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DEVELOPMENT OF A LEADERSHIP MINDSET SCALE

Abstract

The purpose of the study was to construct a Leadership Mindset Scale (LMS) and to assess its reliability and construct validity. Participants were 100 employees in a variety of leadership and non-leadership positions at various organizations in three states. An item and factor analysis on the 13 LMS items led to a scale with 11 items (Cronbach α = .80). A Principal Axis Factor analysis with Promax rotation suggested three factors: Leadership Mindset Teachability (LMS-T), a belief in leadership teachability; Leadership Mindset Improvability (LMS-I), a belief in leadership improvability over time; and Leadership Mindset Predictability (LMS-P), a belief that leadership cannot be predicted at an early age. Convergent validity of LMS-Total and Teachability was evidenced by significant correlations with the implicit theories of intelligence and anxiety scales, and developmental leadership and transactional leadership scales. Divergent validity was evidenced by a non-significant correlation with social desirability. The results suggest that the LMS measures a construct different from those of other leadership scales used in the study. The LMS can be helpful in leadership training programs to promote a growth mindset about the trainability of leadership skills.

Keywords: leadership growth mindset, leadership, training

Introduction

Every day in the United States, organizations invest time, money, and effort to help develop leadership skills so that they can contribute more effectively to their efficient functioning. Often, leaders believe that improving performance means that all employees should show perfect performance, a type of "all or nothing" thinking. Unfortunately, such thinking may lead to decreased performance and mental and emotional fatigue on the part of both leaders and employees.

Companies in the United States spend around $11 billion per year with approximately a quarter of their total training budget allocated for leadership development (Lacerenza et al., 2017). This high demand for leadership development, with a multitude of training programs being offered,

highlights the importance of understanding what makes an effective leader to make leadership training programs more effective.

Distinguishing leaders from non-leaders has been a topic of interest to leadership investigators leading them to develop Implicit Leadership Theories (ILTs) over the past five decades (Lord et al., 2019). In recent years, researchers have extended ILTs to study what constitutes a good follower, developing implicit follower theories (see Junker & Dick, 2014). Lord et al. indicate the early ILT work focused on the "widely shared beliefs about the behavior and traits which affected the encoding, recall, and ratings of leader behaviors…" (p. 15-1) but with the advancement of socio-cognitive research, ILTs shifted their focus to examine cognitive structures associated with leadership that vary contextually (e.g., military or business). This research, grounded in category learning theories, regarded 'leader' as a category with its own prototype that helped people distinguish them from non-leaders. An early study by Lord et al. (1984) developed a categorization-based model of leadership behavior and traits by asking the question: Is there a prototype of a leader that people have as we have a prototype of a bird or a chair? They found such traits as intelligence, honesty, producing outstanding work, and being highly dedicated and understanding were rated as prototypical of the category 'leader.' In contrast, authoritarianism and dishonesty were rated as less prototypical (see Epitropaki and Martin, 2004). Over the years, many ILT measures have been developed with lists of independent traits, along with such implicit measures as lexical decision tasks, word fragment tests, and association-based measures.

The approaches to ILTs are distinct from the one we take here following the work of Dweck and her colleagues, whose work is grounded in educational contexts and uses a questionnaire not so much to study the attributes of a good student but to distinguish individuals who believe in intelligence as a fixed trait (an entity theorist) and those who believe in intelligence as a malleable trait (a malleable or growth-minded theorist). We hoped that applying Dweck's approach to leadership will help identify growth-oriented leaders and design training programs to raise the leadership trainees' awareness of their implicit beliefs and become more growth-oriented. Steffens and Haslam (2022) argued that many theories of leadership "are leader-centric" focusing on "attributes, actions, and qualities as primary determinants of group success." In this view, a leader is essentially a hero or "a great man" (p. 237). They also indicate that traditional leadership training programs may encourage narcissism in corporate leaders, who work more for self-advancement than for the greater good. Thus, designing training programs using Dweck's approach to promote growth-mindedness would possibly help leaders learn to avoid self-serving control and arrogant behaviors when working with people who are responsible to them.

In this study, we developed a questionnaire to examine employees' views of leadership in terms of whether it is a fixed (trait-like) entity or a malleable (trainable) quality and evaluated its reliability and validity. The study derives its impetus from Dweck's (1986) seminal work on implicit self-theory of intelligence. She and her colleagues found that individual differences in implicit beliefs are significantly predictive of academic motivation (Dweck, 1986), academic achievement (Blackwell et al., 2007), and the judgments of the setbacks of self and others (Dweck et al., 1995). Other studies have documented links to appreciable behavioral differences in such domains as math ability, computer skills, shyness, and among individuals facing adversity (Yeager et al., 2014). To our knowledge, there are no previously published validated scales on leadership mindset specifically for differentiating leaders on the fixed-malleability orientation of leadership (see Nickels & Ford, 2017, who summarized all known published leadership instruments).

Item development for our scale *The Leadership Mindset Scale (LMS)* was guided by Dweck's scale of implicit beliefs (fixed or malleability) about the nature of intelligence. We note that we did not merely replace the word "intelligence" with "leadership" when developing our scale, rather we constructed items using focus groups who brainstormed, rated, and selected items.

To evaluate the convergent validity of the LMS, we used Dweck's Theory of Intelligence scale (DTIS), the Theory of Anxiety scale (Schroeder et al. 2014),

and selected leadership and related constructs' measures. To evaluate its discriminant validity, we used the Marlowe-Crowne Social Desirability scale (Short Form). Additionally, we asked the demographic questions: position in the firm (Individual Contributor, Supervisor/Office Manager/Admin, Senior Leader [CEO, President, Vice President, General Manager]), number of years in the position, gender, age (to the approximate year), and ethnic background (White, Black or African American, Asian, Native Hawaiian or Pacific Islander, Other). These demographics were gathered to describe the sample and for exploratory analysis concerning their possible relationships with implicit beliefs. However, because of the small sample size, no analyses were conducted to examine their relationships with the LMS.

Evaluation of Convergent Validity.

Implicit theories of implicit beliefs scales. Assuming that beliefs about nature vs. nurture of traits should generalize to some extent over belief domains, we predicted that the LMS would have a significant positive correlation with the Theory of Intelligence Scale (Dweck, 1986) and the Theory of Anxiety Scale (Schroeder et al., 2015).

Leadership Scales. To evaluate the convergent validity of LMS, we selected the following Leadership instruments: (a) Developmental Leadership Questionnaire (Larrson, 2006), (b) Leadership Self-Efficacy Scale (Bobbio & Manganelli, 2009) (c) Authentic Leadership Self-Assessment Questionnaire (Walumbwa et al., 2008), and (d) Leadership Self-Report Scale (Dussault, Frenette, & Fernet, 2013). Each of these measures has subscales that measure somewhat different aspects of leaders' styles of behavior.

Larsson et al.'s Developmental Leader Questionnaire is designed to measure four styles: (a) Developmental behaviors (serving as an exemplary model, showing individualized consideration, motivating and inspiring people); (b) Conventional Positive behaviors (use of contingent reward, use of positive tone to negotiate with employees); (c) Conventional Negative behaviors (use of negative tone, following rules to avoid mistakes, and controlling); and (d) Non-Leadership behaviors (laissez-faire management, avoiding responsibility). We hypothesized that a leader with strong beliefs in the malleability of intelligence is more likely to endorse the developmental leadership style and less likely to endorse the other three styles. Thus, we expected a positive significant correlation with the first style and negative significant correlations with the other three styles.

The Leadership Self-Report Scale (Dussault et al., 2013) measures three styles based on the work of Bass (1985) and colleagues: (a) Transformational (with subscales Charisma, Intellectual Stimulation, & Individualized Consideration); (b) Transactional (with subscales Contingent Reward & Management-by-Exception); and (c) Laissez-Faire. We used only the three main scales in this study. Transformational leaders inspire enthusiasm and loyalty, allow their subordinates to think reflectively and innovatively, and coach them to help them grow. Transactional leaders keep close contact with their subordinates, use contingent rewards for reinforcement when they perform well, give negative feedback when they fail, and in its "least active form" (p. 420) intervene only when problems develop. Dussault et al. noted, citing the work of Bass and colleagues, that "most effective leaders utilize both transformational and transactional leadership styles" (p. 420). Laissez-faire leaders are non-leaders, avoid making decisions, avoid conflicts, and are unavailable when needed. We hypothesized that the LMS would correlate

positively and significantly with the Transformational, but negatively with Transactional, and Laissez-Faire scales.

The Authentic Leadership Questionnaire (Walumbwa et al., 2008) measures leaders' self-perceptions of (a) Self-awareness of their strengths and limitations, openness to feedback, and self-acceptance; (b) their Internalized Moral Perspective, the extent to which they are guided by core values and morality, rather than by external pressures; (c) Balanced Processing, the extent to which they listen and seek opinions before making decisions; and (d) Relational Transparency, the extent to which their presentations are open and honest. We hypothesized that a growth-minded leader should be more self-aware, open to feedback, consider others' opinions, and help other opportunities to grow. Thus, the LMS was expected to correlate positively and significantly with the four Authentic Leadership subscales.

Lastly, the Leadership Self-Efficacy Scale (Bobbio, & Manganelli, 2009) was used to measure "individual self-efficacy beliefs to successfully accomplish leadership role in groups" (p. 4). It has four subscales to measure the abilities to initiate change processes, choose people to work with and delegate responsibility, gain consensus, motivate, and be self-aware and confident. We hypothesized that the LMS would have positive and significant correlations with self-perceptions of leadership efficacy.

Relationships with related constructs. Four tests of related constructs were chosen for convergent validation: (a) Multidimensional Perfectionism Scale Short-Form (Hewitt et al., 2008) with three perfectionism subscales: self-oriented (overly demanding of self to be perfect), other-oriented (overly demanding of others to be perfect), and socially prescribed (feeling pressured from expectations of others to be perfect); (b) Short Grit Scale (Grit-S) (Duckworth & Quinn, 2009), a

measure of a type of growth mindset to pursue challenges and long-term goals despite setbacks; (c) a general abbreviated measure of locus of control (Valecha & Ostrom, 1974); and (d) frustrative nonreward responsiveness subscale, a measure of lowered approach motivation following nonreward (Wright et al., 2009).

Deriving from the work of Dweck and her colleagues, we hypothesized that those who subscribe to the malleable theory of leadership are more likely than those who subscribe to the fixed theory of leadership to identify their leadership style as less perfectionistic and to have higher levels of grit (consistency of interest and perseverance of effort), frustrative nonreward responsiveness, and internal locus of control. Thus, the LMS was expected to have a significant negative correlation with perfectionism subscales, and positive significant correlations with grit, frustrative nonreward responsiveness, and internal locus of control scales.

Discriminant Validity. The LMS was expected to have a negligible non-significant correlation with social desirability assuming that the respondents did not consistently respond with a socially desirable set.

Method

Participants. Participants were 100 employees (55 women, 45 men, age range 23 to 73, median age 37.5) at 15 organizations in Pennsylvania, Ohio, and Michigan related to real estate, architecture, computer support, construction, marketing, event catering, insurance, government, K-12 education, and investments. This population was regarded as appropriate for the study because it consisted of employees in corporate settings in various management positions (e.g., CEO, senior management, mid-level managers, team leaders, and entry-level). After receiving approval from the companies, the study's first author, who served as an intern at the Performance Mindset & Development consulting firm at the time of the study, obtained a list of potential participants and their email addresses from the companies. Participants were contacted through their email with a brief

description of the study and a hyperlink to the instrument on Qualtrics, which included an informed consent form that specified that participation was voluntary, that they could withdraw from the study at any time without penalty, their responses were being gathered anonymously, and no compensation is being offered for participation. If they consented, they clicked on the link to gain access to the questionnaire.

The ethnic backgrounds of the participants were 96% White, 1% Black or African American, 1% Asian, 1% Native Hawaiian or Pacific Islander, and 1% Other. The seniority levels of the participants were 52% Individual Contributors (having no direct reports), 24.5% Supervisor/Office Manager/Admin, and 23.5% Senior Leader (CEO, President, Vice President, General Manager). Three participants had worked for reported working less than one year, 40 for 1-4 years, 23 for 5-9 years, 11 for 10-14 years, nine for 15-19 years, seven for 20-24 years, four for 25-29 years, and one for 30-34 years, 35-39 years, and 40-44 years, respectively.

Instruments.

Leadership Mindset Scale (LMS). The construction of items for the scale was guided by Dweck and her colleagues' work on implicit beliefs people hold about the malleability of intelligence. The first author formed a focus group of the employees, who serve as trainers at the Performance Mindset & Development consulting firm, to discuss the construct and to collectively brainstorm items that putatively measure implicit beliefs about the malleability of leadership. After several discussions, the focus group settled on 13 items. The items were further discussed by the authors who worked collaboratively with the group to settle on the wording of items; none of the items were taken from any of the extant mindset scales.

Examples of items include: ("Great leaders are born" and "Even someone with very poor

leadership ability can improve over time") rated on a 1-7 scale (*"Very untrue of what I believe"* to *"Very true of what I believe"*) that measured incremental beliefs towards leadership. The anchor points used differed from those used by Dweck et al. (1-strongly agree to 6-strongly disagree) to more specifically reflect that we were interested in tapping the respondents' beliefs and given only 13 items, a 7-point scale, rather than a 6-point scale was used to get more response variability. Higher scores reflect higher beliefs in the malleability of leadership ability. Item, reliability, structure, and validity analyses on the LMS are presented in the Results section.

Dweck's Theory of Intelligence Scale (DTIS). The eight-item DTIS (Dweck, 2000) measures employees' beliefs about the malleability of intelligence (examples of items include "You have a certain amount of intelligence, and you can't really do much about it" and "You can always substantially change how intelligent you are"). The DTIS is rated on a 6-point Likert scale (*"Strongly Agree"* to *"Strongly Disagree"*), and it has been shown to have excellent psychometric properties with Cronbach alpha values ranging between .94 and .98 and a two-week test-retest reliability of .80 (Dweck et al., 1995). Higher scores on the scale reflect a higher belief in incremental or malleability theory.

Theory of Anxiety Scale (TOA). The four-item TOA (Schroder et al., 2015) measures the degree to which individuals believe anxiety is malleable (examples of items include "You have a certain amount of anxiety, and you cannot really do much to change it" and "No matter how hard you try, you can't really change the level of anxiety that you have"). The instrument is rated on a 6-point Likert scale (*"Strongly Disagree"* to *"Strongly Agree"*). It has excellent

psychometric properties with Cronbach α values ranging from .95 to .97 (Schroder et al., 2019). All items were reverse coded so that higher scores on the scale reflect greater endorsements of the malleable theory of anxiety.

Modified Developmental Leadership Questionnaire (DLQ). The 36-item DLQ (Larsson, G., 2006) measures beliefs about leadership attributes (item example: "A good leader is one who creates enthusiasm for a task"). It is rated on a 9-point scale (*"Never, or almost never"* to *"Always, or almost always"*). However, the scale was modified from a 9-point to a 7-point scale to allow for improved readability of the items on Qualtrics (*"Absolutely untrue of what I believe"* to *"Absolutely true of what I believe"*). The DLQ subscales of leadership consist of Developmental Leadership, Conventional Positive Leadership, Conventional Negative Leadership, and Non-Leadership. Higher scores reflect higher levels of that leadership characteristic measured. Larsson (2006) reported Cronbach α between .70 to .90.

Leadership Self-Efficacy (LSE) Scale. The 21-item LSE scale (Bobbio & Manganelli, 2009) measures self-efficacy behaviors with six subscales: (a) LSE-Change—Starting and Leading Change Processes in Groups (e.g., "I am able to set a new direction for a group, if the one currently taken doesn't seem correct to me"); (b) LSE-Choose and Delegate—Choosing Effective Followers and Delegating Responsibilities ("I am confident in my ability to choose group members in order to build up an effective and efficient team"); (c) LSE-Relationships—Building and Managing Interpersonal Relationships Within Groups ("Usually, I can establish very good relationships with the people I work with"); (d) LSE-Self-Confidence—Showing

Self-Awareness and Self-confidence ("I can identify my strengths and weaknesses"); (e) LSE-Motivate—Motivating People ("With my example, I am sure I can motivate the members of a group"), and (e) LSE-Consensus—gaining consensus of group members ("I can usually make the people I work with appreciate me"). The items are rated on a 7-point response scale (*"Absolutely False"* to *"Absolutely True"*). Higher scores reflect higher leadership self-efficacy on each sub-scale and the total scale (G-LSE). Bobbio and Manganelli reported "satisfactory" (p. 14) reliability values (ρ) ranging between .69 and .79 for the six subscales and .94 for the total scale (G-LSE) of 21 items for their entire sample.

Authentic Leadership Questionnaire (ALQ). The 16-item ALQ **(**Walumbwa et al., 2008) measures beliefs about authentic leadership attributes (item example: "I can list my three greatest weaknesses"). It is rated on a 5-point scale (*"Strongly Disagree"* to *"Strongly Agree"*). The ALQ subscales consist of leader Self-awareness, Relational Transparency, Internalized Moral Perspective, and Balanced Processing. Walumbwa et al. (2008) reported Cronbach α values ranging from .76 to .92 for the subscales. Higher scores on a subscale reflect higher levels of that characteristic measured.

Dussault Leadership Self-Report Scale (DLS). The 21-item DLS (Dussault et al., 2013) measures self-perception of leadership qualities (item example: "I encourage my staff to take professional training"). It is rated on a 4-point scale (*"Completely Disagree"* to *"Completely Agree"*). The subscales consist of Transformational Leadership, Transactional Leadership, and Laissez-faire Leadership. Higher scores on a subscale reflect higher levels of the characteristic measured.

Dussault et al. (2013) reported satisfactory Cronbach α values for the subscales ranging from .65 to .88 in two samples.

Multidimensional Perfectionism Scale Short Form (MPS-SF). The 15-item version of the MPS (Hewitt et al., 2008) measures self-oriented perfectionism (examples of items include "I demand nothing less than perfection of myself"), other-oriented perfectionism ("If I ask someone to do something, I expect it to be done flawlessly"), and socially prescribed perfectionism ("People expect nothing less than perfection from me"). The items are rated on a 7-point response scale (*"Strongly Agree"* to *"Strongly Disagree"*). Stoeber (2018) reported satisfactory Cronbach's alphas (≥ .70) for the self-oriented, socially-prescribed perfectionism, and other-oriented perfectionism in four samples, except the latter scale had Cronbach α of .69 in sample one. Higher scores reflect higher self-oriented, other-oriented, and socially prescribed perfectionism.

Marlowe-Crowne Social Desirability Scale Short Form (M-C SDS). The 20-item *True-False* M-C SDS Short Form (Strahan & Gerbasi, 1972) measures responses based on social desirability (item example: "I'm always willing to admit it when I make a mistake"). Strahan and Gerbasi found the M-C SDS Short Form to correlate strongly (.90s in four samples) with the full MC-SDS and reported reliability coefficients of .78, .83, .73, and .77 in four samples. Higher scores reflect higher self-reported responses based on social desirability.

Short Grit Scale (Grit-S). The eight-item Short Grit Scale (Duckworth & Quinn, 2009) measures trait-level perseverance (e.g., "Setbacks don't discourage me") and passion for long-term goals (e.g., "I finish whatever I begin"). It is rated on a 5-point scale (*"Very much like me"* to *"Not like me at all"*). Higher scores reflect higher levels of grit. Duckworth and Quinn reported Cronbach α values between .73 and .83 for the total score reflecting both interest and perseverance, which was used in this study.

Locus of Control Scale. The Locus of Control Scale (Hsia et al., 2012) is a four-item instrument rated on a 5-point scale (*"Very Inaccurate"* to *"Very Accurate"*) to measure the confidence of individuals in controlling their behaviors and outcomes (examples of items include "When I make plans, I am almost certain that I can make them work"). Hsia et al. (2012) reported Cronbach α at or well above .82 and reported validation evidence. Higher scores reflect higher levels of internal locus of control.

Frustrative Nonreward Responsiveness (FNR) Subscale. The five-item frustrative nonreward responsiveness (FNR) subscale (Wright et al., 2009) measures employees' approach motivation following nonreward (item example: "When circumstances prevent me from achieving an important goal, I find it hard to keep trying"). It is rated on a 4-point Likert subscale (*"Very true for me"* to *"Very false for me"*). The FNR items were reversed so that a high score on the subscale indicates someone who tends to become very demotivated following a nonreward. Wright et al. reported Cronbach α at .68, and one-month test-retest reliabilities of .71 and .73.

Results

Item Analysis and Reliability, and Structure of LMS Scale. Initial reliability analysis of the 13 LMS

items revealed a Cronbach α of .75. An examination of the item-corrected total correlations suggested the removal of one item that had a negative correlation of -.27 to increase the scale's reliability to .81. The item seemed properly coded but ambiguously worded, and thus, the item was dropped. A follow-up reliability analysis on the 12 items indicated the Cronbach α of .81 (see Table 1) and the item-corrected total correlations for these items were between .35 and .68. One other item was dropped after factor analysis, leaving 11 items on the scale (see below for details).

Structure of LMS. According to George and Mallory (2012), skewness and kurtosis values between ± 1.0 are acceptable for most psychometric purposes. The skewness and kurtosis values were between ± 1.0 for 10 out of 12 items selected after an initial item analysis, but two items showed marginal skewness of 1.02 and 1.03. Kurtosis values, however, exceeded the acceptable range between ± 1.0 on three items (2.29, 1.24, and 3.52). Costello and Osborne (2005) suggest using the Principal Axis Factor (PAF) analysis for exploratory purposes when the data are non-normal. They also suggest using oblique rotations given that in social sciences, factors tend to be correlated. Consequently, the structure of LMS consisting of 12 items was explored via the use of PAF and Promax rotation. The analysis yields two matrices: the pattern and structure. The former is often interpreted as it contains regression coefficients (unique variance), and the latter contains correlations (both unique and shared) of items with factors.

The PAF with Promax rotation (kappa = 4) (see Matsunaga, 2010), conducted on the 12-item LMS scale, revealed three factors with eigenvalues greater than 1.0. Factor 1 accounted for 34.75% of the variance (eigenvalue 4.17), Factor 2 14.62% (eigenvalue 1.76), and Factor 3 9.25% (eigenvalue 1.11). The Kaiser-Meyer-Olkin Measure of Sampling Adequacy was .77, above the recommended .60 cutoff value. The Watkins (2008) Monte Carlo parallel analysis on random data with 500 replications suggested retaining the first two factors which exceeded the average random eigenvalues of 1.61 and 1.43, respectively. However, the third factor was slightly lower than the average random eigenvalue of 1.31. Given that this was an exploratory factor analysis, and the third factor was marginally close to the random eigenvalue, we decided to retain the three factors. Factor 1 was correlated .47 and .41 with Factors 1 and 3, but factors 2 and 3 were correlated .001.

Recommendations vary for what cutoff values of loadings to use for interpreting factors. Matsunaga (2010) notes that selecting item loadings of .40 is one such approach (see also Stevens, 1992). Another approach is to use the .5/.2 or .6/.3 rule where the primary loading is either .5 or .6, and its second-highest factor loading is less than .2 or .3. Thus, an item is to be retained if the cross-loadings discrepancies are between .3-.4. However, Costello and Osborne (2005) citing Tabachnik and Fidell (2005) note a good rule of thumb is to use .32 as a cutoff for retaining items because the item shares 10% of the variance with other items on the factor and that items that cross-load .32 or higher need to be discarded or treated with caution.

Table 1 summarizes the pattern matrix listing the items and their loadings. Loadings of .40 and above were retained for interpretation. Applying Matsunaga's recommendation of the .5/.2 or .6/.3 rule (and discrepant cross-loadings of .3-.4), it seemed that except for item 2 and item 8, all other factor loadings met these requirements. Item 2, however, had a loading of .475 on Factor one and the second highest loading .206 (a discrepancy of .269) and given a fairly strong loading of .475 and close to the discrepancy of .3, it was retained on Factor one. Item 8 was dropped from further analysis because even though it had a loading of .32, the next highest loading was .172, a small discrepancy per the .3-.4 rule.

Table 1

Rotated Pattern Matrix for the Leadership Mindset Scale

Item	Factor 1	Factor 2	Factor 3
1. Great leaders are born*	**.551**	-.125	.241
2. Psychology has much to offer in the development of leadership skills in all people	**.475**	.208	-.176
3. Leadership is a skill that can be learned	**.759**	.175	-.105
4. One can see inherent leadership qualities in children that don't seem to change as they age*	.028	-.039	**.810**
5. Training in leadership skills only benefits those who are natural leaders*	**.532**	.072	-.003
6. Even someone with very poor leadership ability can improve over time	-.074	**.643**	.010
7. Leadership ability can be improved at any stage of life	-.128	**.863**	.109
8. Everyone has a certain capacity for leadership ability that cannot be developed over time*	.321	.172	.088
10. One can predict the makings of a leader when they are very young*	-.011	.187	**.636**
11. No matter how poor your leadership skills are, they can be honed over time	.193	**.572**	.003
12. What it really takes to be a leader is something that cannot be taught*	**.751**	-.182	.148
13. Only people with a certain personality can become leaders*	**.574**	.049	-.014

Note. Reverse coded; Item 9 was dropped after item analysis; LMS – Teachability Subscale: Items 1, 2, 3, 5, 12, and 13; LMS – Improvability Subscale: Items 6, 7, and 11; LMS – Predictability Subscale: Items 4 and 10.

Thus, three factors were formed: Leadership Mindset Teachability (consisting of items 1, 2, 3, 5, 12, 13), a belief that leadership is a skill that can be taught; Leadership Mindset Improvability (items 6, 7, 11), a belief that leadership can be improved over time; and, Leadership Mindset Predictability (items 4, 10), a belief that leadership ability cannot be predicted at an early age (see Table 2). The Cronbach α values for the three subscales derived from the PAF analysis were LMS-Teachability = .77 (six items), LMS-Improvability =.76 (three

items), and LMS-Predictability = .69 (two items; see Table 1). The LMS-Total score with 11 items had a Cronbach α of .80.

The Cronbach α values for the two implicit belief scales (Theory of Intelligence & Theory of Anxiety) were .93 and .97, respectively. The Cronbach alpha ranged between .64 and .94. for the retained leadership scales. The retained Perfectionism-Other Oriented scales had a Cronbach α value of .62 and the Marlowe-Crowne Social Desirability Scale had a Cronbach α of .81 (see Table 2).

Evidence of Validity. Given the large number of correlations tested, we used a general strategy to evaluate the significance of each correlation coefficient. The Bonferroni *p*-value of .013 was used to evaluate the significance of the four correlations of the LMS-Total and its three subscales with each variable to keep the overall type one error probability to approximately equal to or less than the .05 level of significance.

Reliability of Other Instruments. Although internal consistency reliability values greater than .70 are recommended for tests used for research purposes, values .60-.70 are not unusual. For example, Stone et al., (2020) regarded .60 and above to indicate "sufficient internal consistency" (p. 528) for some of their measures. Thus, scales with Cronbach α values of lower than .60 were dropped from further analysis; these scales were three ALQ subscales (leader self-awareness, internalized moral perspective, & balanced processing), and two perfectionism subscales (self and socially prescribed scales).

Table 2

Leadership Scale and Other Scales' Reliabilities

Scale	# Items	Cronbach α
Leadership		
LMS Total Score	11	.80
LMS Teachability	7	.77
LMS Improvability	3	.76
LMS Predictability	2	.69
DLQ Developmental	21	.92
DLQ Conventional Positive	6	.84
DLQ Conventional Negative	6	.70
DLQ Laissez Faire	3	.79
ALQ Relational Transparency	4	.64
DLS Transformational	12	.86
DLS Transactional	6	.66
G-LSE (Total Score)	21	.94
LSE Change	3	.86
LSE Delegate Responsibilities	4	.86
LSE Relationships	3	.77
LSE Self-Confidence	5	.78
LSE Motivate	3	.89
LSE Consensus	3	.87
Other		
MPS-SF Other Oriented Perfectionism	5	.62
Marlowe-Crowne Short	13	.81
GRIT-S	8	.80
Locus of Control	5	.69
Frustrative Nonreward Responsiveness	5	.80
Dweck's Theory of intelligence Scale	8	.93
Implicit Theory of Anxiety Scale	4	.97

Note. LMS = Leadership Mindset Scale, DLQ = Developmental Leadership Questionnaire; LSE = Leadership Self-Efficacy, ALQ = Authentic Leadership Questionnaire, DLS= Dussault Leadership Self-Report Scale, MPS-SF = Multidimensional Perfectionism Scale – Short Form.

Correlations with implicit beliefs scales. As hypothesized (Table 3) the LMS-Total score has positive significant correlations with both theories of intelligence (.38, *p* = .000) and anxiety scales (.31, *p* = 002). While the LMS-Teachability subscale scores have positive significant correlations with both theories of intelligence (.44, *p* = .000) and anxiety scales (.34, *p* = .000), the LMS-Improvability subscale did not correlate significantly with either implicit beliefs scale (.08, *p* = .429 and .14, *p* = .165, respectively). Also, the LMS-Predictability subscale was not significantly correlated with either implicit beliefs scale (DTIS = *r* = .19, *p* = .058, TOA *r* = .12, *p* = .234).

Correlations of LMS with leadership scales. Several leadership scales were hypothesized to correlate with the LMS-Total score as evidence of its convergent validity; however, only a few correlations were significant. As expected (Table 3), the LMS-Total score had significant positive correlations with Larrson et al.'s DLQ-Developmental Leadership subscale (*r* = .28, *p* = .005). Additionally, the LMS-Teachability and Improvability subscales had significant correlations with the DLQ Developmental

Scale (*r* = .33, *p* = .001; *r* = .25, *p* = .012, respectively). The LMS-Predictability subscale did not correlate significantly with the DLQ. The LMS-Total score and the subscales did not correlate significantly with any of the other Developmental Leadership Questionnaire (DLQ) subscales (DLQ Positive, Negative, & Laissez-Faire) or the Authentic Leadership Questionnaire (ALQ) subscale Relational Transparency.

Contrary to expectation, the LMS-Total score correlated positively and significantly, not negatively, with Dussault et al.'s DLS-Transactional subscale (*r* = .26, *p* = .009). Additionally, the LMS-Teachability and Improvability subscales also had significant correlations with the DLS-Transactional Scale (*r* = .27, *p* = .007; & *r* = .26, *p* = .009). The LMS-Predictability score did not have a significant correlation with the DLQ-Transactional Subscale. Correlations of the LMS-Total score and subscales with the Leadership Self-Efficacy Total score and subscales were not significant, except for the Leadership Self-Efficacy Self-Awareness and Self-Confidence subscale which correlated significantly with the LMS-Teachability subscale (*r* = .30, *p* = .002).

Table 3
Correlations between Leadership Mindset Scales and Belief in Malleability Scales, Leadership and Other Scales (n = 100)

Scales	LMS Total		LMS Teach		LMS Improve		LMS Predict	
	r	*p*	*r*	*p*	*r*	*p*	*r*	*p*
DTIS	**.38**	.000	**.44**	.000	.08	.429	.19	.058
TOA	**.31**	.002	**.34**	.001	.14	.165	.12	.234
DLQ Developmental	**.28**	.005	**.33**	.001	**.25**	.012	-.08	.429
DLQ Conventional Positive	.13	.197	.21	.036	.11	.276	-.18	.073
DLQ Conventional Negative	.06	.553	.06	.553	.09	.373	-.05	.621
DLQ Laissez Faire	-.11	.276	-.11	.276	-.12	.234	.01	.921
ALQ Relational Transparency	.10	.322	.12	.234	.09	.373	-.15	.136
DLS Transformational	.14	.165	.16	.112	.14	.165	-.04	.693

	r	p	r	p	r	p	r	p
DLS Transactional	**.26**	.009	**.27**	.007	**.26**	.009	-.03	.767
DLS Laissez Faire	.00	.996	-.03	.767	.03	.767	.03	.767
G-LSE (Total Score)	.15	.136	.21	.036	.18	.073	.18	.073
LSE-Change	.18	.073	.18	.073	.30	.003	.14	.165
LSE-Choose & Delegate	.11	.276	.14	.165	.17	.091	.11	.276
LSE-Relationships	.02	.843	.09	.373	.01	.921	-.17	.091
LSE-Self-Confidence	.21	.036	**.30**	.002	.11	.276	.11	.276
LSE-Motivate	.13	.197	.18	.073	.08	.429	-.09	.373
LSE-Consensus	.07	.489	.12	.234	.15	.136	-.21	.036
MPS-SF Other Oriented	.16	.105	.18	.073	.14	.165	-.02	.843
Marlowe-Crowne Short	.06	.553	.11	.276	-.05	.621	-.02	.843
Grit-S	.19	.073	**.25**	.012	.07	.489	-.01	.921
Locus of Control	.18	.073	.21	.036	.13	.197	-.02	.843
Frustrative Nonreward Responsiveness	**-.31**	.002	**-.34**	.001	-.21	.036	-.04	.693

Note. Bolded values *p* < .013. LMS = Leadership Mindset Scale, LMS Teach = Leadership Mindset Scale Teachability Subscale, LMS Improve = Leadership Mindset Scale Improvability Subscale, LMS Predict = Leadership Mindset Scale Predictability Subscale, DTIS = Dweck's Theory of Intelligence Scale, TOA = Implicit Theories of Anxiety Scale, DLQ = Developmental Leadership Questionnaire; LSE = Leadership Self-Efficacy, ALQ = Authentic Leadership Questionnaire, DLS = Dussault Leadership Self-Report Scale, MPS-SF = Multidimensional Perfectionism Scale – Short Form.

Correlations with scales of related constructs. Only, the LMS-Teachability score correlated significantly with the GRIT scale (*r* = .25, *p* = .012) and the LMS-Total and Teachability scores correlated significantly with Frustrative Non-Reward Responsiveness (*r* = -.31, *p* = .002 and.34, *p* = .001, respectively).

Discriminant validity. As expected, the LMS-Total score and subscales did not correlate significantly with the Marlowe-Crowne Social Desirability Scale Short Form.

Discussion

As a new scale, the internal consistency reliability of the LMS-Total score of .80 is acceptable for research purposes. An exploratory principal axis analysis with Promax rotation of LMS revealed three subscales—LMS-Teachability, LMS-Improvability, For convergent validity, as expected, people's beliefs about the inheritance of traits do seem to generalize across traits to some extent. The LMS-Total score had significant positive correlations with the two implicit beliefs scales: the malleability of intelligence (r = .38, p = .000) and anxiety (r = .31, p = 002). The subscale LMS-Teachability had an equally strong correlation with the two implicit beliefs scales: intelligence (r = .44, p =.000) and anxiety (r = .34, p = .000). However, LMS-Improvability and LMS-Predictability had non-significant correlations with the implicit beliefs scales which suggests that teachability of leadership is a more important component of the belief in the malleability of leadership ability than beliefs in improvability over time and in its lack of predictability from a younger age. For training purposes, a stronger belief in the teachability of leadership skills may be more important than just believing in improvability over time due to experience, and one's beliefs about being able to predict someone's leadership ability at a younger age.

As expected, the LMS-Total score had a significant correlation with Larsson's Developmental Leadership Subscale (r =.28, p = .005) which measures the ability to show individualized consideration and to motivate and inspire people. The LMS-Teachability and Improvability subscales also had significant correlations with the Developmental Leadership Subscale (r = .33, p = .001; & r = .25, p = .013, respectively). The LMS-Predictability and Development Leadership Subscale were not correlated significantly. These results again reinforce that the teachability component of the Leadership Mindset Scale (LMS) is more important for training purposes.

Contrary to expectation, the LMS-Total score and subscale scores had negligible correlations with Dussault's transformational and Laissez-Faire subscales. However, the LMS-Total score and LMS-Teachability score correlated significantly with and LMS-Predictability, albeit with somewhat lower reliabilities: .77, 76, and .69, respectively, but acceptable for research purposes. Some of the scales selected for validation purposes had to be dropped from validity analysis because of their low reliability.

Dussaualt's Transactional Subscale (r = .26, p = .009, & r = .27, p = .007, respectively. In hindsight, this seems reasonable because as Bass (1985) suggested, most effective leaders use transformational and transactional leadership styles. Understandably, the ability to deal and negotiate are important aspects of everyday leadership, and growth-minded leaders seemed to be cognizant that transactional skills are relevant for their leadership. However, it is not clear as to why the LMS scale/subscales did not correlate significantly with Dussault's Transformational scale; perhaps not all leaders with a growth mindset endorsed these items because they tap into a leader's charisma and expect loyalty from subordinates, characteristics that may not appeal to a leader with a growth mindset. Also, given that the Leadership Self-Efficacy Total score and subscale did not correlate with the LMS-Total and subscale score, except for Self-Awareness and Self-Confidence which correlated significantly with LMS Teachability, suggests the abilities measured by the self-efficacy and LMS are mostly divergent.

Regarding the relationships of the LMS-Total score and subscales with scales of related constructs, most predictions with respect to the Locus of Control Scales, Perfectionism subscales and Grit scale did not hold, except for the significant correlation of the Grit scale with LMS Teachability (r = .25, p = .012). It seems that leaders who tend to believe that leadership is a trainable skill may also show consistency of interest and perseverance in reaching their goals.

As expected, the LMS-Total and Teachability had significant negative correlations with Frustrative Nonreward Responsiveness (r = -.31, p = .002; r = -.34, p = .001, respectively), but not with the LMS-Improvability and Predictability. These results point to the possibility that those who endorse persistence in the face of nonreward contingencies view leadership as a teachable skill.

Regarding discriminant validity, as expected, the LMS-Total score and subscales did not correlate significantly with the Marlowe-Crowne Social Desirability Scale. However, considering the observed correlations with most leadership scales, it seems that the LMS measures a construct that is different from the traditional leadership scales.

Conclusions

Given the lack of instruments to measure the mindset of leaders, the Leadership Mindset Scale (LMS) was developed and assessed for its reliability and validity. The PAF analysis with Promax rotation indicated three factors for the LMS scale: LMS-Teachability, LMS-Improvability, and LMS-Predictability. The LMS-Total score and Teachability subscale performed better than the Improvability and Predictability subscales both on reliability and validity. The findings support the convergent validity of the LMS-Total and LMS-Teachability inasmuch as they were correlated with other implicit belief scales of intelligence and anxiety, the DLS Developmental Leadership and Transactional scales, and the ability to bounce back from failures (Frustrative Nonreward Responsiveness Scale). However, the evidence for the validity of the LMS Improvability and Predictability subscales was weaker and thus warrants further evaluation in future studies.

A major strength of the study was that the respondents were individuals in different leadership positions rather than students at a university. However, the study was limited by the low-reliability values of some of the leadership scales, a result that may be specific to the current sample and warrants further study with other samples. Although the respondents came from three states, the study was limited by the voluntary nature of the sample of participants. It was difficult to get a larger sample despite reminders sent to a larger group of employees. Also, perhaps other scales such as optimism and resilience might be included for validation purposes.

Despite some limitations, this study is a step forward in understanding the leadership mindset construct,

especially with initial results which suggest that the construct contains three distinct factors, a result that needs confirmation with a fresh sample via a confirmatory factor analysis. The most promising of the three factors appears to be the belief in leadership teachability, a notion that is consistent with the idea of a growth mindset.

Despite the weak convergent validity evidence for LMS, the findings suggest thinking of a leadership growth mindset in terms of the three components could be useful in helping leadership trainees appreciate that the skills can be learned, improved over time, and not easy to predict early on as to who will become a good leader.

The study was a collaboration between academicians and corporate trainers. Both parties collaborated on the leadership mindset construct formation, item generation, and item inclusion decisions during the LMS construction. The study attempted to bridge the gap between theoretical and applied approaches in industrial-organizational psychology. Results suggest the importance of the belief that leadership can be taught. This appears to be the most impactful factor associated with a growth mindset and by extension the positive leadership attributes (belief in the developmental nature of leadership, self-awareness and self-confidence, Grit, and a tendency to respond even when frustrated) to which it is associated.

Practical implications include improving awareness in trainees' implicit beliefs regarding leadership teachability, improvability, and predictability. The results may have important training applications in that it presents a new way of conceptualizing leadership and leadership training programs. In leadership training, the LMS may prove useful in increasing client awareness of their own beliefs regarding what makes a good leader. In contrast to a leadership typology model, the growth mindset model suggests that leadership skills can be improved over time, successfully taught, and may or may not be present in childhood. While many extant studies have presented evidence for leadership models and typologies for the best style of leadership training, few have examined the inherent beliefs of trainees regarding leadership and the ability to improve it and teach it to others. The

effectiveness of leadership training programs may, in part, depend on the beliefs trainees have before, during, and following training initiatives. The instrument can be used for bringing awareness of the importance of a growth leadership mindset based on the assumption that such a mindset would lead to promoting a learning and growth orientation instead of a performance orientation in people who work with them. Consistent with this notion are the results of Rege et. al (2021) which suggest that growth mindset training interventions may increase challenge-seeking behavior among students. In addition to training on frustration tolerance, resilience, and other characteristics, the LMS may be a helpful tool for improving leadership training programs by including a component on the notion of developing a growth mindset that leadership is a trainable quality and not limited to a gifted few.

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