formative (viewing the indicators as defining charac-

teristics of the construct). We propose that LSME is formative, versus reflective, as it comprises three inter-related components that each contribute uniquely to leaders' overall levels of LSME. The direction of causality flows from the three components to the latent construct, and these components jointly determine the conceptual and empirical meaning of LSME (Jarvis, MacKenzie, & Podsakoff, 2003). The means component of LSME clearly represents this causal flow, as means efficacy is influenced in part external to the leader, both by the actual means made available, as well as how others persuade the leader about the relative utility of those means for enhancing task performance, thereby influencing perceived utility independent of the actual means available (Eden, 2001; Eden et al., 2010). A second defining characteristic of formative constructs is that if any indicators or components are removed, it fundamentally alters the meaning of the latent construct (Jarvis et al., 2003). We propose that if leaders are lacking in any component of self-efficacy for self-regulation or action, or are lacking in means efficacy, their overall perceived capability to lead will be reduced.

Further, we conceptualize that LSME is context-specific, in that it is developed as leaders perform specific tasks in specific situations and thereby build self-efficacy for similar future actions under similar conditions (Bandura, 1997). The means efficacy component of LSME is similarly contextualized, as leaders' means efficacy is based on the means perceived to be available in their current context to support performance (Eden, 2001). Yet, we also know based on prior research that through successful performance on relatively similar tasks across various contexts, self-efficacy beliefs can become more *generalized*, which is "a function of the degree of similarity of qualitative features of activities and the skills they require [as compared to activities and skills for which one already possesses self-efficacy]" (Bandura, 1997, p. 51). For example, a series of successful presentations in front of various audiences may form within a leader over time a more generalized form of self-efficacy for "public speaking" which they can apply across a set of situations. Related to means efficacy, a leader may, for example, develop over time a more generalized perception that their organization will provide them adequate resources for certain types of leadership initiatives, yet perhaps not others. Therefore, based on their unique experiences in their particular organization and job related roles, those leaders could develop a unique efficacy "signature" applicable to certain sets of tasks and contexts.

To ensure the contextualized nature of LSME is maintained, LSME is operationalized by having leaders state their levels of self-efficacy for action and self-regulation, and levels of means efficacy, *as leaders in their current organization*. Thus, LSME is theoretically—and we will demonstrate empirically—differentiated from the global and de-contextualized construct of *general self-efficacy* (e.g., Chen, Gully, & Eden, 2001). Based on the contextualized and formative nature of LSME, we define the construct as follows:

*Leaders' beliefs in their perceived capabilities to organize the psychological capabilities, motivation, means, collective resources, and courses of action required to attain effective, sustainable performance across their unique leadership roles, demands, and contexts.*

## Self-efficacy components of LSME

Meta-analyses have demonstrated the relationships between self-efficacy and a wide range of human performance criteria (e.g., Stajkovic & Luthans, 1998). Bandura (1986) defined self-efficacy as "people's judgments of their capabilities to organize and execute courses of action required to attain designated types of performances" (p. 391). Bandura and Locke (2003) added that

**Table 1**  
Overview of prior published leader efficacy studies.

Published studies and definition of LSE used in studies	No of dimensions and items	Sample characteristics (relevance of sample to leadership)	Reliability; test-retest checks	Construct validity: (1) Were tests of validity (e.g. convergent, discriminant, criterion) specifically conducted? (2) Relationship with other constructs	Type of design; measures separated longitudinally?
<i>Studies using single dimension measure of LSE as perceptions of general leadership capabilities adapted from Murphy'S (1992) unpublished doctoral dissertation</i> Murphy and Ensher (1999) Eight items from Murphy (1992) plus two additional items specific to interns	1;10	104 interns who participated in an 8-week summer job training program.	.88; N.C.	(1) N.C. (2) Leader self-efficacy and optimism predicted subordinates' ratings of LMX quality only for female supervisors.	Cross-sectional; Measures taken 8 weeks apart
Hoyt, Murphy, Halverson, and Watson (2003)	1;8	Study 1 = 39 Groups of 3; 117 undergraduates Study 2 = 72 groups of 3; 216 undergraduates	.75; N.C.	(1) N.C. (2) Predicted leader's task efficacy	Cross-sectional; no
Hoyt (2005)	1;8	85 female undergraduates	.80; N.C.	(1) N.C. (Used as moderator)	Cross-sectional; no
Hoyt and Blascovich (2007)	1;8	125 undergraduates in 2 studies	.93; N.C.	(1) N.C. (Used as screening score for participant selection)	Cross-sectional; no
Hoyt, Johnson, Murphy, and Skinnell (2010) Composite from Murphy (1992) and Hoyt et al. (2003)	1;9	73 female undergraduates in Study 1; 157 female undergrads in Study 2.	.85; N.C.	(1) N.C. (Used as D.V.)	Cross-sectional; no
Burnette, Pollack, and Hoyt (2010)	1;8	51 undergraduates	.78; N.C.	(1) N.C. (Used to explore impact of starting LSE on self-appraisal following stereotype threat)	Cross-sectional; measured in 2 time periods
Hoyt and Blascovich (2010)	1;8	88 undergraduates	.88; N.C.	(1) N.C. (Used to dichotomize sample)	N/A
<i>Studies using single dimension measure of LSE as general perceptions of confidence to lead adapted from Feasel's (1995) Masters Degree Thesis</i> Chan and Drasgow (2001)	1;6	Military sample: ranging from 1334 to 1592 after pairwise deletion Junior college students: ranging from 267 to 274 after pairwise deletion US undergrads: ranging from 284 to 290 after pairwise deletion	.76-.83 across 3 samples; invariant across multi-sample CFA conducted	(1) N.C. (2) Mediated personality (extraversion, conscientiousness and openness to experience) and past leadership experience with affective and social-normative motivation to lead	Yes, longitudinal
Hendricks and Payne (2007) As above	1;6	100 student teams; 400 students; 100 leaders	.81, N.C.	(1) N.C. (2) Together with goal-orientation and motivation to lead, LSE mediated Big Five Personality factors with leadership effectiveness	Cross-sectional with random assignment of leader
<i>Studies using single dimension measure of LSE as perceptions of general leadership capabilities adapted from Paglis and Green (2002)</i> Paglis and Green (2002)	1;12	150 managers & 415 direct reports from the commercial real estate and industrial chemicals sectors	.92 ; yes	(1) Convergent validity with Singer's (1991) self-perceived leadership abilities; Discriminant validity from internal locus of control and trait self-esteem (2) Predicted Yukl, Wall, and Lepsinger's (1990) inspiring/motivating and problem-solving scales	Cross-sectional; Pilot conducted prior to study (n = 55) using university dept heads and MBA students
LSE defined as efficacies in (1) direction setting, (2) gaining commitment and (3) overcoming obstacles to change (but assessed as a single factor)					
Semandar et al. (2006) As above	1;11	108 male and 28 female managers of an Australian motor manufacturing firm	.94; N.C.	(1) N.C. (2) Concurrent validity with emotional intelligence and political skill in predicting job performance.	Cross-sectional; no
<i>Study using single dimension measure of LSE as perceptions of general leadership capabilities adapted from Kane and Baltes (1998) unpublished conference paper</i> McCormick et al. (2002)	1;8	223 juniors and seniors from undergraduate psychology course	N.R.; N.C.	(1) N.C. (2) Correlated with attempted leadership: frequency of individual attempts to assume leadership role	Cross-sectional; no
Self-reported ability to perform functional leadership activities: (1) perform as a leader across different settings; (2) motivate					

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Table 1 (continued)

Published studies and definition of LSE used in studies	No of dimensions and items	Sample characteristics (relevance of sample to leadership)	Reliability; test–retest checks	Construct validity: (1) Were tests of validity (e.g. convergent, discriminant, criterion) specifically conducted? (2) Relationship with other constructs	Type of design; measures separated longitudinally?
group members; (3) build members' confidence; (4) develop teamwork; (5) "take charge"; (6) communicate effectively; (7) develop effective task strategies and (8) assess the strengths and weaknesses of the group.				given opportunity	
Kane et al. (2002)	1;7	35 male and 48 female leaders, 246 group members all drawn from class of Psychology undergraduates	.95; N.C.	(1) N.C. (Used as manipulation check)	Cross-sectional; no
<i>Progressive levels of LSE for a single task</i> Bandura and Wood (1989) Managerial Self-efficacy (Time 1): Subjects rated the strength of their perceived self-efficacy that they could get their group to achieve each of 9 different levels of organizational performance	1;9	60 graduate students in business studies	N.A.	(1) N.C. (2) Correlated with organizational performance	Cross-sectional; no
Wood and Bandura (1989b) As above	1;9	24 graduate students in Business studies	N.A.	(1) N.C. (2) Correlated with organizational performance.	Cross-sectional; no
Kane et al. (2002) Leaders reported their confidence to lead a group to achieve five increasingly more difficult profit levels on a group task (Used in same study along with general LSE measure as noted in Kane et al. (2002) above)	Single item measure repeated five times	83 leaders and 246 group members drawn from class of psychology undergraduates	.92; N.C.	(1) N.C. (Used as manipulation check)	Cross-sectional; no
<i>Other single dimensional constructs of LSE developed specifically for the study for which they were used</i> Robertson and Sadri (1993) Managerial self-efficacy	1;57	150 junior Sales and Banking managers in pilot study; 89 managers in validation study	.98; Yes	(1) N.C. (2) Correlated with supervisor ratings of work performance	Cross-sectional; no
Taggar and Seijts (2003)  Leader Role Efficacy for initiating structure Measure adapted from Taggar, Hackett, and Saha (1999) which measured actual leader initiating behavior whereas in this study it was adapted to measure perceived capability to enact those leadership behaviors	1;5	268 Business school undergraduates	.82; N.C.	(1) Correlated with the measure it was derived from (leader initiating behavior) (.41); discriminant validity: no correlation with Staff role efficacy (.06–.12) (2) Related to team performance	Cross-sectional with random assignment; measures administered post task
Olivares, Peterson, and Hess (2007) Described as confidence building: "The experience has increased my belief in my ability to be an effective leader."	1;1	49 Military personnel	NA; N.C.	(1) N.C. Construct derived from qualitative analysis of leadership developmental experiences.	N.A.
Villanueva and Sanchez (2007) Confidence in general leadership ability	1;10	70 leaders of 70 groups with 2 followers per group from student population	.85; N.C.	(1) N.C. (2) LSE mediated by task self-efficacy related to collective task efficacy and group performance	Cross-sectional; no
Anderson, Krajewski, Goffin, and Jackson (2008) 88 attributes derived from interviews with financial managers, for which an exploratory principal component analysis with equamax rotation was conducted to empirically derive 18 components	18;88	227 managers in a financial services firm.	N.A.; N.C.	(1) N.C. (2) Correlated with leadership effectiveness ratings	Cross-sectional; no
<i>LSE in special crisis context</i> Hadley, Pittinsky, Sommer, and Zhu (2011)	1;9	Study 1: 282 cross-section of working adults	Study 1: .83	(1) Discriminates from general leadership efficacy and procedural preparedness in crisis	Cross sectional; measures 10 days apart

Crisis Leadership Efficacy in Assessing and Deciding Scale (C-LEAD) Perceived capability to lead during crisis situations	Study 2: 83 from US federal agency Study 3: 300 Mgrs from cross-section of working adults	Study 2: .81 Study 3: .88	(2) Predicts crisis decision-making, role-taking and motivation to lead in crisis. Crisis-LESE was correlated to prior experience in crises, learning goal orientation, and general intelligence
LSE treated as dispositional factor Chemers, Watson, and May (2000)	T1 = 96 ROTC Cadets; T2 = 64 ROTC Cadets	.84; N.C.	(1) Discriminated from LSE; Concurrent validity with optimism and LSE contributing to ratings of leadership potential (2) Predicted peer-rated and objective leadership performance
LSE comprise a factor-score composite from 2 measures: (1) self-appraisals on specific skills on 16 dimensions from the US Army Leadership Assessment Program and (2) measure of general leadership efficacy from Murphy (1992) Ng, Ang and Chan (2008)	394 military leaders; 303 supervisors responding (252 rated one leader and 51 rated multiple leaders)	.96, N.C.	Ratings of leadership potential followed by ratings of leadership performance 6 weeks later Measures across 2 years
Measure adapted from Chemers et al. (2000)			(1) Discriminated from personality, job demands, and job autonomy (2) mediated relationship between personality and leader effectiveness

\*N.C. = none conducted; N.R. = not reported; N.A. = not available.

“[self-efficacy beliefs] affect whether individuals think in self-enhancing or self-debilitating ways, how well they motivate themselves and persevere in the face of difficulties” (p. 87). LSME includes two leader self-efficacy domains: self-regulatory and action.

#### Leader self-regulatory efficacy

Bandura (1997) suggests that researchers employ “multifactor scales [to assess participants’] perceived self-regulatory efficacy to plan and structure activities; to enlist needed resources; to regulate one’s motivation through proximal challenges and self-incentives; and to manage the emotionally and cognitively disruptive effects of obstacles, setbacks, and stressors” (p. 53). The self-regulation component of LSME thus includes leaders’ level of self-efficacy to regulate their thinking and self-motivation, which our review of the literature suggests are core intrapersonal aspects of leading (Yukl, 2006). Self-regulatory efficacy is distinct from the self-regulatory abilities it predicts (Bandura, 1997). For example, levels of self-regulatory efficacy that one can motivate him or herself to attend work is related to actual levels of effort made to attend work (Frayne & Latham, 1987).

First, leadership requires complex social problem-solving skills. Cognitive ability has thus been a core facet in models of leadership capability (e.g., Mumford, Zaccaro, Harding, Jacobs, & Fleishman, 2000) and has been shown to predict leader emergence and effectiveness (e.g., Atwater, Dionne, Avolio, Camobreco, & Lau, 1999). Yet, prior models examining leader cognition (e.g., Mumford, Friedrich, Caughron, & Byrne, 2007) have generally not examined how leader self-efficacy plays a role in cognition. Yet, managers’ self-efficacy for decision-making can enhance the extent that individuals employ their cognitive capabilities, and their use of analytic strategies (Wood & Bandura, 1989a, 1989b).

As noted by Bandura (1997), “People need a sense of efficacy to apply what they know consistently, persistently, and skillfully” (p. 223). We suggest that self-efficacy to regulate thought is central to leaders’ ability to generate effective solutions in that it has been empirically linked to memory functioning and recall (Hultsch, Hertzog, Dixon, & Davidson, 1988), cognitive performance (Schunk & Gunn, 1986), greater application of attention and information processing resources (Berry, 1987), ability to acquire complex skills (Kanfer & Ackerman, 1989), and enhanced idea generation (Gist, 1989).

Bandura (1989) outlines the critical role of self-efficacy in the regulation of cognitive processes, stating that “people’s perceptions of their efficacy influence the types of anticipatory scenarios that they construct and reiterate. For example, those that have a high sense of efficacy visualize success scenarios that provide positive guides for performance and they cognitively rehearse good solutions to potential problems” (p. 729). Self-efficacy to regulate thought thus produces positive forethought and has been linked to enhanced performance (Bandura, 1986).

Leaders also create conation through thought, producing self-motivation to accomplish leadership role demands. When an individual’s level of self-efficacy to regulate their level of effort is low, their level of performance motivation is reduced (Bandura & Cervone, 1986; Frayne & Latham, 1987). This is consistent with Bandura’s (1989) description of the human agency required to exercise forethought whereby envisioned future outcomes serve as proximal motivators to regulate behavior. This motivational aspect of self-efficacy contributes to goal setting independent of level of ability (Kane, Zaccaro, Tremble, & Masuda, 2002), producing what Kanfer (1987) calls “intentions for effort allocations” (p. 260). Most encouraging to explaining leader effectiveness, such challenging goals have in turn been associated with higher levels of motivation and performance (Bandura, 1989). Self-motivation or self-management have thus been incorporated into various leadership theories including self-leadership (Manz, 1986), managerial role-motiva-

tion (Miner, 1993), transformational leadership (Bass, 1985), and motivation-to-lead (Chan & Drasgow, 2001), amongst others. It is thus important to consider the role of self-regulatory leader efficacy in generating such motivation.

#### *Leader action self-efficacy*

While self-regulatory LSME entails psychological processes internal to the leader, the action component of LSME represents leaders' beliefs that they have the capability to enact leadership and create *effects*. For instance, whereas the self-regulatory dimension of LSME reflects leaders' beliefs regarding their ability to self-motivate, the action dimension reflects their beliefs in their capability to behave in ways that in turn motivate others to act. Our conceptualization of action LSME includes leaders' beliefs they can direct, inspire, coach, administer rewards, and otherwise gain follower commitment and enhance follower performance. We thus approach leadership as being a positive influence process where the effects of leadership on group and organizational performance are not direct, but are mediated through positive effects on followers (Yukl, 2006). Leaders' individual performance, then, is defined by how effectively they influence their followers in the ways described above, such as gaining commitment. What we describe as action LSME has been the primary focus of prior operational definitions of LSE, to the exclusion of self-regulatory and means efficacy.

The relationship between self-efficacy and various behaviors and performance is well established in the literature (see Bandura, 1997; Stajkovic & Luthans, 1998). In the leadership domain specifically, LSE related to perceived capability to enact effective leader actions has been associated with outcomes such as leader effectiveness (Prussia, Anderson, & Manz, 1998; Semandar, Robins, & Ferris, 2006), leader-member exchange and follower performance (Murphy & Ensher, 1999), and gaining follower support for change (Paglis & Green, 2002). For parsimony here, a more detailed review can be found in Hannah et al. (2008).

#### *Leader means efficacy*

As leadership is inextricably linked with the leader's context, we draw from means efficacy (Eden, 2001) as representing the third domain of LSME. Research has demonstrated that self-efficacy and means efficacy have distinct effects on outcomes (Eden & Sulimani, 2002; Eden et al., 2010). Means efficacy extends beyond the realm of personal self-efficacy and reflects leaders' beliefs in the utility of the means available for performing. As noted by Eden et al. (2010), these means can be inanimate tools (e.g., a management information system), but also supervisors, managers, teammates, budgets, organizational structures and administrative support.

As leadership is a social process involving others and resources, leaders' beliefs in the quality and utility of the means available to support the enactment of their leadership is inextricably linked to their formation of LSME. Eden et al. (2010) propose that means efficacy operates similar to self-efficacy in that "the subjective utility of external means arouses expectations for success and motivates performance" (p. 689). It is important to note that means efficacy is not just a function of the availability of means, but also in what one believes that they can do with those means to enhance their leadership performance.

Eden's (2001) framework holds that tasks differ to the extent they are means-dependent, and research suggests means efficacy may overshadow self-efficacy in determining performance in tasks that demand heavy reliance on means such as where complex technology is required to perform a task (Eden & Sulimani, 2002). The perception that one can lead effectively based on the means available gives leaders a sense of control. This perception of the context is important to the development of LSME as Bandura and

Wood (1989) demonstrated that when managers were exposed to an organizational context they perceived they could control, they generated higher levels of self-efficacy, established more challenging goals, and were more effective in using analytical processes. Conversely, in the experimental condition with less perceived managerial control, managers swiftly lost self-efficacy and thereby performance worsened, even when performance goals were within reach.

Other people that leaders must rely upon to assist in their performance are also key sources of means (Eden, 2001). Leaders exercise influence largely through others and there is a growing realization that leadership is a collective process and often occurs through social systems and networks (e.g., Bass & Bass, 2008). Thus, the extent leaders perceive that their higher level leaders, their peers, and others can serve to enhance their capability to be effective as a leader should influence their level of LSME. Leaders, for example, can influence the level of self-efficacy of those at lower organizational levels through practicing supportive leadership (Rafferty & Griffin, 2006), suggesting senior leaders can influence lower level leaders' LSME.

#### **Outcomes of LSME**

To establish the predictive validity of LSME, we assessed its relationship with three outcomes: leader performance, transactional and transformational leadership (Bass, 1985), and motivation to lead (Chan & Drasgow, 2001). We discuss in more detail each outcome below.

#### *Influence of LSME on leader performance*

Ultimately, we expect that leaders with higher levels of LSME will perform at higher levels. This is because self and means efficacy promote extra effort and more intense engagement in tasks, such as leading others to success (Bandura, 1997; Eden et al., 2010). The positive relationship between self-efficacy in general and performance in organizations has been well-documented in a meta-analysis of 114 studies where Stajkovic and Luthans (1998) found an average weighted correlation of .38 between self-efficacy and work-related performance. Yet this synthesis study was based largely on primary studies with correlational designs. Further, tests specific to the effects of LSE on leader performance have been limited, but some have related LSE to ratings of leader potential (Chan & Drasgow, 2001) and performance ratings from peers and supervisors (Chemers et al., 2000; Luthans & Peterson, 2002; Robertson & Sadri, 1993). Yet, studies linking leader self-efficacy to external ratings of performance in field settings using lagged measures, as we use here, are limited, presenting the need for additional research.

As Eden's (2001) concept of means efficacy has not yet been incorporated with leader self-efficacy, we do not know about its effects on leader performance. Yet, means efficacy research suggests it is important in promoting individual performance in organizations (Walumbwa, Cropanzano, et al., 2011; Walumbwa et al., 2008). Using experimental interventions in field research, Eden and his colleagues (e.g., Eden & Granat-Flomin, 2000; Eden & Sulimani, 2002; Eden et al., 2010) were able to boost means efficacy while isolating its effects on performance from that of self-efficacy. Based on these findings, Hannah et al. (2008) suggested that means efficacy is a critical aspect of leaders' perceived capabilities in driving their performance that has been neglected in the literature. Leaders must believe they have the capability for self-regulation and action to perform a task, as well as high-utility means available.

In this first test of LSME in predicting performance we focus on overall leader performance, as observed by others, based on lead-

ers' demonstrated ability to positively influence their followers. As higher levels of self and means efficacy in turn generate higher levels of engagement, persistence in tasks, and employment of skills (Bandura, 1997; Eden, 2001), we expect leaders higher in LSME will perform in ways that positively affect followers, leading to higher leader performance ratings. We therefore present the following hypothesis:

**Hypothesis 1.** Leader Self and Means Efficacy is positively related to leader performance.

#### *Influence of LSME on active forms of leadership*

In their review of the LSE literature, Hannah et al. (2008) suggested that more efficacious leaders would be better able to perform more active and complex leadership styles. Although we propose that LSME will predict a range of active leadership styles, such as shared and participatory leadership, for this first test of LSME we use contingent reward transactional and transformational leadership as our criterion (Bass, 1985). Testing this linkage is important both to establish the predictive validity of LSME, as well as the fact that although they have been highly studied forms of leadership over the last 25 years, we still have much to learn about the antecedents to transactional and transformational leadership (Bass & Bass, 2008).

As noted by Bass and Avolio (1997), active leadership styles require greater allocation of effort, as well as cognitive and behavioral skills as compared to more passive (e.g., management by exception and laissez faire) leadership styles. As Leader Self and Means Efficacy influences the intensity and persistence of effort and the extent that skills are employed (Bandura, 1997; Eden, 2001; Hannah et al., 2008), it follows that higher levels of LSME would predict more active and intensive forms of leadership.

Avolio (2002) describes that effectively employing transactional (contingent reward) and the more complex transformational (intellectual stimulation, individualized consideration, idealized influence, and inspirational motivation) forms of leadership requires that leaders are first able to understand dynamic situational demands and determine the most appropriate set of leader behaviors to use in a given situation or challenge. We have described self-regulatory LSME as underlying and enhancing such cognitive capability. Further, Avolio (2002) describes that these more active forms of leadership require extensive effort allocation by the leader as compared to more passive styles, such as spending time coaching and mentoring and otherwise being individually considerate with followers (from a transformational approach) or determining and allocating what rewards will best motivate each follower (from transformational and transactional perspectives). We earlier described the mechanisms through which self-regulatory LSME promotes such high levels of leader self-motivation.

These active forms of leadership also require the employment of a richer suite of leader skills as compared to more directive or laissez faire styles of leadership. Instead of remaining inactive or relying on simple legitimate power to command followers, these styles call for the employment of various skills to provide extrinsic rewards or inspire followers intrinsically to achieve organizational goals (Bass, 1985; Bass & Avolio, 1997). As self and means efficacy determine the extent that individuals employ their skills to achieve performance (Bandura, 1997; Eden, 2001), we propose that LSME would promote fuller use of leaders' skills and capabilities.

Finally, enacting a range of active leader behaviors would be dependent on the extent that leaders perceive they have available and can use the means in their environment to support their actions. The ability to provide contingent rewards to followers as specified in transactional leadership (Bass, 1985), for example,

would require that leaders perceive that resources for rewards are available as well as organizational policies that support their employment of flexible rewards to motivate followers. Similarly, we would expect leaders to be more transformational when they feel their leaders, peers, and others will set the conditions for them to behave in a transformational manner (Bass & Bass, 2008). As outlined previously, means LSME includes leaders' belief their leader, peers, and followers will help enhance their leadership through aiding in their development, stimulating their creativity, establishing an ethical climate, helping to solve problems, etc. This theorizing leads to our next hypothesis:

**Hypothesis 2.** Leader Self and Means Efficacy is positively related to contingent reward transactional and transformational leadership behaviors.

#### *Influence of LSME on motivation to lead*

As leaders develop LSME over time through such activities as role modeling, mastery experiences and vicarious learning (Bandura, 1997), we expect more efficacious leaders will build increased motivation to take on leadership roles and challenges. Indeed, Chan and Drasgow (2001) demonstrated that leader self-efficacy is an antecedent to *motivation to lead* (MTL), which they define as "an individual-differences construct that affects a leader's or leader-to-be decisions to assume leadership training, roles, and responsibilities and that affect his or her intensity of effort at leading and persistence as a leader" (p. 482).

Chan and Drasgow (2001) separated MTL into three dimensions. The first is *socio-normative* which specifies that some leaders lead because they are driven by a sense of duty, service, or obligation. The second dimension is *affective-identity*, which suggests that some leaders lead because they see themselves as a prototypical leader, which is central to their identity, and are thereby driven to lead and receive satisfaction by leading others. The third dimension of MTL, *non-calculative*, suggests that because leadership is a challenging and sometimes costly endeavor, some individuals are motivated to take on leadership because they are *not* concerned with or calculative as to the relative costs. In exploratory testing, Chan and Drasgow found across two samples that LSE had a small effect on socio-normative ( $\beta = .12, p < .05$ ) and a sizeable effect on affective-identity ( $\beta = .52, p < .01$ ) MTL. The relationship between LSE and the non-calculative dimension was insignificant. Hendricks and Payne (2007) also demonstrated that LSE predicted the affective-identity and to a lesser extent, the socio-normative dimension, while they did not report attempts to predict the non-calculative dimension of MTL.

We base our linkage between LSME and affective-identity MTL on self-concept based motivation. Leaders' self-concepts drive proximal self-regulation and goal-directed behaviors (Lord et al., 2011). This is because when leaders perceive they have requisite leadership capability they are predisposed to achieve a sense of coherence with their identity and a sense of self completion via their leadership (Lord & Brown, 2004). This is consistent with Singer's (1991) findings that self-efficacy was associated with motivation to pursue leadership positions. It is also consistent with the findings of Paglis and Green (2002) linking LSE to attempts to lead. Individuals with high levels of LSME would perceive they possess high levels of capability as leaders. The strong influence of this salient aspect of the self on proximal motivation would thus serve to generate high levels of identity-based motivation as well as positive affectivity toward leadership (Lord & Brown, 2004), both consistent with affective-identity MTL.

Any potential linkages between LSME and non-calculative and social-normative MTL are less clear based on the research reported

by Chan and Drasgow (2001) and Hendricks and Payne (2007). Thus at this early stage of testing LSME, we propose exploratory tests of the other two MTL dimensions, resulting in the following hypothesis and research question:

**Hypothesis 3.** Leader Self and Means Efficacy is positively related to affective-identity motivation to lead.

*Research Question 1: Does Leader Self and Means Efficacy positively relate to social-normative and non-calculative motivation to lead?*

### Overview of studies, procedures, and data sample characteristics

Scale development is a multi-faceted process that should be performed using multiple methods and samples (Hinkin, 1995, 1998). In the following section, we describe five studies entailing five separate samples designed to examine the psychometric properties and construct validity of the LSME measure. Study 1 outlines steps to create a theory-based LSME measure. Studies 2–3 provide validation of the LSME construct by assessing its dimensionality and providing evidence of convergent and discriminant validity with other related constructs. Study 4 further assesses the nomological validity of LSME by associating it with known correlates of self-efficacy or leader self-efficacy. Finally, Study 5 examines the relationships between LSME and various organizational out-

comes to establish its predictive validity. In some cases we use select data in more than one study seeking to validate and replicate our work over time based on some of the initial foundational studies we conducted. Where we have done so, those samples included a broader range of variables not used in the prior study to test new relationships. Table 2 provides a summary of the purpose of each study, samples used, predictions and findings.

### Method and results

#### Study 1

##### Item generation and development

Based on the theoretical framework proposed, we set forth to create a measure to represent the LSME construct drawing from widely accepted scale development approaches and using multiple samples (Hinkin, 1995, 1998). First, five practitioners, each with 10–23 years of experience leading dynamic organizations were given construct definitions of the three domains of LSME: action, means, and self-regulation. Further, each was provided with descriptions of three models of leadership (situational leadership theory, transactional and transformational leadership theory, and path-goal theory) that portray the use of flexible leader behaviors ranging from more task-oriented and contingent behaviors to more follower-oriented and inspirational behaviors. Respondents were asked to establish construct coverage by ensuring the three LSME components covered leaders' perceived capabilities related to a

**Table 2**  
Summary of studies, sample characteristics and results.

Study	Data/Sample	Action and variables	Prediction	Findings
1	None	Initial pool = 63 items Reduction to 22 items using naïve and expert sorting and reviews		
2	Sample 1: N = 303 working adults 53% females M age = 25.42 years (s.d. = 3.71). Sample 2: N = 265 mid and senior level military officers 70% men M age = 32.45 years (s.d. = 5.01)	EFA and CFA and reliability estimates for 22 item Leader Self and Means Efficacy (LSME) Measure	3-factor higher order core construct	Confirmed
3	Sample 2 from Study 2 (265 mid and senior level military officers) Sample 3: N = 219 working adults from diverse fields 55% men M age = 24.6 years (s.d. = 3.1)	<i>Convergent validity</i> Leader self-efficacy K&B Leader self-efficacy P&G <i>Discriminant validity</i> Core self-evaluation Self-esteem General self-efficacy State hope <i>Test–Retest</i>	Converge Converge Discrim. Discrim. Discrim. Discrim. Reliable	Converge Converge Discrim. Discrim. Discrim. Discrim. Reliable
4	Sample 3 from study 3 (219 working adults)	<i>Nomological validity</i> (correlates of LSME) Big-5 personality General self-efficacy Learning goal orientation Meta-cognitive ability	+ + + +	+ + + +
5	Sample 2 from Study 2 (265 military officers) 8 week field study Sample 3 from study 3 (219 working adults) 8 week field study Sample 4: N = 200 junior military officers 84% men M age = 19.8 years (s.d. = .96). 8 week field study Sample 5: N = 63 military squad leaders and platoon sergeants 94% men M age = 21.14 years (s.d. = 1.37) 8 week field study	<i>Predictive validity</i> Transformational leadership Transactional leadership Motivation to lead Leader performance <i>Incremental predictive validity</i> Over ldr. self-efficacy K&B Over ldr. self-efficacy P&G Over psychological capital Over core self-evaluations	+ + + + + + + + +	+ + + + + + + +

Note: + positive relationship hypothesized/verified; K&B (Kane and Baltes, 1998); P&G (Paglis and Green, 2002).

span of active leadership components. Simultaneously, six leadership scholars were provided the definitions and asked to generate similar lists for each LSME domain based on reviews of the leadership literature and prior LSE measures. Seventy-eight percent of the aspects identified by the practitioners and scholars overlapped after adjusting for differences in wording, representing 65 aspects of leadership. This list was then sent to four additional leadership practitioners and scholars for examination. Based on responses, seven aspects were deleted and five others added. The 63 remaining aspects were then formed into scale items in accordance with Bandura's (2006) self-efficacy scale guide.

Next, the 63 items were placed into a randomized list and presented to five naïve observers (doctoral students in organizational behavior), who were asked to sort those items into the three dimensions based on the factor definitions. Following MacKenzie, Podsakoff, and Fetter (1991), items assigned to the proper category more than 80% of the time were retained. A second naïve sorting was then conducted with five new observers, resulting in a 40-item LSME measure comprised of items consistently allocated by participants to the three domains.

The 40 items were then subjected to two rounds of content validity assessments by eight scholars with expertise in leadership. Raters were provided with the LSME domain descriptions and assigned each randomly ordered item to one of the three domains, and recommended items to drop or change, such as to reduce redundancy. Again, items assigned to the proper category 80% of the time were retained. In the first round the measure was reduced to 30 items and in the second round to 22 items. Inter-rater consistency was 96% in the second round. The 22 items retained for further analysis included 7 action items, 7 means items, and 8 self-regulation items<sup>1</sup>.

The LSME instructions ask participants to respond to the items on a 0–100 continuous scale, reflecting their efficacy strength (expressed as a percentage) in their perceived capability to enact each aspect of leadership specified. Bandura (2006) suggests that the efficacy strength score is the most effective measure of self-efficacy beliefs. The 0–100 response format was used as it has been suggested by Bandura (1997) and validated by Pajares, Hartley, and Valiante (2001) as more accurate, predictive, and psychometrically valid than self-efficacy scales of less response span. The measure was then re-scaled in each study to a 1–10 point scale for analysis for ease of interpretation and to scale more similarly to other measures. To prompt respondents to contextualize the measure to their unique leadership demands, they are instructed as follows: "For each item below, indicate your level of confidence as a leader in your current organization in the future. A score of 100 represents 100% confidence, whereas a score of 0 means no confidence at all." Further, they were provided with an item stem which read "As a leader I can. . ." Example self-regulatory LSME items include, "Think up innovative solutions to challenging problems", "Determine what leadership style is needed in each situation", and "Motivate myself to perform at levels that inspire others to excellence." Example action LSME items include, "Coach followers to assume greater responsibilities for leadership", "Get followers to identify with the central focus of our mission", and "Energize my followers to achieve their best." Example means LSME items include, "Rely on my organization to provide the resources needed to be effective", "Rely on my leaders to come up with ways to stimulate my creativity", and "Effectively lead working within the boundaries of my organization's policies". Responses to these items do not reflect the level of difficulty or performance that would be required by the leader in a specific situation, but the level of difficulty that they believe that they *could* perform at, or what Bandura (1997)

calls efficacy strength. Items are thus worded such that they represent sufficiently high levels of performance to promote variance in responses.

## Study 2

In Study 2 we sought to confirm the factor structure and provide initial evidence of convergent and discriminant validity of the LSME measure. We used confirmatory factor analysis (CFA) to test the factor structure and the dimensionality of the LSME measure and conducted exploratory tests to compare the hypothesized higher-order structure to separate 1, 2, and 3 factor formulations of LSME. The CFA approach allowed us to specify correlated measurement errors, to perform statistical comparisons of alternative models, and to test the higher-order LSME factor model (Podsakoff, MacKenzie, Podsakoff, & Lee, 2003).

We proposed that the components of action, self-regulation, and means represent a formative higher order construct of LSME. Law, Wong, and Mobley (1998) described how multi-dimensional constructs can have components that are tied to a core factor whereby the shared variance or commonality between each facet comprises the higher order factor. Hence, the higher order factor of LSME may represent the common variance connecting the three components of LSME.

## Sample and procedure

We conducted CFA with two independent samples to test the LSME structure. Sample 1 consisted of 303 working adults comprised of 161 females and 142 males (average age 25.42; *s.d.* = 3.71) representing diverse work fields who were solicited from graduate business classes at a large university. Participants were solicited via an in-course announcement and were told the study sought to better understand managerial thinking. All participants were assured of anonymity and completed a paper version of the 22 item LSME measure and other measures.

Sample 2 consisted of 265 volunteer participants drawn from active duty mid and senior level US Army officers (in the rank of major through colonel) representing all major military career specialties (branches). This sample was procured through an email recruitment solicitation sent to Army officers belonging to a diverse Army professional group that had approximately 480 members, asking them to participate in an online general management study. The average age was 32.45 (*s.d.* = 5.01) years, and 70% of participants were male. Surveys were administered via the internet. Table 3 shows the inter-correlations among the LSME dimensions for these two samples and the reliability coefficients for each dimension.

## Results

We conducted a CFA using maximum likelihood estimation to test the proposed higher-order multidimensional LSME measure. To do this, we conducted competing model analyses comparing a second order factor model (in which items are loaded on their respective factors and the three factors then loading on a second-order latent LSME factor) against several competing models as indicators of LSME. Second-order factor model analyses was preferable because it allows for the co-variation among first-order factors by accounting for corrected errors that are very common in first-order CFA (Gerbing & Anderson, 1984). Taking this approach shows that the factors, while related, are best represented by a latent model representing the commonality between the factors (see Law et al., 1998, p. 747). We used the chi-square ( $\chi^2$ ) difference test and the ratio of chi-square to degrees of freedom, incremental fit index (IFI), comparative fit index (CFI), and root mean square error of approximation (RMSEA) to assess the absolute fit of the model to our data. Note, however, that some researchers (e.g., Barrett, 2007; Hayduk & Glaser, 2000; Marsh, Hau, & Wen, 2004; Steiger,

<sup>1</sup> The full LSME measure is available at Mindgarden.com.

**Table 3**  
Means, standard deviations, and correlations.

Variables	Sample 1: working adults (n = 303)			Sample 2: mid-senior level officers (n = 265)							
	M	s.d.		1	2	3	M	s.d.	1	2	3
1. Actions	7.52	1.35	.90				8.40	1.02	.90		
2. Means	7.93	1.20	.65**	.85			7.50	1.40	.56**	.86	
3. Self regulation	8.35	1.03	.69**	.66**	.85		9.06	.68	.67**	.52**	.83

Note: The reliability coefficients are shown in the diagonal. The composite reliability coefficient is .94 for working adults and .93 for mid-senior level military officers.  
\*\* p < .01 (two tailed tests).

2000) have argued that fit indices are not very informative, adding little to the analysis, and that the chi square and ratio of chi-square to degrees of freedom should be the primary metrics interpreted. This is because the cutoffs for a fit index can be misleading and subject to misuse (Hayduk, Cummings, Boadu, Pazderka-Robinson, & Boulianne, 2007). For example, although some scholars have recommended a cutoff value for RMSEA (Hu & Bentler, 1999; MacCallum, Browne, & Sugawara, 1996), others have cautioned researchers about the use of precise numerical cutoff points for RMSEA (e.g., Hayduk & Glaser, 2000; Marsh et al., 2004; Steiger, 2000); and in an empirical evaluation of the choice of fixed cutoff points in assessing the RMSEA test statistic as a measure of goodness-of-fit in SEM, Chen, Curran, Bollen, Kirby, and Paxton (2008) demonstrated that there is little empirical support for the use of .05 or any other value as universal cutoff values to determine adequate model fit, and that “to achieve a certain level of power or Type I error rate, the choice of cutoff values depends on model specifications, degrees of freedom, and sample size. Thus, in the current paper we rely heavily in the chi-square and ratio of chi-square to degrees of freedom when interpreting our results. As shown in Table 4, the results show that the proposed second order factor model fit the data significantly better than all competing models. Fig. 1 summarizes the standardized factor loadings for the second order LSME factor using maximum likelihood estimation. As shown, all the factor loadings for items on each of the subscales were relatively high, with 37 of 44 factor loadings being over .70, and the lowest being .60 and .62 for the active duty mid and senior level Army officers and working adults, respectively. The three LSME components then loaded on the latent construct ranging from .77 to .96 across both samples. The composite internal consistency estimates were .93 and .94 for the Army officers (action = .90, means = .85, self-regulation = .85) and working adults (action = .90, means = .86, self-regulation = .83), respectively.

We also calculated average variance extracted (AVE) for both the sub-dimensions and the higher order latent LSME construct. The AVE is a measure of the shared or common variance in a latent variable and the amount of variance that is captured by the latent

variable in relation to the amount of variance due to its measurement error, and thus is used as an index of convergent validity (Fornell & Larcker, 1981; Netemeyer, Johnston, & Burton, 1990). For the working adult sample, the variance-extracted estimates were as follows: Action, .57, means, .50, self-regulation, .52, and composite LSME, .53. For the Army officer sample, the variance-extracted estimates were as follows: Action, .65, means, .53, self-regulation, .52, and composite LSME, .57. Taken together, the results of Study 2 suggest that the three LSME dimensions combine to each contribute uniquely to create an overall core LSME construct, and thus provide support for the higher-order structure, and convergent and discriminant validity of the LSME measure and its dimensions (Campbell & Fiske, 1959).

Study 3

The purpose of Study 3 was to further examine the discriminant and convergent validity of the LSME measure by investigating how the new measure relates to theoretically relevant constructs. First, we expected that LSME would be positively related to, but discriminant from, various individual difference measures that have been previously linked to leadership. Specifically, we assessed LSME against core self-evaluations, a hierarchical construct combining the positive traits of self-esteem, generalized self-efficacy, locus of control, and emotional stability; which together reflects the extent an individual holds a general positive evaluation of themselves (e.g., Judge, Erez, Bono, & Thoresen, 2003). Core self-evaluation traits have been linked to motivation and goal-setting behavior (e.g., Judge, Bono, Erez, & Locke, 2005), job performance (e.g., Grant & Wrzesniewski, 2010), and self-determination (e.g., Judge et al., 2005) among other outcomes. Beyond discriminating LSME from the overall core self-evaluation measure, we also conducted tests to discriminate LSME from more specific measures of self-esteem (Rosenberg, 1965) and general self-efficacy (Chen et al., 2001), the latter based on our earlier theorizing that LSME is a contextualized versus a general efficacy construct.

**Table 4**  
Comparison of a priori Leader Self and Means Efficacy questionnaire factor structure.

Model and structure	$\chi^2$	df	$\Delta\chi^2$	IFI	CFI	RMSEA
<i>Sample 1 working adults (n = 303)</i>						
Model 1: 3 factors as indicators of LSME (AE, ME, and SE)	547.28	206		.90	.90	.07
Model 2: 2 factors as indicators of LSME (AE and ME merged, SE)	756.66	208	209.38*	.83	.83	.10
Model 3: 2 factors as indicators of LSME (AE and SE merged, ME)	633.15	208	85.87*	.87	.87	.09
Model 4: 2 factors as indicators of LSME (ME and SE merged, AE)	670.15	208	122.97*	.86	.86	.09
Model 5: 1-factor (all 22 items as indicators of LSME)	811.51	209	264.23*	.82	.81	.10
<i>Sample 2 mid-senior level military officers (n = 265)</i>						
Model 1: 3 factors as indicators of LSME (AE, ME, and SE)	533.28	206		.90	.90	.08
Model 2: 2 factors as indicators of LSME (AE and ME merged, SE)	980.09	208	446.81*	.74	.74	.12
Model 3: 2 factors as indicators of LSME (AE and SE merged, ME)	628.50	208	95.22*	.86	.86	.09
Model 4: 2 factors as indicators of LSME (ME and SE merged, AE)	999.01	208	465.73*	.73	.73	.12
Model 5: 1-factor (all 22 items as indicators of LSME)	1090.13	209	556.85*	.70	.70	.13

Note: AE = action LSME, ME = means LSME, SE = self-regulatory LSME.  
\* p < .05.

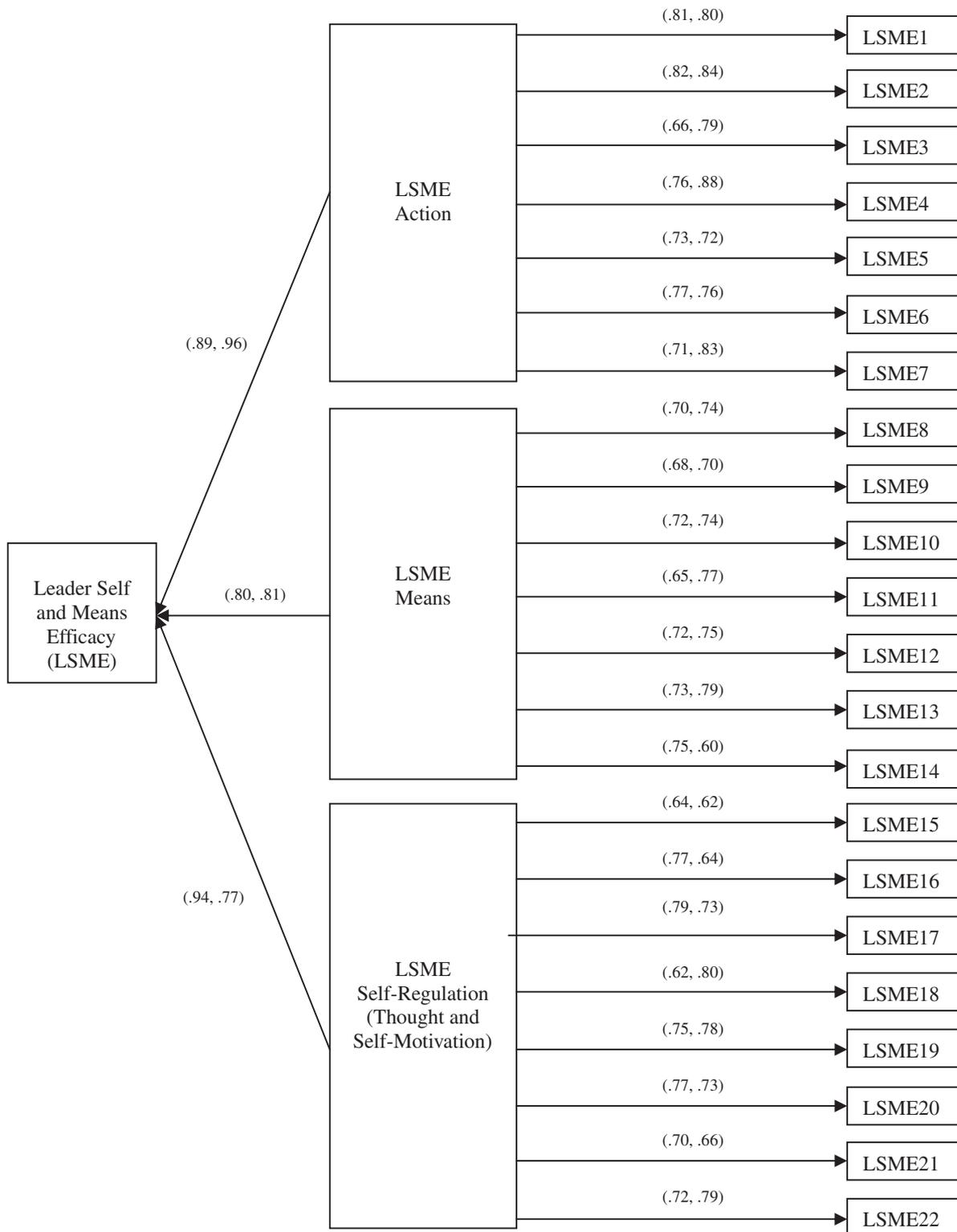


Fig. 1. Factor structure of Leader Self and Means Efficacy. Note: Sample 1: working adults ( $n = 303$ ); Sample 2: mid-senior level military officers ( $n = 265$ ) in preceding order.

Second, based on our arguments that LSME promotes motivation and human agency in leaders, we assessed whether LSME is distinct from the more general agentic psychological construct of state hope (e.g., Snyder, 2000). Hope is defined as a “positive motivational state that is based on an interactively derived sense of successful (a) agency (goal directed energy) and (b) pathways (planning to meet goals)” (Snyder, Irving, & Anderson, 1991, p. 287).

Third, we assessed the convergence of LSME with two other measures of LSE (i.e., Kane & Baltes, 1998; Paglis & Green, 2002). We selected these measures as their item content covered leaders’ self-efficacy for a span of leader actions, similar to our approach to the self-efficacy components of LSME. Further, the Paglis and Green measure was one of the few that had limited tests for construct validity. We expected LSME to converge with these existing LSE measures, yet as these other measures do not include the self-reg-

ulatory and means-efficacy components of LSME, we expected LSME to be a broader construct that demonstrates discriminant validity.

**Sample and procedure**

We used two independent samples including Sample 2 of 265 Army officers described in Study 2, plus a new independent sample (Sample 3 of 219 working adults) to assess the relationship between LSME and core self-evaluations, state hope, self-esteem, general self-efficacy, and LSE measures.

Surveys were administered to Sample 2 via the internet at the same time as LSME. Participants completed the Judge et al. (2003) 12-item measure of core self-evaluation ( $\alpha = .77$ ), Snyder's (2000) 6-item state hope measure ( $\alpha = .82$ ) and Kane and Baltes' (1998); see also McCormick, Tanguma, & Lopez-Forment, 2002) 8-item LSE measure ( $\alpha = .87$ ).

Sample 3 consisted of 219 working adults comprised of 120 males and 99 females (average age 24.6; *s.d.* = 3.1) representing diverse work fields who were solicited from an executive management course at a large university in the Midwestern United States. Participants were solicited via an in-course announcement and were told the study sought to better understand managerial thinking. All participants were assured of anonymity and completed a paper version of the 22 item LSME measure and other measures. This sample was given a second administration of the LSME measure ( $\alpha = .96$ ) 2 months later to assess test-retest stability, which was .81 for overall LSME, .82 for action, .76 for means, and .79 for self-regulation. We used Sample 4 to assess the relationship between LSME and self-esteem, general self-efficacy, and an alternate LSE measure. We utilized Rosenberg's (1965) 10-item measure of self-esteem ( $\alpha = .88$ ), Chen et al.'s (2001) 8-item mea-

sure of general self-efficacy ( $\alpha = .88$ ), and Paglis and Green's (2002); see also Semander et al., 2006) 12-item LSE measure ( $\alpha = .94$ ). All these other measures were administered in paper format at Time 1 along with the Time 1 LSME measure.

**Results**

Table 5 summarizes the descriptive statistics and zero-order correlations among the study variables, and the internal consistency (alpha) reliabilities for study variables for each sample.

To examine the relationship between LSME and theoretically relevant constructs, we conducted a set of chi-square difference tests. To do this, we ran pairs of nested models—one in which the two factors under consideration were allowed to correlate (Model 1: i.e., LSME vs. self-esteem, LSME vs. LSE, LSME vs. core self-evaluations, LSME vs. general self-efficacy, LSME vs. state hope), and one in which the correlation between the two factors was fixed to zero (Model 2). Evidence of discriminant validity (e.g., construct distinctiveness) is obtained if the chi-square of the first model is significantly lower than that of the second model (Anderson & Gerbing, 1988; Bagozzi & Phillips, 1982). Results shown in Table 6 indicate that the chi-square in which the two factors under consideration are allowed to correlate is in all cases significantly lower than when the correlation is fixed at zero, providing support for discriminant validity.

Finally, following the suggestions of Fornell and Larcker (1981) and Netemeyer et al. (1990), we further tested the discriminant validity of LSME and the other related constructs by comparing the variance shared by each construct and its measures with the variance shared by both constructs. For Sample 2 (*N* = 265), the AVE for LSME was .57 exceeding the square of the correlation between LMSE and core self-evaluations, LMSE and state hope, and

**Table 5**  
Means, standard deviations, and correlations.

Variables	<i>M</i>	<i>s.d.</i>	1	2	3	4
<i>Sample 2 mid-senior level military officers (n = 265)</i>						
1. Leader Self and Means Efficacy	8.35	.84	.93			
2. Core self-evaluations	4.03	.45	.43**	.77		
3. State hope	6.97	.70	.35**	.47**	.82	
4. Leader self-efficacy (Kane & Baltes, 1998)	6.13	.55	.58**	.41**	.48**	.87
<i>Sample 3 working adults (n = 219)</i>						
1. Leader Self and Means Efficacy	7.88	1.06	.94			
2. Self-esteem	4.12	.63	.44**	.88		
3. Leader self-efficacy (Paglis & Green, 2002)	7.77	1.22	.68**	.43**	.94	
4. General self-efficacy	4.26	.50	.51**	.55**	.60**	.88

Note: The reliability coefficients are in diagonal.  
\*\* *p* < .01 (two tailed).

**Table 6**  
LSME measure and theoretically relevant constructs.

Fit indices	LSME and CSE		LSME and State Hope		LSME and LSE-KB	
	2-factor model	Constrained model	2-factor model	Constrained model	2-factor model	Constrained Model
<i>Sample 2 mid-senior level military officers (n = 265)</i>						
$\chi^2$	1651.34	1708.28	1352.11	1397.53	1511.74	1679.88
<i>df</i>	526	527	349	350	404	405
$\Delta\chi^2(1)$	56.94**		45.42**		168.14**	
<i>Sample 3 working adults (n = 219)</i>						
	LSME and self esteem		LSME and LSE-PG		LSME and GSE	
$\chi^2$	1188.73	1251.31	1571.39	1768.55	1046.87	1123.45
<i>df</i>	463	464	494	495	404	405
$\Delta\chi^2(1)$	62.58**		197.16**		76.58**	

Note: LSME = Leader Self and Means Efficacy; CSE = core self-evaluations; LSE-KB = leader self-efficacy (Kane & Baltes, 1998); LSE-PG = leader self-efficacy (Paglis & Green, 2002); GSE = general self-efficacy; IFI = incremental fit index; TLI = Tucker-Lewis fit index; CFI = confirmatory fit index; RMSEA = root mean square error of approximation.  
\*\* *p* < .001 (two tailed).

LSME and LSE (Kane & Baltes, 1998). For Sample 3 ( $N = 219$ ), the AVE for LSME was .48 exceeding the square of the correlation between LMSE and self-esteem, LMSE and LSE (Paglis & Green, 2002), and LSME and general self-efficacy. Taken together, the results of Study 3 provide evidence that the LSME construct is discriminant from these various state and trait-like individual difference constructs as well as two existing LSE measures. Importantly, these results generalized across different samples of participants operating in different contexts.

#### Study 4

To further examine the network of constructs related to LSME, we measured and assessed various correlates that have been related to self-efficacy or leader efficacy in prior research. In doing so we sought to further establish the nomological validity of LSME. Specifically, we assessed the relationship between LSME and the big-five personality traits, general self-efficacy, learning goal orientation, and meta-cognitive ability.

Personality traits have been shown to be meaningful correlates of leader emergence and effectiveness (e.g., Judge, Bono, Ilies, & Gerhardt, 2002), and the big-five traits have been determined to be associated with LSE (Chan & Drasgow, 2001; Hendricks & Payne, 2007). Ng et al. (2008) argued that this is because distal personality traits create task-specific motivation as represented by more proximal self-efficacy beliefs, with personality representing a hierarchical structure comprised of both abstract and more contextualized self-relevant factors that are interlinked to drive individuals' proximal thoughts and behaviors (Wood, 2007).

We demonstrated in Study 3 that LSME is discriminant from decontextualized forms of general self-efficacy. Research has shown, however, that general self-efficacy is associated with the more proximal or domain-specific constructs of self-efficacy (Kane et al., 2002), as well as LSE specifically (Chen et al., 2001). Based on the complex hierarchical structuring of the self (Hannah, Woolfolk, et al., 2009; Lord et al., 2011), if an individual feels highly efficacious in general, it may enhance the likelihood that they will generalize their existing LSME to new contexts (Bandura, 1997), being more likely to think "if I can do it there, I can do it here."

Next, learning goal orientation has been found to be positively related to both levels of self-efficacy in general (Phillips & Gully, 1997; Schmidt & Ford, 2003), and LSE more specifically (Hendricks & Payne, 2007), providing us another relevant construct to test the nomological network of LSME. This linkage is based on theorizing that individuals with a high learning goal orientation tend to view their ability to take on new tasks as malleable, view feedback as constructive, and use feedback to enhance development and thereby by expectations for future performance (Phillips & Gully, 1997). Learning goal orientation thus enhances individuals' propensity to engage in new tasks and to learn and develop from those tasks, enhancing levels of self-efficacy (Hendricks & Payne, 2007; Schmidt & Ford, 2003).

Finally, we also expect meta-cognitive ability to correlate with LSME. This is because meta-cognitive ability has the primary functions of enhancing the *knowledge of, monitoring, and control* (regulation) of human cognitions and processes (Metcalfe & Shimamura, 1994). It thus serves both self-referential and executive-control functions that are critical to the processing of task and performance information that ultimately enhance the formation of self-efficacy beliefs (Bandura, 1997; Schmidt & Ford, 2003). For example, prior research has linked meta-cognition to the effective use of learning strategies (Schraw & Dennison, 1994), which have in turn been linked to the development of self-efficacy (Bandura, 1997). Prussia et al. (1998) also found that meta-cognitive leadership strategies leaders' employ were mediated through self-efficacy. We therefore expect meta-cognitive ability to relate to

LSME in large part because self and means efficacy are not based on actual performance, but one's interpretation of their performances and the contextual factors present during task execution (Stajkovic & Luthans, 1998), making the meta-cognitive ability to effectively process task and performance information critical.

#### Sample and procedures

We used Sample 3 of 219 working adults for these tests of nomological validity. At Time 1 we administered the Button, Matieu, and Zajac (1996) 8-item learning goal orientation scale, the 24-item meta-cognitive awareness measure by Schraw and Dennison (1994), the big-five personality traits using Gosling, Rentfrow and Swann's (2003) 10-item measure, and general self-efficacy using the 8-item measure of Chen et al. (2001). To separate the measurement of LSME from these correlates to reduce source bias, we used LSME at Time 2, which was collected 2 months later as earlier reported for use in test-retest validation (see Study 3).

#### Results

Table 7 summarizes the descriptive statistics, zero-order correlations, and the internal consistency (alpha) reliabilities of the study variables. Results show that LSME is positively correlated with overall big-five personality traits ( $r = .45, p < .01$ ), with LSME correlated with the separate traits of extraversion ( $r = .35, p < .01$ ), conscientiousness ( $r = .27, p < .01$ ), agreeableness ( $r = .13, p < .10$ ), emotional stability ( $r = .34, p < .01$ ), and openness to experience ( $r = .24, p < .01$ ). Results also show that learning goal orientation ( $r = .46, p < .01$ ), and meta-cognitive ability ( $r = .47, p < .01$ ) were each positively related to LSME, establishing nomological validity with these known correlates of leader efficacy.

#### Study 5

The purpose of Study 5 was to examine the incremental predictive validity of LSME across four separate samples in predicting leader performance (Hypothesis 1), transactional and transformational leadership (Hypothesis 2), and motivation to lead (Hypothesis 3).

#### LSME and performance

*Sample and procedure.* To test Hypothesis 1 we used a new sample not employed in Studies 1–4 (Sample 4) of 200 junior military officers to examine the effects of LSME at Time 1 ( $\alpha = .86, M = 7.85, s.d. = 1.04$ ) on two sources of external performance ratings collected at Time 2. Participants were junior military officers attending a US Army leader development course in the Eastern United States (33 females and 167 males with mean age of 19.8 years ( $s.d. = .96$ )). Volunteers were solicited via an in-course announcement and were told the study sought to better understand managerial thinking. Participants' were serving as team leaders conducting tactical training exercises, such as raids, ambushes, and using weapons ranges. These military leaders had each been with the organization for over 1 year and had been in their leadership positions for at least 6 months. Each had been through similar training exercises, suggesting that their efficacy for leadership in military training was somewhat calibrated through experience. During the tactical exercises each leader's performance was closely observed and rated by their training cadre company commander (a US Army captain or major assigned to closely oversee trainee development and performance), and their peers, using the organization's standard performance rating system. LSME was self-rated prior to the beginning of the training exercise, while the external performance ratings were issued 2 months later, at the completion of training.

Commander overall ratings of the team leader were based on an A to F letter grade, which we transformed into a 0–4.33 interval

**Table 7**  
Means, standard deviations, and correlations.

Variables	M	s.d.	1	2	3	4	5
1. Leader Self and Means Efficacy	7.88	1.06	.94				
2. Big five personality	4.48	.57	.45**	.65			
3. General self-efficacy	4.26	.50	.51**	.36**	.88		
4. Learning goal orientation	5.64	.72	.46**	.27**	.43**	.84	
5. Meta cognitive ability	3.89	.41	.47**	.39**	.60**	.47**	.86

Note: n = 219 (Sample 3: working adults).  
\*\* p < .01 (two tailed tests).

scale with .33 increments. The mean commander rating was 3.46 (s.d. = .86). Second, each leader received peer performance ratings from a minimum of three peers. The organization provided us with the average peer ratings on each unit leader. Peers rated each team leader on the frequency of performance behaviors utilizing a 1 (never) to 7 (always) response set ( $\alpha = .81$ ,  $M = 3.99$ ,  $s.d. = .70$ ). Sample items from this 48-item measure included, “To what extent does this leader... strive for excellence in all duties”, “... work to improve self and unit, based on feedback”, “...constructively contribute to problem-solving and decision-making”, and “...coach, teach, and train subordinates.”

We controlled for an earlier commander performance rating given at Time 1 ( $M = 2.97$ ,  $s.d. = .92$ ), collected 2 weeks prior to the onset of the field exercise to better isolate the effects of LSME on current performance. To provide additional rigor in our analysis, we also controlled for four other positive psychological states: *state hope* (garnering the will and paths to achieve goals), *optimism* (a positive expectation about succeeding), *general efficacy* (beliefs one can generally succeed at any challenging tasks), and *resilience* (bouncing back to attain success when beset by adversity). We chose this approach to isolate the effects of LSME from the effects of these more general positive states that are not specific to individuals’ assessments of leadership capability. This was important as these other positive states have been shown to be predictive of leader performance (e.g., Walumbwa, Luthans, Avey, & Oke, 2011), as well as leader effectiveness (Peterson, Walumbwa, Byron, & Myrowitz, 2009). At Time 1 we used the short version of the Psychological Capital Questionnaire (PCQ; Luthans, Avolio, Avey, &

Norman, 2007), which includes two items each for hope, optimism, general efficacy, and resiliency, as used previously by Walumbwa, Luthans, et al. (2011) ( $\alpha = .79$ ,  $M = 5.65$ ,  $s.d. = .75$ ). Items were rated on a 1 (strongly disagree) to 7 (strongly agree) response scale.

**Results.** The zero-order correlations revealed that LSME at Time 1 was positively correlated with both commander-rated performance ( $r = .17$ ,  $p < .05$ ) and peer rated performance ( $r = .38$ ,  $p < .01$ ) at Time 2 based on the leader’s performance during the tactical exercise. Similarly, ratings of psychological capital were positively correlated with both supervisor-rated performance ( $r = .15$ ,  $p < .05$ ) and peer performance ratings ( $r = .20$ ,  $p < .01$ ) given at Time 2. Finally, supervisor-rated performance given at Time 1 was positively correlated with supervisor-rated performance in the tactical field exercise at Time 2 ( $r = .39$ ,  $p < .01$ ), but was not related to Time 1 LSME, ratings of psychological capital, and peer performance ratings.

We used SEM to test Hypothesis 1. As the factor structure of the LMSE construct was already confirmed in Study 2, to establish adequate indicator-to-sample-size ratios, we used parcels as opposed to items as indicators. Researchers (e.g., Landis, Beal, & Tesluk, 2000; Robert, Probst, Martocchio, Drasgow, & Lawler, 2000) suggest that this procedure minimizes the extent to which the indicators of each construct share variance, and thus has the ability to generate more stable parameter estimates. Moreover, because of the complexity of the models being tested as compared to sample size – with multiple constructs and control variables, as well as multi-component constructs such as psychological capital – the

**Table 8**  
Results of Leader Self and Means Efficacy predicting performance, leadership, and motivation to lead (MTL).

Variables	Supervisor-rated performance	Peer-rated performance	Contingent leadership	Transformational leadership	
<i>Sample 4: n = 200 junior military officers</i>					
Controls					
Supervisor rated performance (Time1)	.39**	.11†			
Psychological capital	.00	.09			
Leader Self and Means Efficacy	.15*	.44**			
<i>Sample 3: 219 working adults</i>					
Controls					
Leader self-efficacy (Paglis & Green, 2002)			.18	.20†	
Leader Self and Means Efficacy			.49**	.46**	
<i>Sample 5: 63 senior military trainees</i>					
Controls					
Prior leader experience			.28†	.23†	
Leader Self and Means Efficacy			.23†	.51**	
			Affective identity	Non calculative	Social normative
<i>Sample 2: 265 mid-senior military officers</i>					
Controls					
Core self-evaluations	.13		.27**	.14	
Leader self-efficacy (Kane & Baltes, 1998)	-.09		.16	.38**	
Leader Self and Means Efficacy	.41**		.06	-.16	

Note: MTL = motivation to lead.  
† p < .10.  
\* p < .05.  
\*\* p < .01 (two tailed tests).

use of item parcels was an appropriate strategy. For LSME, we used the three confirmed factors as its indicators. For psychological capital, we used the four factors of efficacy, hope, optimism, and resiliency as its indicators. Results are shown in Table 8.

As shown in the upper part of Table 8, SEM results show that LSME at Time 1 was positively related to participants' externally rated supervisor ( $\beta = .15, p < .05$ ) and peer rated performance ( $\beta = .44, p < .01$ ) ratings at Time 2 ( $\chi^2 = 36.79; df = 28, p < .01$ ; IFI = .99; CFI = .99; RMSEA = .04), after controlling for Time 1 performance and the four psychological capital constructs. To assess the incremental predictive validity of LSME, we used hierarchical regression and found that LSME accounted for an additional 11% and 2% of the variance in peer and supervisor-rated performance taken 2 months later, respectively, above and beyond performance at Time 1 and psychological capital. These results support Hypothesis 1, indicating there was incremental validity for LSME in predicting performance.

#### LSME and transactional and transformational leadership

Hypothesis 2 posited that LSME would be positively related to ratings of contingent reward transactional and transformational leadership. We tested this hypothesis using two samples, assessing both self-rated and externally-rated measures.

*Sample and procedure.* We used Sample 3 of 219 working adults described above in Study 2 to test this hypothesis. We collected LSME ( $\alpha = .94$ ) at Time 1 and measured participant-reported contingent reward transactional ( $M = 2.96, s.d. = .56$ ) and transformational leadership ( $M = 2.76, s.d. = .55$ ) 2 months later (Time 2) to reduce common method bias (Podsakoff et al., 2003). Both collections used a web-based survey system. We used the standard 20-items to assess transformational leadership ( $\alpha = .88$ ) and the 4-item contingent reward scale ( $\alpha = .71$ ) from the Multi-Factor Leadership Questionnaire (MLQ Form 5X short; Bass & Avolio, 1997). To help mitigate the possibility that the effects of LSME on the outcomes were confounded with those of theoretically related constructs, and to establish incremental predictive validity over an alternate LSE measure, we controlled for Paglis and Green's (2002) 12-item LSE measure ( $\alpha = .94$ ) collected at Time 1.

*Results.* Zero-order correlations showed that LSME was positively correlated with ratings of contingent reward transactional leadership ( $r = .51, p < .01$ ) and transformational leadership ( $r = .55, p < .01$ ). LSE (Paglis & Green, 2002) was also positively correlated with contingent reward ( $r = .46, p < .01$ ) and transformational leadership ( $r = .48, p < .01$ ).

Once again, we used SEM to test Hypothesis 2 using parcels as indicators. For transformational leadership, we used the five dimensions of idealized influence (attributed), idealized influence (behavior), individualized consideration, inspirational motivation, and intellectual stimulation as its indicators. For leader self-efficacy (Paglis & Green, 2002), we randomly created three parcels of items as its indicators. For contingent reward, we randomly created two parcels of items as its indicators. Results are presented in the middle part of Table 8, indicating that LSME at Time 1 significantly predicted contingent reward transactional leadership ( $\beta = .49, p < .01$ ) and transformational leadership ( $\beta = .46, p < .01$ ) at Time 2, while controlling for the alternate LSE measure. The fit indices for this structural model also showed a good fit to the data ( $\chi^2 = 147.88; df = 57, p < .01$ ; IFI = .95; CFI = .95; RMSEA = .08). Using hierarchical regression analyses, we found that LSME accounted for an additional 6% and 5% of the variance in contingent reward transactional and transformational leadership, respectively, above and beyond this alternate LSE measure. Therefore, the results support the incremental validity of LSME over the alter-

nate LSE measure (Paglis & Green, 2002), and support Hypothesis 2 linking LSME to leadership behaviors.

*Replication sample: sample and procedures.* We then confirmed these results using another new independent sample (Sample 5) not used in any of our other studies, to ensure the pattern of results found using Sample 3 held using external ratings of contingent reward transactional and transformational leadership. This Sample 5 consisted of 63 senior military trainees attending the same military leadership training program described in Sample 4, but 1 year later than Sample 4 participants. This sample was also more senior leaders serving as squad leaders or platoon sergeants (versus team leaders as in Sample 4). Again, these leaders were observed and rated while leading their units through training and daily military missions and duties. Ratings of transactional contingent reward and transformational leadership were given by participant leaders' next higher level leader using the same MLQ Form 5X short (Bass & Avolio, 1997) described in Sample 3. LSME ( $\alpha = .94, M = 8.00, s.d. = 1.01$ ) was collected at Time 1 and the transactional contingent reward ( $\alpha = .70, M = 3.26, s.d. = .50$ ) and transformational leadership ( $\alpha = .92, M = 3.26, s.d. = .38$ ) ratings were collected 2 months later at Time 2, both using paper surveys. Volunteer participants were recruited through an in-course announcement and asked to participate in a general management study. The sample mean age was 21.14 ( $s.d. = 1.37$ ) and included 59 males and 4 females. We controlled for participants' length of prior leadership experience, based on number of months, to better isolate the effects of LSME on external ratings of leadership.

*Results.* We found that LSME was positively correlated with ratings of contingent reward transactional ( $r = .22, p < .05$ ) and transformational leadership ( $r = .44, p < .01$ ). Further, as shown in Table 8, the confirmatory tests showed that LSME was significantly related to transformational leadership ( $\beta = .51, p < .01$ ), and marginally related to contingent reward transactional leadership ( $\beta = .23, p < .10$ ) 2 months later at Time 2 controlling for prior leader experience, providing further support for Hypothesis 2. The fit indices for this structural model also showed a good fit to the data ( $\chi^2 = 56.05; df = 39, p < .05$ ; IFI = .94; CFI = .94; RMSEA = .08).

#### LSME and motivation to lead

We proposed in Hypothesis 3 that LSME will be positively related to affective-identity motivation to lead (MTL), while also exploring in Research Question 1 whether LSME would be positively related to social-normative and non-calculative MTL.

*Sample and procedure.* We used Sample 2 of 265 mid-senior level military officers described in Study 2 to test this hypothesis and research question. To further test the incremental predictive validity of LSME, we controlled for a second alternate LSE measure (Kane & Baltes, 1998). We also controlled for core self-evaluation traits (Judge et al., 2003), as this construct has been linked to motivation and goal-setting behavior (e.g., Judge et al., 2005), job performance (e.g., Grant & Wrzesniewski, 2010), and self-determination (e.g., Judge et al., 2005).

LSME ( $\alpha = .93, M = 8.31, s.d. = .86$ ) and core-self-evaluations ( $\alpha = .77, M = 4.03, s.d. = .45$ ) were measured at Time 1. To reduce potential common method bias (Podsakoff et al., 2003), MTL was then administered at Time 2 two months later using Chan and Drasgow's (2001) 27-item measure consisting of affective-identity (9 items,  $\alpha = .84, M = 3.77, s.d. = .61$ ), non-calculative (9 items,  $\alpha = .83, M = 4.26, s.d. = .53$ ), and social normative dimensions (9 items,  $\alpha = .76, M = 3.89, s.d. = .49$ ).

*Results.* Zero-order correlations showed that LSME was positively correlated with core self-evaluation traits ( $r = .43, p < .01$ ), the

alternate LSE measure ( $r = .58, p < .01$ ), and each of the affective-identity ( $r = .31, p < .01$ ), non-calculative ( $r = .29, p < .01$ ), and social normative ( $r = .15, p < .05$ ) dimensions of MTL. The two control variables were also positively correlated with all three dimensions of MTL.

We used SEM to test **Hypothesis 3**, once again using parcels as indicators. For core self-evaluations, affective identity motivation-to-lead (MTL), non calculative MTL, social normative MTL and leader self-efficacy, we randomly created three parcels of items as their indicators. The structural model showed a good fit to the data ( $\chi^2 = 328.49; df = 103, p < .01$ ; IFI = .90; CFI = .90; RMSEA = .09). As shown in the lower part of **Table 8**, LSME at Time 1 was positively related to affective-identity ( $\beta = .41, p < .01$ ), but not non-calculative ( $\beta = .06, ns$ ) or social normative ( $\beta = -.16, ns$ ) forms of MTL at Time 2, controlling for core self-evaluations and the alternate LSE measure (Kane & Baltes, 1998). To assess the incremental validity of LSME in predicting the affective identity dimension of MTL, we used hierarchical regression analysis and determined that LSME accounted for an additional 3% of the variance in affective identity MTL beyond core self-evaluations and the alternate LSE measure. **Hypothesis 3** thus received support.

## General discussion

### *Theoretical implications*

We propose that the LSME construct expands prior leader self-efficacy research in four primary ways. First, based on our review of the literature (see **Table 1**), we believe that LSME is the first leader efficacy measure to be tested across all requirements for establishing construct reliability and validity (i.e., content, convergent, discriminant, predictive, and nomological validity). We did so across five unique samples. LSME thus offers an initially validated measure to guide future leader efficacy research, with further testing and improvements warranted.

Second, building on and testing the model of Hannah et al. (2008), we propose that LSME provides a more refined understanding of the complexities of leaders' self and means efficacy. We demonstrated across two samples in Study 2 that LSME is comprised of three dimensions that are independent, but converge to form a core formative LSME construct. This is consistent with theorizing that leaders' "orchestrate" various forms and bases of perceived capability when contemplating thought and action (Gist & Mitchell, 1992; Hannah et al., 2008), and recognizes that leaders' beliefs in their capabilities represents a complex scaffolding or assemblage (Hannah, Woolfolk, et al., 2009; Lord et al., 2011; Wood, 2007). Further, while Hannah et al. (2008) conceptualized that leaders' self-efficacy for thought and self-efficacy for self-motivation were separate constructs; our theorizing and empirical results suggest they are combined as a broader form of leader self-regulatory efficacy. LSME opens new areas of research as models of leader motivation, cognition and decision-making have generally not considered the effects of self-regulatory leader efficacy.

Third, LSME is the first leader efficacy construct to incorporate means efficacy, and thus the influence of leaders' contexts in determining their efficacy. As leadership is inherently contextualized and embedded (Osborn et al., 2002; Porter & McLaughlin, 2006), we believe this has been a critical omission in leader efficacy research. Given the demonstrated utility of means efficacy in predicting outcomes in other areas of organizational behavior research (Eden & Granat-Flomin, 2000; Eden & Sulimani, 2002; Eden et al., 2010; Walumbwa, Cropanzano, et al., 2011; Walumbwa et al., 2008), we suggest that means efficacy will provide for future advancements in leader efficacy research and a deeper understanding of leaders' agency.

Given this greater construct breadth, we believe that LSME will be useful for predicting leader emergence and performance across complex performance domains. This is important, as in a single meeting a leader may face demands to simultaneously influence group dynamics, follower motivation, rewards, visioning and planning. Reductionist approaches that isolate leader self or means efficacy to overly narrow definitions may miss some of the latent dynamics of what constitutes agentic and effective leadership in today's complex organizational contexts. The utility of LSME over more narrowly defined LSE constructs was demonstrated in Study 5, where LSME predicted additional variance in contingent reward transactional and transformational leadership as well as motivation to lead beyond core self evaluations (Judge et al., 2003) and two other alternate LSE measures (i.e., Kane & Baltes, 1998; Paglis & Green, 2002).

Fourth, the findings reported in Study 5 demonstrated across four samples that LSME predicted leader affective-identity motivation to lead, self and other-reports of leadership style (contingent reward transactional and transformational leadership) and performance (external peer and supervisor ratings). To enhance our confidence in the predictive validity of LSME; when conducting these analyses we controlled for various relevant controls across the four samples. We believe these results, all using lagged outcome measures, demonstrate incremental predictive validity and the usefulness of LSME for future leadership research. As reported in the review by Hannah et al. (2008), only a handful of studies have tested the effects of LSE specifically with leader performance as the criterion, much less using external ratings over time. Our findings linking LSME to leader performance ratings from two external sources provides validation evidence for this measure in particular and extends LSE research in general. Further, by demonstrating that LSME is an antecedent to transformational leadership also answers calls to better understand what underpins and promotes transformational behaviors (Bass & Bass, 2008).

Our findings linking LSME to motivation to lead warrant further attention. In support of **Hypothesis 3**, our data replicated links between LSE and the affective-identity dimension as reported by Chan and Drasgow (2001) and Hendricks and Payne (2007). This suggests that seeing oneself as possessing leadership capabilities may drive proximal motivation to exercise leadership behaviors as suggested in self-identity based theories of leader motivation (Lord & Brown, 2004). Based on our exploratory research question, we did not replicate the small effect found by Chan and Drasgow (2001) as well Hendricks and Payne (2007) between LSME and the social-normative dimension. However, like Chan and Drasgow (2001), we also did not find any link between LSME and the non-calculative dimension of motivation to lead. Thus, although affective-identity motivation to lead is clearly the most potent correlate to LSE and LSME, the relationships with all motivation to lead dimensions may warrant future research.

### *Practical implications*

We believe there are three primary practical contributions of the LSME construct. First, LSME was shown to predict two separate external performance ratings over time in an organizational field context as well as to predict three other constructs (transactional and transformational leadership and motivation to lead), which have all been linked to performance outcomes in organizational settings (Bass & Bass, 2008; Chan & Drasgow, 2001).

Second, by empirically distinguishing the rich and complex structuring of leaders' perceived capabilities across the domains of action, self-regulation, and means we may enhance our understanding of LSME *development*. For example, our findings suggest that leaders' perceptions of the utility of means available (e.g., peers, leaders, tools and resources) in their context is a key factor

in their orchestration of LSME. This component can therefore be isolated and targeted in developmental interventions. That may include both organizational development efforts to shape the context in ways that enhance the *actual* means available to the leader, combined with interventions to demonstrate to leaders the utility of those means, in order to enhance their *perceptions* of the utility of those means to task accomplishment. The later techniques have been demonstrated by Edén and Sulimani (2002) in raising follower self and means efficacy and we see no reason those same techniques would not apply to leadership research and to developing the means component of LSME.

Third, we suggest that the differentiation of the self-efficacy components of LSME into action and self-regulation can similarly aid organizational leaders in their conduct of developmental interventions. Although there is a dearth of research on LSE development specifically (Hannah et al., 2008), there is rich literature on the development of self-regulatory (i.e., thought and motivational) self-efficacy development (see Bandura, 1997). Again, there is no reason why techniques proven to develop self-regulatory components of self-efficacy in clinical and social psychology cannot be applied to leadership research and the development of self-regulatory LSME. In sum, the discrimination of LSME into components may allow leader developers to better conceptualize, isolate and measure its development.

#### *Limitations, future research, and conclusions*

First, although our initial findings suggest construct reliability and validity across five samples and multiple contexts (military and a breadth of working adult industries), additional longitudinal designs are needed to assess LSME across various permutations of leader contexts and outcomes to extend its generalizability. In the current study, we assessed externally rated measures of overall leader performance. Future research should extend our work by assessing more specific leadership performance domains. With its self-regulatory component, for example, LSME may be particularly useful in predicting performance on leader tasks requiring high levels of cognitive ability or adaptive thinking, or the requirement for enhanced self-motivation to overcome challenges or setbacks and persevere. We believe this may explain why LSME had higher predictive validity in Study 5 where we were predicting military team leader performance in more (tactical training) versus less (in garrison) challenging contexts.

As the LSME measure has respondents rate their perceived capabilities to lead in their current context, it prompts contextualized responses, and it thus can be used across a wide variety of varying contexts. For example, extreme contexts impose unique and significant challenges to leaders, and a recent review of the leadership in extreme contexts literature has proposed that LSE is a key leader attribute needed to operate effectively in such contexts (Hannah, Uhl-Bien, Avolio, & Cavarretta, 2009). Studies testing whether LSME sustains leader performance in more extreme contexts would thus be important.

Assessing LSME across contexts with varied amounts or levels or quality of means available to the leader would also be important. This would allow assessment of how the means component of LSME may be influenced by available means and subsequently affect performance. It is important to note that means LSME is not determined only by the availability of means, however, but also by leaders' beliefs as to what they can do with those means to enhance their capabilities. A leader with high means LSME may thus be more resourceful as compared to other leaders to leverage available means when they are limited.

Future research should also test how LSME predicts a larger range of leadership styles than those assessed here, such as visionary, shared, or authentic leadership. Further, while we focused on

predicting active forms of leadership in this first set of studies, a more focused future longitudinal research study could assess the effects of LSME across a larger range of passive and active leader behaviors, such as all nine leadership styles represented in the Full Range Model of leadership spanning from laissez faire to transformational (Avolio, 2002). Researchers could observe the effects of LSME on leader behaviors across a range of tasks and contexts where those styles are theorized to be more or less appropriate. Concerning laissez faire leadership, researchers might also assess the *confidence not to act*, which would also require assessing mediating factors to determine whether an absence of action is related to confidence, a lack of confidence, or other factors (e.g., a lack of motivation).

Further, in Sample 3 (219 working adults) LSME and transactional and transformational leadership ratings were all collected from participants. We separated the collections by 2 months to reduce potential common method bias (Podsakoff et al., 2003), yet some bias may have remained. To address this weakness, we conducted a confirmatory test using a new Sample 5 (63 military leaders) to link LSME to external ratings of contingent reward transactional and transformational leadership, enhancing our confidence in this relationship.

To establish broad construct coverage, in Study 1, experts generated items for the LSME measures based in part on descriptions of situational, transactional and transformational, and path-goal leadership theories. These well-validated frameworks provided a solid basis for LSME. Yet, while these broad frameworks each represent a span of leader actions ranging from task and structure oriented to more inspirational and follower oriented leadership, they do not cover the full span of possible leadership. Further, with the intent to develop a parsimonious measure, the LSME measure only provides items that are representative of leaders' efficacy. Future research might explore other theories and aspects of leadership to see if they might expand the breadth covered by the 22 items included in these foundational LSME scales.

Finally, the self-regulatory factor of LSME does not directly reflect self-efficacy related to leaders' emotions. This is because the vast majority of research linking emotions and self-efficacy has focused on the causal influence of emotions on self-efficacy through psychological arousal, which is one of the four primary sources of self-efficacy (Bandura, 1997). Research assessing affect and emotions as outcomes of self-efficacy, however, is much less developed, and largely assesses the indirect links between self-efficacy and emotions through cognitive appraisals or thought control (e.g., self-efficacy → cognitive appraisal → emotions). For example, highly efficacious people may interpret a situation as less threatening and thereby experience less fear (Bandura, 1997). Thus the cognitive component and temporal ordering would need to be considered if an emotions component were to be considered for LSME.

In conclusion, we set out to expand how to view and assess LSME, which we propose is a critical driver of leadership success in challenging and dynamic contexts. The advantage of pursuing further conceptual and empirical development of the LSME construct is that it is state-like, eminently developable and has demonstrated preliminary support for predicting leader motivation, leadership styles, and performance. These are all positive elements for what should constitute and genuinely develop more optimal leadership potential.

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