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Thinking and behavioral styles as described by self versus others: a replication and extension with male and female managers

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Abstract

The *Life Styles Inventory* (LSI) is among the first and most widely used 360° feedback surveys for management and leadership development. The LSI measures 12 thinking and behavioral styles reflecting three, more general, personal orientations that are related to managerial effectiveness. Previous studies demonstrated the reliability and validity of an early version of the LSI, which was completed by both self and others using paper-based surveys. The current study replicates the original reliability and validity analyses with data on a recent sample of 6899 male and female managers and their respondents using the current, online version of the survey. Analyses on these data were conducted for the total sample and for male and female managers separately. The results of the current study confirm the three-factor structure—Constructive, Passive/Defensive, and Aggressive/Defensive—identified by previous studies. In addition, the current version of the LSI scales demonstrates levels of internal consistency reliability, inter-rater reliability, consensual validity (between and self and others), and criterion-related validity that are as strong or slightly stronger than those reported in earlier studies. The results show that Constructive ways of thinking and behaving are positively related to the effectiveness of both male and female managers and that Aggressive/Defensive thinking and behavior detracts from their effectiveness. The results for Passive/Defensive thinking and behavioral styles and effectiveness are more complex and somewhat different for males versus females. The strengths and limitations of the study are discussed along with the implications for using the LSI in management development and in future research on gender and leadership.

Keywords Life styles inventory · 360 feedback · Gender differences · Managerial effectiveness · Leadership development

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1 Introduction

Multi-rater and 360° feedback instruments—which enable participants to compare the way they see and describe themselves to the way in which others describe them—are a key component of many individual, leadership, team, and organizational development programs (e.g., Antonioni 1996; Yammarino and Atwater 1997; Nowack and Mashihi 2012). Among the first and most widely used instruments of this type is the *Life Styles Inventory* (LSI; Lafferty 1973, 1976), which provides managers and other members of work organizations with feedback on their personal thinking and behavioral styles. Like most 360° feedback instruments, the LSI 1 (*Self Description*) and LSI 2 (*Descriptions by Others*) are assumed to provide valuable information that, for some, reflects different—and perhaps opposing—perspectives. These differences can shed light on "blind spots" or areas that focal individuals do not recognize need improvement, increase the cognitive dissonance of focal individuals (Festinger 1957), and motivate them to make constructive changes in their thinking and/or behavior. Consistent with this expectation, Cooke, Rousseau, and Lafferty (1987) found that, while there was a fair amount of agreement between the LSI descriptions by self and others, there were also some differences, particularly along the less observable styles.

Most of the studies published on the LSI (including that by Cooke et al.) are based on earlier, paper-based versions of the inventory. However, the current version of the LSI typically is completed online rather than on paper and includes minor modifications to or the replacement of approximately 10% of the original items.

In addition, the demographic characteristics of the management population have changed since the early LSI reliability and validity studies were conducted. Most importantly, females made up only 10% of the sample used in the 1987 Cooke et al. study which examined the consistency between the LSI 1 and LSI 2 results for 556 managers. Since that time, women have filled the largest share of new management jobs (Scarborough 2018) such that by 2015 approximately 40% of management positions were held by women (Bureau of Labor Statistics 2015).

Concurrent with these trends, several studies have used multi-rater or 360-degree surveys to examine potential differences between male and female managers along various dimensions, including self-awareness and leadership effectiveness (Van Velsor et al. 1993; Song et al. 2018). The results vary. Some studies show that, compared to men, women describe themselves in ways that are more consistent with how others describe them (e.g., Mayo et al. 2012). Other studies report no significant differences between male and female managers in terms of the consistency between self and others (e.g., van Velsor et al. 1993; Church 1997). Similarly, some studies show that women tend to underrate their leadership attributes, abilities, and effectiveness relative to other raters and that men tend to overrate themselves (e.g., Fleenor et al. 2010; Song et al. 2018). Again, other studies show no differences (e.g., Van Velsor et al. 1993). Although one study suggests that differences in the way men and women rate themselves tend to diminish with age (Zenger and Folkman 2019), the conclusion of a

meta-analysis of 95 studies spanning 50 years indicates that, overall, there are no gender differences in leadership effectiveness (Paustian-Underdahl et al. 2014).

The above trends and other changes underscore the need for a replication of the reliability and validity studies on the LSI 1 Self Description (which many consultants and coaches refer to as a measure of "thinking styles") and LSI 2 Descriptions by Others (referred to as a measure of "behavioral styles"). In this paper we examine the internal consistency, factor structure, inter-rater reliability, and consensual validity of the current version of the LSI 1 and 2 with a recent sample of managers. We compare these results to those reported by Cooke et al. (1987) and by Cooke and Rousseau in an earlier article (1983a). Because the LSI styles are hypothesized to be related to the performance of managers, we also assess the relationship between the LSI 1 self descriptions of personal styles and ratings of managerial effectiveness provided by others. We compare these results to those reported by Gratzinger, Warren, and Cooke (1990), which used the same sample of managers as that used by Cooke et al., but included only half the LSI style items to assess their effects.

After presenting the results for the total current sample and comparing them to the findings reported by the earlier studies, we present parallel results for female versus male managers. Modifications to the LSI were intended to maintain and even strengthen its reliability and validity in a new era; thus, we would expect that the results for the current version and sample would be consistent with, if not more favorable than, those reported by the early studies for both female and male managers.

2 Method

2.1 Sample

The recent sample used for this study includes 6899 focal managers from a variety of organizations who participated in a workshop, public program, accreditation, or internal leadership or management development program incorporating the LSI. Although the LSI is available in 30 languages, to properly replicate the 1987 study, only focal managers who completed the US English language forms were chosen for this study. Subsequently, these managers were based primarily in the United States. Sixty-four percent (4429) of them were male and 35% (2386) were female (1% [84] chose not to provide information about gender). Most of the managers held at least an associate's or bachelor's degree (84%) and the majority were between 30 and 49 years old (69.1%).

As part of the workshop or program, the managers described themselves using the current version of the LSI 1 (Lafferty and Cooke 2010a). In addition, each manager selected at least 4 others (higher-level managers, peers, direct reports) to describe him or her. A total of 54,527 others (average of 7.9 others per focal manager) provided descriptions by completing the current version of the LSI 2 (Lafferty and Cooke 2010b).

2.2 Measures

2.2.1 Thinking and behavioral styles

The LSI measures 12 different but interrelated styles that describe the thinking and behavior of members of work organizations. General descriptions of these styles are provided in "Appendix 1". The 240 items used in the LSI 1 to measure these styles directly parallel those in the LSI 2. Responses to the LSI items range from 0 ("essentially unlike you"/ "essentially unlike that person") to 2 ("like you most of the time"/ "like the person you are describing most of the time").

The thinking and behavioral styles measured by the LSI are defined by two underlying dimensions. The first dimension distinguishes between styles that reflect a concern for people versus a concern for tasks. Historically, this distinction has been emphasized in the literature on leadership (e.g., Stogdill 1963; Blake and Mouton 1964; Northouse 2016) as well as that on interpersonal behavior and group interaction (e.g., Cattell 1948; Bales 1950; McGrath 1984; Forsythe 2018). Similarly, it has been a key focus of the literature on gender differences in leadership (e.g., Pratch and Jacobowitz 1996; Eagly et al. 2003). The second dimension distinguishes between styles directed toward the fulfillment of higher-order needs for growth and satisfaction versus those directed toward protecting and maintaining one's security (Maslow 1954).

Previous studies of the LSI's factor structure indicate that the styles reflect three different personal orientations defined by the task versus people and security versus satisfaction dimensions (e.g., Cooke and Lafferty 1981; Cooke and Rousseau 1983a; Cooke et al. 1987; Ware et al. 1985; Nediger and Chelladurai 1989; Levin, 1991). The original name of each orientation is listed below, followed by the current name (in parentheses), and a brief description.

- *Satisfaction (Constructive) Orientation* characterizes thinking and behavior that contribute to one's self-development and level of *satisfaction,* ability to develop healthy relationships and work effectively with *people,* and proficiency at accomplishing *tasks*. Specific styles include Achievement, Self-Actualizing, Humanistic-Helpful (now Humanistic-Encouraging), and Affiliative.
- *People/Security (Passive/Defensive) Orientation* describes self-protective thinking and behavior that promote the fulfillment of *security* needs through interactions with *people*. Specific styles include Approval, Conventional, Dependent, and Avoidance.
- *Task/Security (Aggressive/Defensive) Orientation* reflects self-promoting thinking and behavior that are directed toward maintaining one's status or position and fulfilling *security* needs through *task*-related activities. Specific styles include Oppositional, Power, Competitive, and Competence (now Perfectionistic).

As previous noted, approximately 10% of the original 240 survey items (i.e., 20 items) were slightly modified or replaced. Specifically, seven items were simplified (e.g., "thinks for himself/herself" was simplified to "thinks for self"). Two items were expanded for clarification of meaning (e.g., "tactful" was expanded to

"diplomatic, tactful"). Nine items were revised (e.g., "wants recognition" was changed to "seeks recognition") and two items were replaced (e.g., "persistent" was replaced with "compliant").

2.2.2 Overall managerial effectiveness

The LSI 2 includes 4 additional items that were used in the Gratzinger et al. study to assess overall managerial effectiveness. These items are:

1. How do you view this person's level of effectiveness in his/her job assignment? (*Task Effectiveness*)
2. How would you describe the quality of this person's work relationship with others? (*Interpersonal Effectiveness*)
3. How interested does this person appear to be in improving him/her self? (*Interest in Self-Improvement*)
4. How do you think this person would react to any negative feedback received from this program? (*Receptivity to Feedback*)

Responses to the above items are based on 7-point semantic differential scales. Gratzinger and his associates used principle components analysis to analyze the aggregated responses of focal managers' raters to the four items. They found that 50.8% of the variance in the items was explained by a single factor reflecting overall managerial effectiveness.

The results of a principle components analysis of the four effectiveness items with the current sample indicated that a single factor explained 72.4% of the variance in the items, substantially more than that reported in the earlier study. Like the Gratzinger et al. study, a single weighted factor score for each focal manager in the current sample was computed based on the aggregated raters' responses. This score was used to identify the most effective (top 10%) and least effective (bottom 10%) managers in the sample.

2.3 Analysis

Previous studies reported on the internal consistency of the LSI 1 using Cronbach's alpha (Cooke and Rousseau 1983b; Nediger and Chelladurai 1989). Thus, we used this statistic to examine the internal consistency of the current LSI 1 and 2 with the sample of 6899 managers and to compare the results to the earlier findings.

Following the Cooke et al. (1987) study, the factor structure of the LSI 1 and LSI 2 scale scores were examined separately using principle components analysis with varimax rotation. Three-factor solutions reflecting the distinction between Constructive, Passive/Defensive, and Aggressive/Defensive styles would replicate their earlier findings and support the construct validity of the inventory.

Consistent with the Cooke et al. study, the inter-rater reliability of the LSI 2 Descriptions by Others was assessed for the current sample using oneway analysis of variance with the focal manager as the independent variable and the LSI styles as the dependent

variables. Significant *F*-statistics would demonstrate that the variance in responses within groups of others describing the same focal manager is less than the variance between respondent groups. Eta^2 comparable to (or greater than) those previously reported would indicate that the amount of variance in the LSI 2 Descriptions by Others explained by focal manager has remained consistent (or has improved).

To examine the consensual validity of the LSI 1 and LSI 2, correlations between the scale scores generated by self versus other respondents were computed and then compared to the earlier findings reported by Cooke et al. Significant positive correlations between self and others' reports along the same styles would support consensual validity. As mentioned earlier, the correlations could be far from perfect given that: (a) behavior can diverge from thinking, and (b) the Descriptions by Others inventory provides at least some individuals with feedback that goes beyond and sometimes conflicts with their Self Description.

We also examined the relationship between the 12 styles and managerial effectiveness and compared the results to the earlier findings reported by Gratzinger et al. Following their approach, we identified the top and bottom 10% of managers on the effectiveness measure and then conducted two-sample t-tests to examine the differences in the 12 personal styles between the two sets of managers.

As previously noted, all the analyses were conducted on the total sample and then on male and female managers separately. This allowed us to (a) compare the psychometric properties of the current version of the LSI to the earlier findings and (b) determine whether differences in the composition of the early versus current samples explain changes in reliability and validity.

3 Results

3.1 Internal consistency reliability

Cronbach's alpha reliability coefficients for each of the LSI styles are reported in Table 1 for the Self Description and Descriptions by Others surveys. The alpha coefficients for the current LSI 1 (column 2) range from 0.78 to 0.89 (mean = 0.84). These are close to the coefficients reported for the earlier version of the LSI 1 (column 1) which, in the study being replicated, ranged from 0.80 to 0.88 (mean = 0.85; see Cooke and Rousseau 1983b). They are also similar to those reported by Nediger and Chelladurai (1989), which ranged from 0.78 to 0.88 (mean = 0.85).

The coefficients for the current LSI 2 are reported in the last two columns of Table 1 and range from 0.79 to 0.94 (mean = 0.88) at the individual respondent level and from 0.84 to 0.96 (mean = 0.92) at the aggregated (focal leader) level. Internal consistency reliability data on the early version of the LSI 2 were not published.

3.2 Construct validity (factor structure)

Tables 2 and 3 show the results of the principle components analyses on the 12 LSI scales for the current sample (second and italicized number in each cell) and the

Table 1 Reliabilities of LSI 1 and LSI 2 based on cronbach's alpha: early versus current sample (in Italics)

Style	LSI 1		LSI2	
	Early sample	Current sample	Current sample	Current sample
	$N=1000$ focal managers	$N=6899$ focal managers	$N=54{,}527$ individual raters	$N=6899$ aggregate raters
Humanistic-Encouraging	0.85	*0.86*	*0.94*	*0.96*
Affiliative	0.80	*0.89*	*0.94*	*0.96*
Approval	0.82	*0.82*	*0.84*	*0.89*
Conventional	0.83	*0.80*	*0.80*	*0.84*
Dependent	0.82	*0.79*	*0.80*	*0.86*
Avoidance	0.88	*0.81*	*0.86*	*0.90*
Oppositional	0.85	*0.83*	*0.92*	*0.95*
Power	0.86	*0.87*	*0.94*	*0.96*
Competitive	0.85	*0.84*	*0.90*	*0.94*
Perfectionistic	0.83	*0.78*	*0.79*	*0.85*
Achievement	0.88	*0.86*	*0.91*	*0.94*
Self-Actualizing	0.88	*0.87*	*0.91*	*0.93*

Early values from Cooke RA, Rousseau DM (1983) Relationship of life events and personal orientations to symptoms of strain. *J Appl Psychol* 68: 446–458. Copyright © 1983 American Psychological Association. Adapted with permission

results reported by Cooke et al. based on an earlier sample (first number in each cell). For the LSI 1, 3 factors were identified that explained 71.0 percent and 76.2 percent of the total variance in scale scores for the earlier sample and current sample, respectively (Table 2). For the LSI 2, the 3 factors explained 81.1 percent and 86.3 percent of the total variance in scale scores for the earlier sample and current sample, respectively (Table 3). Thus, the 3 factors explain slightly more variance in the LSI 2 scores than in the LSI 1 scores, both currently and in the past.

Consistent with the early study, the factors loadings for the current sample support the distinction between descriptions of Constructive, Passive/Defensive, and Aggressive/Defensive styles by self and others. Affiliative, Avoidance, and Oppositional showed loadings greater than |.40| on more than one factor for the LSI 2 but not for the LSI 1—suggesting that responses to the Self Description form are slightly more discriminating than to the Descriptions by Others form. However, in all cases the highest loading was on the correct factor, supporting the construct validity of the scale scores.

3.3 Inter-rater reliability

Table 4 presents the oneway ANOVA results reported by Cooke et al. (1987) compared to those based on the data for current sample (in italics). All *F*-statistics

Table 2 Factor analysis of the LSI 1: early versus current sample (in Italics)

Style	Communality	Factor loadings[a]		
		Constructive	Passive/Defensive	Aggressive/Defensive
Humanistic-Encouraging	.73/*.77*	***.84/.85***	.08/*.14*	−.09/*−.17*
Affiliative	.79/*.83*	***.84/.83***	.25/*.29*	−.16/*−.22*
Approval	.59/*.72*	.02/*.16*	***.75/.83***	.16/*.08*
Conventional	.72/*.77*	.10/*.08*	***.83/.86***	.13/*.14*
Dependent	.74/*.79*	.08/*.03*	***.85/.89***	.08/*.06*
Avoidance	.73/*.71*	−.28/*−.30*	***.75/.70***	.29/*.36*
Oppositional	.64/*.74*	−.29/*−.28*	.34/*.38*	***.66/.72***
Power	.72/*.78*	−.05/*−.18*	.17/*.08*	***.83/.86***
Competitive	.63/*.70*	.09/*.12*	.12/*.19*	***.78/.81***
Perfectionistic	.66/*.76*	.37/*.24*	.08/*.03*	***.72/.84***
Achievement	.73/*.75*	***.79/.76***	−.17/*−.22*	.27/*.35*
Self-Actualizing	.87/.81	***.91/.89***	−.11/*−.09*	.16/*.11*
Eigenvalues		3.19/*3.10*	2.81/*3.06*	2.51/*2.98*
% Variance explained		26.6/*25.8*	23.5/*25.5*	20.9/*24.9*
Cumulative (total) variance explained		26.6/*25.5*	50.1/*51.3*	71.0/*76.2*

N = 556 for Early sample; *N* = 6,899 for current sample. Early values from Cooke RA, Rousseau DM, Lafferty JC (1987) Thinking and behavioral styles: Consistency between self-descriptions and descriptions by others. Educ Psychol Meas 47:815–823. Copyright © 1987 Sage Journals

[a]Factor loadings shown following varimax rotation. Loadings greater than |.40| are in **boldface**

Table 3 Factor analysis of the LSI 2: early versus current sample (in Italics)

Style	Communality	Factor loadings[a]		
		Constructive	Passive/Defensive	Aggressive/Defensive
Humanistic-Encouraging	.86/*.90*	**.87/*.87***	.10/*.11*	−.30/*−.37*
Affiliative	.87/*.92*	**.80/*.81***	.26/*.24*	**-.41/− *.45***
Approval	.65/*.78*	−.04/*.10*	**.81/*.87***	.04/*.07*
Conventional	.84/*.85*	−.05/*−.05*	**.91/*.92***	− .01/*.05*
Dependent	.86/*.86*	.13/*.01*	**.91/*.92***	−.12/*−.10*
Avoidance	.80/*.81*	**−.41/*−.48***	**.77/*.68***	.22/*.33*
Oppositional	.81/*.88*	**−.43/*−.49***	.23/*.21*	**.75/*.78***
Power	.86/*.89*	−.22/*−.38*	−.01/*.01*	**.90/*.87***
Competitive	.66/*.82*	−.08/*−.11*	−.02/*.09*	**.81/*.90***
Perfectionistic	.81/*.87*	.35/*.20*	−.04/*−.05*	**.83/*.91***
Achievement	.81/*.87*	**.83/*.88***	−.24/*−.25*	.24/*.21*
Self-Actualizing	.91/*.90*	**.94/*.95***	−.11/*−.07*	.01/*−.07*
Eigenvalues		3.53/*3.75*	3.11/*3.11*	3.10/*3.49*
% Variance explained		29.4/*31.3*	25.9/*25.9*	25.8/*29.1*
Cumulative (total) variance explained		29.4/*31.3*	55.3/*57.2*	81.1/*86.3*

Descriptions by Others' scores were aggregated to the focal manager level prior to the factor analysis. $N = 556$ for early sample; $N = 6{,}899$ for current sample. Early values from Cooke RA, Rousseau DM, Lafferty JC (1987) Thinking and behavioral styles: Consistency between self-descriptions and descriptions by others. Educ Psychol Meas 47:815–823. Copyright (C) 1987 Sage Journals

[a]Factor loadings shown following varimax rotation. Loadings greater than |.40| are in **boldface**

were significant at $p < 0.001$, indicating that the variance between others describing different focal managers was greater than the variance between those describing the same focal manager for both the earlier study and for the current sample.

Per Cooke et al., the interrater reliability of the Descriptions by Others for the earlier version of the survey tended to be "fairly high," with eta^2 statistics for the styles ranging from 0.33 (for Approval, Oppositional, and Self-Actualizing) to 0.47 (for Competitive). The eta^2s for the three personal orientations ranged from 0.35 (for Constructive) to 0.46 (for Aggressive/Defensive). The corresponding statistics for the current version and sample (in italics) were somewhat lower than those for the earlier version and sample and ranged from 0.28 (Avoidance) to 0.39 (Competitive) for the styles and from 0.31 (Passive/Defensive) to 0.37 (Aggressive/Defensive) for the more general orientations. These lower eta^2 statistics were not surprising given that the average number of raters per focal manager was greater for the current sample (average of 7.9 others per focal manager) than the sample used by Cooke et al. (average of 5.2 others per focal manager). See Bliese (2000) regarding the effects of the number of raters on the eta^2 statistic. Post-hoc analyses carried out on the current sample confirmed that when only the data from managers with 6 or fewer raters were considered, the eta^2 for styles ranged from 0.35 to 0.47 (average $eta^2 = 0.39$) and were the same or slightly higher than those reported in the original study.

Table 4 Inter-rater reliability of the LSI 2: early versus current sample (in Italics)

Style/Orientation		*F* (ANOVA)***	eta^2	90% CI[a]	
				LL	UL
Humanistic-Encouraging	Early	2.50	0.37	*0.23*	*0.25*
	Current	*3.49*	*0.34*		
Affiliative	Early	2.60	0.38	*0.25*	*0.26*
	Current	*3.70*	*0.35*		
Approval	Early	2.11	0.33	*0.21*	*0.22*
	Current	*3.19*	*0.32*		
Conventional	Early	2.23	0.35	*0.19*	*0.20*
	Current	*2.96*	*0.30*		
Dependent	Early	2.62	0.38	*0.21*	*0.22*
	Current	*3.11*	*0.31*		
Avoidance	Early	2.45	0.37	*0.16*	*0.17*
	Current	*2.68*	*0.28*		
Oppositional	Early	2.12	0.33	*0.20*	*0.21*
	Current	*3.08*	*0.31*		
Power	Early	3.05	0.42	*0.27*	*0.28*
	Current	*4.04*	*0.37*		
Competitive	Early	3.73	0.47	*0.29*	*0.31*
	Current	*4.40*	*0.39*		
Perfectionistic	Early	2.45	0.37	*0.22*	*0.23*
	Current	*3.29*	*0.32*		
Achievement	Early	2.45	0.37	*0.19*	*0.20*
	Current	*2.89*	*0.29*		
Self-Actualizing	Early	2.14	0.33	*0.18*	*0.19*
	Current	*2.83*	*0.29*		
Constructive	Early	2.26	0.35	*0.21*	*0.22*
	Current	*3.19*	*0.32*		
Passive/Defensive	Early	2.95	0.41	*0.21*	*0.22*
	Current	*3.14*	*0.31*		
Aggressive/Defensive	Early	3.69	0.46	*0.28*	*0.29*
	Current	*4.09*	*0.37*		

For early sample, $N = 2922$ others describing 556 focal managers. For current sample, $N = 54{,}527$ others describing 6,899 focal managers. Early values from Cooke RA, Rousseau DM, Lafferty JC (1987) Thinking and behavioral styles: Consistency between self-descriptions and descriptions by others. Educ Psychol Meas 47:815–823. Copyright (c) 1987 Sage Journals. Confidence intervals were not reported in the article

[a] *CI* = Confidence interval of eta^2; *LL* = Lower limit; *UL* = upper limit

*** All *F* statistics significant at $p < .001$

3.4 Consensual validity

The correlations between the LSI 1 Self Description and LSI 2 Descriptions by Others are shown in Table 5. Within each cell, the correlation reported by Cooke et al. is shown first, followed (in italics) by the correlation based on the current version the survey.

The correlations between self and others for the same styles were slightly greater for the current sample (from $r=0.20$ to 0.38, mean $r=0.31$) than those for the earlier sample (from $r=0.16$ to 0.32, mean $r=0.24$). Similarly, the self-others correlation coefficients for the same orientations (not reported in Table) were slightly greater for the current sample ($r=0.21$ for Constructive and $r=0.35$ for Passive/Defensive and Aggressive/Defensive) than for the earlier sample ($r=0.20$ for Constructive, $r=0.32$ for Passive/Defensive, and $r=0.31$ for Aggressive/Defensive). The correlations for the current sample were also slightly greater than those reported in a study by Butler, Kwantes, and Boglarsky (2014) except for the Constructive orientation ($r=0.30$ for Constructive, $r=0.32$ for Passive/Defensive, and $r=0.34$ for Aggressive/Defensive). With respect to magnitude, these correlations are generally consistent with those reported by other researchers for similar types of surveys. This include surveys focusing on:

- leadership behaviors (e.g., Hernandez et al. 2015 [$r=0.17$]; Church, 1997 [$r=0.25$]),
- personality (e.g., McCrae et al. 2004 [$r=0.33$ to 0.65 for Russian and Czech samples, $r=0.34$ for one American sample]; Connelly and Ones 2010 meta-analysis [mean observed $r=0.29$–0.41]),
- well-being (e.g., Schneider and Schimmack 2009 meta-analysis [$r=0.42$; 99% credibility interval: 0.39–0.45], and
- performance (Nowack and Mashihi 2012 [$r=0.30$–0.60]).

For the current sample, the same style-different raters correlations were greater than the different styles-different raters correlations with only four exceptions. For example, the correlations between the LSI 1 measure of Humanistic-Encouraging and the LSI 2 measures of Humanistic-Encouraging and Affiliative were about equal ($r=0.26$). In addition, the correlation between the LSI 1 measure of Achievement and the LSI 2 measure of Perfectionistic ($r=0.24$) was slightly greater than that between the self-others measures of Achievement ($r=0.23$). Such patterns were evident in the correlations based on the earlier sample. Overall, these results indicate the moderate degree of consensus between self and others that is expected with these kinds of surveys.

3.5 Criterion-related validity

The results of the two-sample *t*-tests comparing the LSI 1 styles of the most effective managers to those of the least effective managers as rated by others are shown

Table 5 Correlations between LSI 1 and LSI 2: early versus current sample (in Italics)

LSI 2 Style	LSI 1 Style											
	1	2	3	4	5	6	7	8	9	10	11	12
1. Humanistic-Encouraging	***.23/.26***	.23/*.25*	.08/*.12*	.10/*.06*	.09/*.08*	−.02/−*.04*[a]	−.16/−*.13*	−.13/−*.20*	−.12/−*.10*	−.06/−*.13*	.07/*.01*[a]	.11/*.10*
2. Affiliative	.16/*.26*	***.23/.33***	.16/*.20*	.12/*.11*	.13/*.12*	−.01/−*.03*[a]	−.17/−*.14*	−.19/−*.23*	−.13/−*.09*	−.14/−*.17*	−.02/−*.02*[a]	.08/*.13*
3. Approval	.06/*.15*	.15/*.23*	***.19/.38***	.14/*.27*	.21/*.25*	.14/*.12*	−.01/*.02*[a]	−.06/−*.05*	−.05/*.09*	−.08/−*.07*	−.06/−*.07*	.01/*.08*
4. Conventional	.08/*.06*	.13/*.10*	.18/*.24*	***.27/.37***	.29/*.31*	.19/*.18*	−.03/*.03*[a]	−.08/−*.06*	−.12/*.00*[a]	−.04/−*.06*	−.08/−*.09*	−.04/−*.03*[a]
5. Dependent	.06/*.07*	.11/*.12*	.17/*.27*	.28/*.35*	***.32/.37***	.23/*.21*	−.03/*.01*[a]	−.11/−*.12*	−.18/−*.06*	−.06/−*.10*	−.08/−*.13*	−.05/−*.08*
6. Avoidance	−.02/−*.09*	.01/−*.10*	.10/*.10*	.16/*.19*	.22/*.16*	***.25/.22***	.13/*.12*	.04/*.10*	−.08/*.01*[a]	.02/*.02*[a]	−.09/−*.10*	−.07/−*.10*
7. Oppositional	−.08/−*.14*	−.14/−*.19*	−.10/−*.06*	−.09/−*.03*[a]	−.05/−*.07*	.02/*.06*	***.21/.21***	.22/*.30*	.13/*.19*	.17/*.18*	.02/*.04*	−.02/−*.01*[a]
8. Power	.00/−*.16*	.07/−*.21*	−.14/−*.11*	−.15/−*.11*	−.11/−*.15*	−.08/*.00*[a]	.17/*.17*	***.27/.37***	.21/.	.23/*.23*	.11/*.10*	.09/*.02*[a]
9. Competitive	.03/−*.05*	.00/−*.07*	−.13/−*.02*[a]	−.21/−*.09*	−.20/−*.15*	−.21/−*.07*	.05/*.15*	.21/*.33*	***.30/.38***	.21/*.28*	.19/*.19*	.17/*.14*
10. Perfectionistic	.08/−*.11*	−.02/−*.16*	−.18/−*.12*	−.12/−*.11*	−.13/−*.15*	−.19/−*.02*[a]	.01/*.15*	.18/*.32*	.19/*.29*	***.28/.38***	.26/*.24*	.16/*.07*
11. Achievement	.11/*.08*	.04/*.06*	−.11/−*.07*	−.05/−*.11*	−.08/−*.10*	−.16/−*.09*	−.10/−*.02*[a]	.02/*.03*[a]	.06/*.09*	.12/*.15*	***.21/.23***	.13/*.12*
12. Self-Actualizing	.16/*.20*	.15/*.23*	−.02/*.06*	−.04/−*.04*[a]	−.05/−*.05*	−.17/−*.10*	−.15/−*.09*	−.08/−*.07*	.01/*.02*[a]	−.01/−*.03*[a]	.12/*.12*	***.16/.20***

N = 556 for early sample; *N* = 6,899 for current sample (Descriptions by Others were aggregated to the focal manager level prior to correlating the scores). Correlation coefficients for same-style different-rater correlations are along the diagonal in **boldface**. Coefficients above and below the diagonal are the different-style different-rater correlations. Early values from Cooke RA, Rousseau DM, Lafferty JC (1987) Thinking and behavioral styles: Consistency between self-descriptions and descriptions by others. Educ Psychol Meas 47:815–823. Copyright (c) 1987 Sage Journals. Significance levels not reported in article

[a] $p > .001$

Table 6 Personal styles (LSI 1) of most effective (Top 10%) versus least effective (bottom 10%) managers: early versus current sample (in Italics)

Style	Sample	Top 10% mean (SD)	Bottom 10% mean (SD)	*t*-Test[a]	95% CI[b]		Direction of difference between means
					LL	UL	
Humanistic-Encouraging	Early	1.49 (.14)	1.31 (.13)	2.77**	*0.15*	*0.21*	TOP > BOTTOM
	Current	*1.64 (.26)*	*1.45 (.29)*	*12.25****			TOP > BOTTOM
Affiliative	Early	1.51 (.15)	1.40 (.13)	1.53	*0.19*	*0.25*	TOP > BOTTOM
	Current	*1.62 (.28)*	*1.41 (.32)*	*13.52****			TOP > BOTTOM
Approval	Early	0.55 (.13)	0.60 (.16)	−0.61	*0.05*	*0.11*	BOTTOM > TOP
	Current	*0.67 (.30)*	*0.59 (.28)*	*5.19****			TOP > BOTTOM
Conventional	Early	0.82 (.15)	0.88 (.15)	−0.85	*0.01*	*0.07*	BOTTOM > TOP
	Current	*0.70 (.26)*	*0.66 (.26)*	*2.90***			TOP > BOTTOM
Dependent	Early	0.74 (.08)	0.84 (.11)	−1.70*	*0.02*	*0.07*	BOTTOM > TOP
	Current	*0.77 (.27)*	*0.72 (.27)*	*3.04***			TOP > BOTTOM
Avoidance	Early	0.23 (.10)	0.36 (.13)	−2.03*	*− 0.05*	*−0.01*	BOTTOM > TOP
	Current	*0.27 (.22)*	*0.31 (.23)*	*−2.58**			BOTTOM > TOP
Oppositional	Early	0.32 (.09)	0.49 (.12)	−2.78**	*− 0.12*	*−0.06*	BOTTOM > TOP
	Current	*0.26 (.22)*	*0.35 (.27)*	*−6.87****			BOTTOM > TOP
Power	Early	0.29 (.14)	.43 (.16)	−2.01*	*− 0.16*	*−0.11*	BOTTOM > TOP
	Current	*0.19 (.20)*	*0.32 (.28)*	*−10.28****			BOTTOM > TOP
Competitive	Early	0.55 (.19)	0.74 (.16)	−2.41*	*− 0.09*	*−0.03*	BOTTOM > TOP
	Current	*0.55 (.27)*	*0.61 (.32)*	*− 3.85****			BOTTOM > TOP
Perfectionistic	Early	1.08 (.17)	1.14 (.15)	− 0.84	*− 0.09*	*−0.04*	BOTTOM > TOP
	Current	*0.92 (.24)*	*0.98 (.28)*	*− 4.48****			BOTTOM > TOP
Achievement	Early	1.59 (.10)	1.47 (.13)	1.80*	*0.01*	*0.07*	TOP > BOTTOM
	Current	*1.60 (.26)*	*1.56 (.28)*	*2.49**			TOP > BOTTOM
Self-Actualizing	Early	1.37 (.15)	1.29 (.10)	1.14	*0.08*	*0.14*	TOP > BOTTOM
	Current	*1.47 (.30)*	*1.36 (.30)*	*6.91****			TOP > BOTTOM

For the early sample, the TOP 10% ($n = 55$) and BOTTOM 10% ($n = 54$) were selected from a sample of 556 managers based on the effectiveness ratings given by others. For the current sample, the TOP 10% ($n = 690$) and BOTTOM 10% ($n = 689$) were selected from a sample of 6,899 focal managers based on the effectiveness ratings given by others. The means and SDs are based on the average item raw scores for each style. Early values from Gratzinger PA, Warren RA, Cooke RA (1990) Psychological orientations and leadership: Thinking styles that differentiate between effective and ineffective managers. In: Clark KE, Clark, MB (eds) Measures of leadership. Leadership Library of America, West Orange NJ, pp 239–248. Copyright(c) 1990 Center for Creative Leadership

[a] *t*-test for two independent samples

[b] *CI* Confidence interval of the difference between the means; *LL* Lower limit; *UL* upper limit

*$p < .05$. **$p < .01$. ***$p < .001$. Early results were one-tailed; current results are two-tailed

in Table 6. Consistent with the Gratzinger et al. study, the most effective managers in the current sample described themselves as more Constructive (along all 4 styles), less Aggressive/Defensive (again along all 4 styles), and less Avoidance-oriented than the least effective managers described themselves. These differences

were statistically significant and stronger for the current sample than those reported in the earlier study (which, as mentioned above, used only half the LSI items to assess each style).

In contrast to the Gratzinger et al. study, the results for three of the Passive/Defensive styles—Approval, Conventional, and Dependent—were slightly greater for the top 10 percent of managers than the bottom. However, these differences were not as great as those for the Constructive styles. Historically, the Passive/Defensive orientation has been found to be negatively correlated with the task effectiveness item and positively correlated with the items measuring interpersonal effectiveness and interest in self-improvement (Lafferty and Associates 1989). Likewise, with the current sample, post hoc analyses showed that the LSI 1 measures of Approval, Conventional, and Dependent styles were correlated in a negative direction with task effectiveness and in a positive direction with interpersonal effectiveness and interest in self-improvement—as well as in a positive direction with receptivity to feedback (see "Appendix 2" for correlations and significance levels). The LSI 2 measures of these styles were also correlated in a negative direction with task effectiveness and in a positive direction with interpersonal effectiveness. The direction of these LSI 2 style correlations with receptivity to feedback and interest in self-improvement, however, varied (i.e., they were in a positive direction for Dependent, negative for Conventional, and mixed for Approval). This suggests that the relationships between certain styles and aspects of effectiveness depend on whether personal styles are described by self or by others.

3.6 Reliability and validity of the LSI for female versus male managers

We had decided to analyze and compare male versus female LSI data, in part, to see if any differences between the early and more recent results were due to the greater percentage of women in the current sample. The results of these comparisons, based on the current version of the LSI and the recent sample, are as follows.

3.6.1 Internal consistency

As shown in Table 7, the internal consistency reliability of the LSI 1 Self Description and LSI 2 Description by Others is nearly identical for female and male focal managers. Alphas for the LSI 1 ranged from 0.77 to 0.89 (mean alpha = 0.83) for females and from 0.78 to 0.89 (mean alpha = 0.83) for males. For the LSI 2, the alphas ranged from 0.79 to 0.94 (mean alpha = 0.88) for both female and male managers.

3.6.2 Factor structure

The results of the principle components analyses of the 12 styles for females versus males are shown in Table 8 (for the LSI 1) and Table 9 (for the LSI 2). For the LSI 1 Self Description form, the three factors explained slightly more of the variance in scores for male managers (76.6 percent) than they did for female

Table 7 Internal consistency of the LSI 1 and LSI 2 based on cronbach's alpha: female versus male (in Italics) focal managers

Style	LSI 1		LSI2	
	Female Managers ($n=2386$)	Male Managers ($n=4,429$)	Female Managers ($n=19,366$ Individual Raters)	Male Managers ($n=34,471$ Individual Raters)
Humanistic-Encouraging	0.87	*0.86*	0.94	*0.94*
Affiliative	0.89	*0.89*	0.94	*0.94*
Approval	0.81	*0.83*	0.84	*0.84*
Conventional	0.80	*0.80*	0.80	*0.80*
Dependent	0.79	*0.79*	0.80	*0.80*
Avoidance	0.81	*0.80*	0.87	*0.86*
Oppositional	0.83	*0.83*	0.92	*0.91*
Power	0.86	*0.87*	0.94	*0.94*
Competitive	0.83	*0.84*	0.90	*0.90*
Perfectionistic	0.77	*0.78*	0.79	*0.79*
Achievement	0.86	*0.85*	0.91	*0.91*
Self-Actualizing	0.87	*0.87*	0.92	*0.91*

Table 8 Factor analysis of LSI 1: female versus male (in Italics) focal managers

Style	Communality	Factor Loadings[a]		
		Constructive	Passive/Defensive	Aggressive/Defensive
Humanistic-Encouraging	.77/*.78*	**.85/*.85***	.13/*.15*	−.17/*−.16*
Affiliative	.82/*.83*	**.84/*.83.83***	.26/*.30*	−.22/*−.21*
Approval	.70/*.73*	.16/*.16*	**.82/*.84***	.07/*.10*
Conventional	.76/*.78*	.07/*.08*	**.86/.87**	.15/*.13*
Dependent	.79/*.79*	.01/*.04*	**.89/*.89***	.05/*.07*
Avoidance	.70/*.72*	−.33/*−.28*	**.70/*.71***	.32/*.36*
Oppositional	.73/*.74*	−.29/*−.28*	.37/*.39*	**.72/*.72***
Power	.78/*.78*	−.19/*−.18*	.08/*.08*	**.86/*.86***
Competitive	.69/*.71*	.12/*.12*	.16/*.21*	**.81/*.80***
Perfectionistic	.74/*.76*	.24/*.25*	.03/*.03*	**.83/*.84***
Achievement	.74/*.76*	**.75/*.77***	−.22/*−.23*	.36/*.34*
Self-Actualizing	.80/*.82*	**.88/*.89***	−.11/*−.09*	.13/*.10*
Eigenvalues		3.01/*3.11*	2.98/*3.11*	2.94/*3.0*
% Variance explained		25.7/*25.9*	24.8/*26.0*	24.5/*24.7*
Cumulative (total) variance explained		25.7/*25.9*	50.5/*51.9*	75.0/*76.6*

$n=2386$ female focal managers; $n=4429$ male focal managers

[a]Factor loadings following varimax rotation. Loadings above |.40| are in **boldface**

Table 9 Factor analysis of LSI 2: female versus male (in Italics) focal managers

Style	Communality	Factor loadings[a]		
		Constructive	Passive/Defensive	Aggressive/Defensive
Humanistic-Encouraging	.91/*.90*	**.88/*.87***	.09/*.12*	−.36/*−.37*
Affiliative	.92/*.92*	**.82/*.81***	.22/*.25*	**−.44/*−.45***
Approval	.79/*.78*	.11/*.10*	**.88/*.87***	.07/*.07*
Conventional	.84/*.86*	−.08/*−.03*	**.91/*.93***	.06/*.03*
Dependent	.87/*.86*	−.01/*.02*	**.93/*.92***	−.08/*−.11*
Avoidance	.82/*.80*	**−.51/*−.47***	**.68/*.69***	.32/*.33*
Oppositional	.88/*.89*	**−.54/*−.46***	.22/*.21*	**.74/*.79***
Power	.90/*.90*	**−.44**/*−.35*	.01/*.01*	**.84/*.88***
Competitive	.83/*.82*	−.14/*.10*	.09/*.09*	**.89/**
Perfectionistic	.87/*.87*	.17/*.22*	−.01/*−.07*	**.92/*.91***
Achievement	.88/*.87*	**.88/*.87***	−.25/*−.26*	.19/*.22*
Self-Actualizing	.91/*.90*	**.95/*.95***	−.08/*−.06*	−.08/*−.06*
Eigenvalues		3.92/*3.68*	3.09/*3.13*	3.37/*3.53*
% Variance explained		32.7/*30.7*	25.7/*26.1*	28.1/*29.5*
Cumulative (total) variance explained		32.7/*30.7*	58.4/*56.8*	86.5/*86.3*

Female focal managers described by $n = 2386$ sets of raters; male focal managers described by $n = 4429$ sets of raters (Description by Others' scores were aggregated to the focal manager level prior to the factor analysis)

[a]Factor loadings following varimax rotation. Loadings above |.40| are in **boldface**

managers (75.0 percent). For the LSI 2 Description by Others form, the three factors explained slightly more variance in the scale scores for female managers (86.5 percent) than they did for male managers (86.3 percent). As with the results for the total sample, dual loadings (above |.40|) occurred only with the LSI 2 and, again, with the Affiliative, Avoidance and Oppositional styles for both males and females—and with Power for females. More generally, in all cases, the highest loadings were on the expected factor for both the LSI 1 and LSI 2. Thus, the results support the three-factor structure for both female and male managers.

3.6.3 Inter-rater reliability

As shown in Table 10, the *F* tests based on oneway analyses of variance indicated that the variance within groups of others who described the same manager was less than the variance between these groups of respondents for both female and male focal managers. The eta^{2}s for two of the Constructive styles tended to be slightly higher for females (indicating somewhat greater agreement among those describing them) than for males. In contrast, the eta^{2}s for the defensive styles indicated slightly greater agreement among those describing males than those describing females.

Table 10 Inter-rater reliability of the LSI 2: female versus male (in Italics) focal managers

Style		*F* (ANOVA)***	eta^2	90% CI[a]	
				LL	UL
Humanistic-Encouraging	Female	3.62	0.34	0.23	0.25
	Male	*3.38*	*0.33*	*0.23*	*0.24*
Affiliative	Female	3.86	0.35	0.25	0.27
	Male	*3.58*	*0.35*	*0.24*	*0.26*
Approval	Female	3.22	0.31	0.21	0.22
	Male	*3.17*	*0.32*	*0.21*	*0.23*
Conventional	Female	2.97	0.29	0.19	0.20
	Male	*2.92*	*0.30*	*0.19*	*0.20*
Dependent	Female	3.07	0.30	0.19	0.21
	Male	*3.13*	*0.32*	*0.21*	*0.22*
Avoidance	Female	2.88	0.29	0.18	0.20
	Male	*2.58*	*0.28*	*0.16*	*0.18*
Oppositional	Female	3.04	0.30	0.19	0.21
	Male	*3.06*	*0.31*	*0.20*	*0.22*
Power	Female	3.89	0.35	0.25	0.27
	Male	*4.09*	*0.38*	*0.28*	*0.29*
Competitive	Female	3.93	0.36	0.26	0.27
	Male	*4.51*	*0.40*	*0.30*	*0.32*
Perfectionistic	Female	3.15	0.31	0.20	0.22
	Male	*3.33*	*0.33*	*0.22*	*0.24*
Achievement	Female	2.93	0.29	0.18	0.20
	Male	*2.88*	*0.30*	*0.19*	*0.20*
Self-Actualizing	Female	3.03	0.30	0.19	0.21
	Male	*2.73*	*0.29*	*0.17*	*0.19*
Constructive	Female	3.37	0.32	0.22	0.24
	Male	*3.07*	*0.31*	*0.20*	*0.22*
Passive/Defensive	Female	3.19	0.31	0.20	0.22
	Male	*3.12*	*0.32*	*0.21*	*0.22*
Aggressive/Defensive	Female	3.84	0.35	0.25	0.27
	Male	*4.17*	*0.38*	*0.28*	*0.30*

$n = 18{,}962$ raters for 2386 female focal managers; $n = 30{,}255$ for 4429 male focal managers

[a] *CI* Confidence interval of eta^2; *LL* Lower limit; *UL* upper limit

*** All *F* statistics are significant at the .001 level

3.6.4 Consensual validity

The correlations between the LSI 1 Self Descriptions and LSI 2 Descriptions by Others for females and males (in italics) are shown in Table 11. For 9 of the 12 styles, the same style correlations between self and others were slightly higher for female managers (mean $r = 0.32$) than for male managers (mean $r = 0.29$). The

Table 11 Correlations between LSI 1 and LSI 2: Female versus Male (in Italics) Focal Managers

LSI 2 Style	LSI 1 Style											
	1	2	3	4	5	6	7	8	9	10	11	12
1. Humanistic-Encouraging	**.27/*.24***	.26/*.24*	.13/*.11*	.04[a]/*.07*	.06[a]/*.09*	−.05[a]/−*.02*[a]	−.13/−*.12*	−.16/−*.21*	−.07/−*.10*	−.11/−*.13*	.02[a]/*.01*[a]	.12/*.09*
2. Affiliative	.28/*.25*	**.34/*.32***	.21/*.20*	.09/*.13*	.09/*.13*	−.04[a]/−*.01*[a]	−.15/−*.12*	−.20/−*.23*	−.08/−*.07*	−.16/−*.17*	−.05[a]/*.02*[a]	.14/*.12*
3. Approval	.16/*.14*	.22/*.23*	**.40/*.36***	.29/*.27*	.26/*.25*	.18/*.09*	−.03[a]/−*.02*[a]	−.05[a]/−*.04*[a]	.07/*.10*	−.04[a]/−*.09*	−.07[a]/−*.07*	.05[a]/*.09*
4. Conventional	.06[a]/*.06*	.09/*.10*	.24/*.25*	**.40/*.35***	.32/*.32*	.23/*.16*	.05[a]/−*.02*[a]	−.07/−*.07*	−.03[a]/−*.01*[a]	−.05[a]/−*.08*	−.10/−*.10*	−.05[a]/−*.03*[a]
5. Dependent	.06[a]/*.06*	.10/*.12*	.28/*.27*	.36/*.35*	**.37/*.37***	.26/*.19*	.03[a]/*.00*[a]	−.13/−*.11*	−.08/−*.05*[a]	−.08/−*.10*	−.14/−*.12*	−.11/−*.07*
6. Avoidance	−.10/−*.08*	−.12/−*.09*	.10/*.10*	.22/*.17*	.18/*.15*	**.29/*.19***	.15/*.10*	.09/*.10*	−.01[a]/−*.01*[a]	.03[a]/*.00*[a]	−.11/−*.10*	−.13/−*.08*
7. Oppositional	−.16/−*.13*	−.22/−*.17*	−.05[a]/−*.06*	−.00[a]/−*.05*[a]	−.05[a]/−*.08*	.10/*.03*[a]	**.23/*.19***	.27/*.31*	.18/*.19*	.16/*.18*	.03[a]/*.05*[a]	−.06[a]/−*.00*[a]
8. Power	−.19/−*.14*	−.25/−*.20*	−.11/−*.12*	−.08/−*.12*	−.14/−*.15*	.02[a]/−*.01*[a]	.19/*.16*	**.34/*.38***	.22/*.22*	.21/*.23*	.08/*.10*	−.02[a]/−*.03*[a]
9. Competitive	−.07[a]/−*.04*[a]	−.09/−*.05*[a]	−.02[a]/−*.02*[a]	−.08/−*.11*	−.15/−*.15*	−.07[a]/−*.09*	.14/*.13*	.29/*.33*	**.36/*.37***	.25/*.27*	.17/*.19*	.12/*.15*
10. Perfectionistic	−.12/−*.10*	−.17/−*.15*	−.09/−*.14*	−.07/−*.13*	−.13/−*.17*	.00[a]/−*.04*[a]	.17/*.13*	.31/*.32*	.30/*.28*	**.35/.34/*.34***	.23/*.23*	.06[a]/−*.07*
11. Achievement	.10/*.07*	.07/*.04*[a]	−.06[a]/−*.08*	−.12/−*.11*	−.11/−*.09*	−.12/−*.08*	−.03[a]/−*.01*[a]	.04[a]/*.04*[a]	.11/*.08*	.15/*.15*	**.25/*.22***	.15/*.10*
12. Self-Actualizing	.21/*.20*	.24/*.21*	.07[a]/*.06*	−.05[a]/−*.03*[a]	−.07/−*.04*[a]	−.13/−*.09*	−.10/−*.08*	−.06[a]/−*.08*	.04[a]/*.02*[a]	−.03[a]/*.02*[a]	.12/*.12*	**.23/*.19***

$n = 2386$ female focal managers; $n = 4429$ male focal managers (Descriptions by others were aggregated to the focal manager level prior to correlating the scores). Coefficients for the same-style different-rater are in **boldface** on the diagonal. Coefficients for different-style different-rater are above and below the diagonal

[a] $p > .001$

largest difference was for the Avoidance style ($r = 0.29$ for female managers versus 0.19 for male managers), suggesting that male managers may be less aware of the extent of their Avoidant tendencies than female managers.

For most styles, the highest correlations between self and others were along the same style for both females and males. Among the exceptions were (a) a slightly higher correlation between self-described Humanistic-Encouraging and others' description of Affiliative for both female and male focal managers and (b) a slightly higher correlation between self-described Achievement and others' description of Perfectionistic for male focal managers. Exception such as these were also evident in the analyses for the total sample. More generally, the results indicate that the consensual validity of the survey is slightly stronger for female than for male managers.

3.6.5 Criterion-related validity

The *t*-test results comparing the LSI 1 Self Descriptions of the female managers who were in the top and bottom 10 percent of the total sample on the effectiveness measure (based on Descriptions by Others) are shown in Table 12. In addition, the table includes comparable results for the male managers who were in the top and bottom 10 percent of the total sample. It is noted that a greater proportion of the total number of female managers were in the top 10% of effectiveness for the total sample (12.65% of 2386 female managers) than the proportion of the total number of male managers (8.67% of the 4429 male managers). On the other hand, the proportion of the total number of female managers who were in the bottom 10 percent of the total sample (9.35% of females) was about the same as the proportion of males (10% of males).

For both female and male managers, the results of the *t*-tests indicated that weaker Aggressive/Defensive styles and stronger Humanistic-Encouraging, Affiliative, and Self-Actualizing styles distinguished the most effective from the least effective. In addition, stronger Achievement, Approval, Conventional, and Dependent styles were characteristic of the most effective as opposed to the least effective male managers; while a stronger Avoidance style differentiated the least effective female managers from those who were most effective.

4 Discussion

The results of this study essentially replicated most of the earlier findings on the reliability and validity of the LSI, but with a larger sample of managers and a more recent version of the inventories used to gather information from self and others. Successful replications of psychological studies are relatively rare and, when they do occur, they tend to produce effects that are smaller or weaker than the original studies (Bohannon 2015; Weir 2015). In contrast, the current results regarding the LSI's internal consistency reliability, construct validity, consensual validity, and criterion-related validity were either as strong or slightly stronger than those reported by the early studies. Moreover, the results of the additional analyses presented here provide some insights regarding the reliability and validity of the LSI with respect

Table 12 Personal styles (LSI 1) of most effective (Top 10%) versus least effective (bottom 10%) managers: female versus male (in Italics)

Style		Top 10%[a] Mean (SD)	Bottom 10%[a] Mean (SD)	*t*-Test[b]	95% CI[c]		Direction of difference between means
					LL	UL	
Humanistic-Encouraging	Female	1.65 (.26)	1.47 (.29)	7.63***	0.13	0.23	TOP > BOTTOM
	Male	*1.62 (.27)*	*1.45 (.29)*	*9.05****	*0.14*	*0.22*	TOP > BOTTOM
Affiliative	Female	1.64 (.27)	1.45 (.31)	7.98***	0.15	0.25	TOP > BOTTOM
	Male	*1.60 (.28)*	*1.39 (.32)*	*10.20****	*0.17*	*0.26*	TOP > BOTTOM
Approval	Female	0.65 (.30)	0.60 (.27)	1.93	0.00	0.10	TOP > BOTTOM
	Male	*0.69 (.30)*	*0.59 (.28)*	*5.13****	*0.06*	*0.14*	TOP > BOTTOM
Conventional	Female	0.66 (.25)	0.65 (.26)	−0.85	− 0.04	0.05	TOP > BOTTOM
	Male	*0.73 (.27)*	*0.66 (.26)*	*3.70****	*0.03*	*0.10*	TOP > BOTTOM
Dependent	Female	0.74 (.28)	0.75 (.28)	− 0.32	− 0.05	0.04	BOTTOM > TOP
	Male	*0.79 (.27)*	*0.71 (.27)*	*4.21****	*0.04*	*0.12*	TOP > BOTTOM
Avoidance	Female	0.24 (.20)	0.29 (.24)	− .56*	− 0.09	− 0.01	BOTTOM > TOP
	Male	*0.30 (.22)*	*0.31 (.23)*	*− 0.89*	*− 0.05*	*0.02*	BOTTOM > TOP
Oppositional	Female	0.22 (.19)	0.32 (.24)	− 5.19***	− 0.13	− 0.06	BOTTOM > TOP
	Male	*0.29 (.23)*	*0.37 (.27)*	*− 4.16****	*− 0.11*	*− 0.04*	BOTTOM > TOP
Power	Female	0.16 (.16)	0.26 (.24)	− 6.22***	− 0.14	− 0.07	BOTTOM > TOP
	Male	*0.21 (.22)*	*0.35 (.30)*	*− 7.70****	*− 0.18*	*− 0.11*	BOTTOM > TOP
Competitive	Female	0.48 (.25)	0.53 (.28)	− 2.32*	− 0.10	− 0.01	BOTTOM > TOP
	Male	*0.61 (.28)*	*0.65 (.33)*	*− 2.14**	*− 0.09*	*0.00*	BOTTOM > TOP
Perfectionistic	Female	0.86 (.23)	0.92 (.26)	− 2.94**	− 0.10	− 0.02	BOTTOM > TOP
	Male	*0.97 (.24)*	*1.01 (.29)*	*− 2.63***	*− 0.09*	*− 0.01*	BOTTOM > TOP
Achievement	Female	1.59 (.26)	1.56 (.28)	1.11	− 0.02	0.07	TOP > BOTTOM
	Male	*1.60 (.27)*	*1.56 (.28)*	*2.24**	*0.01*	*0.08*	TOP > BOTTOM

Table 12 (continued)

Style		Top 10%[a] Mean (SD)	Bottom 10%[a] Mean (SD)	*t*-Test[b]	95% CI[c]		Direction of difference between means
					LL	UL	
Self-Actualizing	Female	1.46 (.30)	1.34 (.29)	4.81***	0.07	0.18	TOP > BOTTOM
	Male	*1.48 (.30)*	*1.38 (.31)*	*5.00****	*0.06*	*0.15*	TOP > BOTTOM

The TOP 10% ($n = 302$ for female focal managers; $n = 384$ for male focal managers) and BOTTOM 10% ($n = 233$ for female focal managers; $n = 443$ for male focal managers) were selected from a sample of 6,899 managers based on effectiveness ratings given by others. The means and standard deviations are based on the average item raw score for each style

[a]*t*-test for two independent samples

[b]*CI* Confidence interval of the difference between the means; *LL* Lower limit; *UL* upper limit

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

to female versus male managers. That said, there were two differences between the early studies and the current study that warrant discussion.

First, the lower eta^2 statistics from the oneway ANOVAs for the overall sample seem to suggest that the inter-rater reliability of the current version of the LSI 2 is weaker than that of the earlier version. As noted earlier, it appears that these differences are largely due to the differences between the two samples in terms of the average number of raters per focal manager. In addition, the earlier results were based on a sample consisting of 90% male managers. The results presented here for females and males separately show that for 8 of the 12 styles, the consistency among those describing male managers is slightly greater than those describing female managers. Thus, the differences seen between the results of the early study and those for the total sample in the current study can be explained by the diversity of the current sample (with a much higher percentage of female managers than the early study) and the greater number of respondents per focal individual.

Second, in contrast to the findings reported by Gratzinger et al., the current study shows that Approval, Conventional, and Dependent Passive/Defensive thinking styles (as described by self) are positively related to managerial effectiveness (as described by others). This finding cannot be explained by the smaller percentage of males in the recent study who, in contrast to their female counterparts, tend to be the focal individuals that account for this positive relationship between these styles and effectiveness. Similarly, it is unlikely that this finding is due to the survey items that were slightly modified or changed. When we reran the comparisons between the most and least effective managers without the changed items included in the Passive/Defensive scales, the conclusions remained essentially the same (see "Appendix 3"). Thus, other factors and changes apparently account for these differences between the two samples.

The positive relationships between three of the Passive/Defensive styles and effectiveness are to some extent consistent with the writings on servant leadership

(Greenleaf 2002), humble leadership (Schein and Schein 2018), and Level 5 leadership (Collins 2001)—which suggest that effective leaders place the needs of others before or above their own. However, when the current sample was split by gender, the results of the t-tests indicated these Passive/Defensive styles were positively related to the effectiveness of only the male managers. For females the results were either not significant or in a negative direction. Thus, thinking in certain Passive/Defensive ways that place the needs of others before one's own may provide a slight boost to the effectiveness of male managers but not necessarily that of female managers. At the extreme, low levels of passive styles such as Approval could be associated with lack of empathy and with narcissism (Maccoby 2000; Rosenthal and Pittinsky 2006), the latter tending to be higher in men than in women (Grijalva et al. 2015; Brunzel 2020). Nevertheless, the effects of Passive/Defensive thinking styles on the effectiveness of male and female managers are not nearly as strong as the positive effects of the Constructive thinking styles.

The consistently negative relationships between Aggressive/Defensive styles and effectiveness for both female and male managers conflict with the idea that women may have to be more aggressive to be perceived as effective (e.g., Zheng et al. 2018). They also run counter to the notion that aggressive styles detract from perceptions of the effectiveness of only female managers. Though more research is needed, it appears that neither women nor men benefit from relying on these styles as the *modus operandi*. More generally, if the reason or purpose for using the LSI is to strengthen or improve effectiveness, the results consistently indicate that the focus for *all* managers should be on strengthening Constructive styles.

In the research on gender and leadership, Aggressive/Defensive behaviors such as aggressiveness, dominance, and competitiveness are often combined with Constructive behaviors such as assertiveness and confidence and labeled "agentic" or "masculine." Similarly, Passive/Defensive behaviors such as submissiveness are often combined with Constructive behaviors like helpfulness, and kindness, and supportiveness and labeled "communal" or "feminine". While these categories may be useful to those describing gender stereotypes and biases, they have also been used as prescriptions for how females, including those aspiring to leadership positions, should behave (Wofford 2018). As the LSI reliability and validity results show, expecting managers to pay attention to both tasks and people does not inherently place them in a double bind—as is often erroneously assumed (e.g., Zheng et al. 2018; Carli and Eagly 2012; Wofford 2018). Rather, the conflict arises in encouraging managers and aspiring leaders to be both Constructive and Aggressive/Defensive—which are negatively related to each other and are related in opposite directions to effectiveness. The research on transformational, transactional, and laissez-faire leadership seems to offer a more practical basis for making prescriptions than the traditional gender stereotypes (e.g., Eagly et al. 2003; Carli and Eagly 2012). Nevertheless, the personal styles measured by the LSI can explain variance in performance that goes beyond that explained by these leadership styles (Masi and Cooke 2000). Thus, the LSI and its framework could be a valuable addition to future research in this area.

Our findings confirm that the LSI is a reliable and valid tool for the development of female as well as male managers. However, the results should be interpreted in

consideration of the replication's limitations—some of which are due to the fact that the studies we set out to replicate were carried out almost four decades ago. Many things change over time including, in this case, the wording of some of the items in the survey being studied, the demographics of the people participating in management development programs, and the types of statistics used to estimate the reliability and validity of surveys.

This paper addresses one of these changes, that is, the greater number of women in the recent samples, via an extension that complements the replication. Specifically, we expanded the earlier research by exploring possible differences between women and men that might account for inconsistencies between the findings for the earlier versus latter samples. This type of enhancement is consistent with one of Block and Kuckertz's suggestions for strengthening management research: "A reasonable extension might be the inclusion of one, and only one, additional concept into a model that otherwise mimics the original study as closely as possible and, in doing so, enhances the explanatory power of the original model" (2018, 357).

As such, we did not address other changes, including those in the statistical techniques commonly used now versus then. For example, the early study by Gratzinger and his associates investigated the criterion related validity of the LSI by selecting on the dependent variable (effectiveness). Back when the original study was conducted, this procedure seemed to nicely address the question, "what is the difference between highly effective and ineffective mangers with respect to the styles measured by the LSI?" This approach, however, does not appropriately identify the amount of unique variance explained by each of the three personal orientations. Today, our preference for testing this would be to regress effectiveness on the factor scores representing the Constructive, Passive/Defensive, and Aggressive/Defensive orientations.

Similarly, this replication was not designed to address changes in reliability or validity specifically due to the individual survey items that were modified or replaced. That is because the studies that we replicated focused on the LSI scales rather than items and used classical test theory (CTT) as the framework for evaluating its reliability and validity. While the LSI meets (and sometimes exceeds) CTT thresholds, other approaches could be used moving forward to complement and further advance understanding of the LSI's precision and usefulness. For example, item response theory (IRT) could be used to identify items (and the combination of items) within each of the 12 LSI scales that are best at discriminating between different levels of the underlying concept. Alternatively, the Cronbach alpha approach associated with CTT could be expanded to generate item-total correlations and the changes in the coefficients associated with the deletion of items. Such techniques would provide yet additional insights into the psychometric properties of the LSI.

5 Conclusion

As Block and Kuckertz (2018) point out, replication studies are important for the discipline of management to develop in a meaningful way and to help to close the gap between theory and practice. By conducting a replication of the reliability and validity analyses on the LSI, this study provides further evidence of the strength of

its conceptual framework and other psychometric properties—and, as an extension, its usefulness for female as well as male managers.

This study confirms the importance of the applying Constructive styles in management and shows the value of developing these styles in female and male managers to strengthen their effectiveness. Though more research is needed, the LSI framework and styles appear to offer a practical and effective alternative to the double-bind approach that plagues many of the prescriptions offered based on gender and leadership research (e.g., Carli and Eagly 2012).

The results of the post hoc analyses on the LSI styles and effectiveness underscore the importance of using multiple sources of feedback in management development and research. The direction of most of the correlations between the LSI styles and effectiveness came out the same regardless of whether the styles were described by self or by others. However, there were some differences, particularly with respect to interest in self-development and receptivity to feedback. To some extent, this is consistent with research suggesting that feedback source affects recipient reactions and that the relationship is influenced by recipients' personal characteristics, including their needs for approval and achievement (e.g., Lechermeier and Fassnacht 2018). It is also consistent with the meta-analyses of research on gender and effectiveness which show that conclusions differ depending on whether the ratings are by self by others (Paustian-Underdahl et al. 2014). Thus, researchers should continue to examine the relationship between personal styles and outcomes as reported by self and others. This would expand understanding and promote the successful application of knowledge regarding the qualities that help versus hinder the effectiveness of female and male managers and leaders.

Appendix 1

Life styles inventory ™ (LSI) style descriptions (sample items in Italics)

Constructive

The Humanistic-Encouraging style reflects an interest in the growth and development of people, a high positive regard for them, and sensitivity to their needs. People with this style devote energy to counseling and coaching others, interact with others in a thoughtful and considerate way, and provide them with support and encouragement. *(encourages others, willing to take time with people).*

The **Affiliative** style reflects an interest in developing and sustaining pleasant relationships with others. People with this style share their thoughts and feelings with others, are friendly and cooperative, and make others feel like they are part of the team. *(cooperative, likes to include others in activities).*

The **Achievement** style is based on the need to attain high quality results on challenging projects, the belief that outcomes are linked to one's effort rather than chance, and the tendency to personally set challenging yet realistic goals. People exhibiting this style think ahead and plan, explore alternatives before acting, and learn from their mistakes. *(enjoys a challenge, sets own goals).*

The **Self-Actualizing** style is based on needs for personal growth, self-fulfillment, and the realization of one's potential. People exhibiting this style demonstrate a strong desire to learn and experience things, creative yet realistic thinking, and a balanced concern for people and tasks. *(optimistic & realistic, high personal integrity).*

Passive/Defensive

The **Approval** style reflects a need to be accepted and a tendency to tie one's self-worth to being liked by others. People with this style try very hard to please others, make a good impression, and be agreeable or obedient. *(generous to a fault, agrees with everyone).*

The **Conventional** style reflects a preoccupation with conforming and "blending in" with the environment to avoid calling attention to oneself. People with this style tend to rely on established routines and procedures, prefer to maintain the *status quo*, and desire a secure and predictable work environment. *(thinks rules more important than ideas, conforming).*

The **Dependent** style reflects a need for self-protection coupled with the belief that one has little direct or personal control over important events. People who exhibit this style (possibly as a result of recent changes in their personal or work lives) allow others to make decisions for them, depend on others for help, and willingly obey orders. *(obeys too willingly, very respectful to superiors).*

The **Avoidance** style reflects apprehension, a strong need for self-protection, and a propensity to withdraw from threatening situations. People with this style "play it safe" and minimize risks, shy away from group activities and conversations, and react to situations in an indecisive or non-committal way. *(evasive, leaves decisions to others).*

Aggressive/Defensive

The **Oppositional** style reflects a need for security that manifests itself in a questioning, critical and even cynical manner. Though people exhibiting this style ask tough questions that can lead to better ideas, they might also emphasize even minor flaws, use criticism to gain attention, and blame others for their own mistakes. *(slow to forgive a wrong, opposes new ideas).*

The **Power** style reflects needs for prestige and influence and the tendency to equate self-worth with controlling others. People with strong tendencies along this style dictate (rather than guide) the actions of others, try to run everything themselves, and treat others in aggressive and forceful ways—which, ironically, limits their true influence. *(runs things by self, abrupt).*

The **Competitive** style is based on a need to protect one's status by comparing oneself to others, outperforming them, and never appearing to lose. People with this style seek recognition and praise from others, view even non-competitive situations

as a contest or challenge to "prove" themselves, and try to maintain a sense of superiority. *(overestimates ability, gets upset over losing).*

The **Perfectionistic** style is based on the need to attain flawless results and avoid failure, and involves the tendency to equate self-worth with the attainment of unreasonably high standards. People who exhibit this style are preoccupied with details, place excessive demands on themselves and others, and tend to show impatience, frustration, and indifference to the needs of others. *(de-emphasizes feelings, impatient with own errors).*

Appendix 2

See Table 13.

Table 13 Correlations between LSI 1/LSI 2 (in Italics) and effectiveness items

Style/Orientation	Effectiveness Items			
	Task effectiveness	Interpersonal effectiveness	Receptivity to feedback	Interest in self-improvement
Humanistic-Encouraging	.07/*.62*	.20/*.81*	.16/*.72*	.16/*.66*
Affiliative	.04/*.49*	.26/*.85*	.18/*.71*	.19/*.63*
Approval	−.05/*−.23*	.14/*.12*	.06/*−.03*[a]	.09/*.05*
Conventional	−.04[a]/*−.23*	.12/*.04*[a]	.04[a]/*−.09*	.04[a]/*−.07*
Dependent	−.04[a]/*−.18*	.11/*.13*	.04[a]/*.02*[a]	.05/*.05*
Avoidance	−.06/*−.51*	−.01[a]/*−.45*	.03[a] /*−.47*	−.03[a]/*−.44*
Oppositional	−.02[a]/*−.43*	−.11/*−.71*	−.14/*−.72*	−.08/*−.54*
Power	−.01[a]/*−.29*	−.22/−.71	−.19/*−.64*	−.09/*−.45*
Competitive	.02[a]/*−.21*	−.09/*−.50*	−.09/*−.50*	.01[a]/*−.26*
Perfectionistic	.06/*.19*	−.15/*−.33*	−.10/−.23	.01[a]/*−.02*[a]
Achievement	.11/*.75*	−.05/*.45*	.01[a]/*.51*	.09/*.60*
Self-Actualizing	.05/*.68*	.07/*.70*	.08/*.67*	.10/*.65*
Constructive	.08/*.70*	.15/*.79*	.13/*.73*	.16/*.70*
Passive/Defensive	−.05/*−.32*	.11/*−.03*[a]	.04[a]/*−.15*	.05/*−.11*
Aggressive/Defensive	.01[a]/*−.23*	−.17/*−.64*	−.15/*−.60*	−.04[a]/*−.37*

$N = 6{,}899$ for LSI 1 and LSI 2 (LSI 2 Descriptions by Others were aggregated to the focal manager level prior to correlating the scores)

[a] $p > .001$

Appendix 3

See Table 14.

Table 14 Passive/defensive styles (LSI 1) of most effective (Top 10%) versus least effective (Bottom 10%) managers: current sample results based on scales with all items versus without changed items

Style	Sample	Top 10%	Bottom 10%	*t*-Test[a]	95% CI[b]		Direction of Difference Between Means
		Mean (SD)	Mean (SD)		LL	UL	
Approval	All Items	0.67 (.30)	0.59 (.28)	5.19***	0.05	0.11	TOP > BOTTOM
	Without Changed Items	0.67 (.29)	0.59 (.27)	5.39***	0.05	0.11	TOP > BOTTOM
Conventional[c]	All Items	0.70 (.26)	0.66 (.26)	2.90**	0.01	0.07	TOP > BOTTOM
Dependent	All Items	0.77 (.27)	0.72 (.27)	3.04**	0.02	0.07	TOP > BOTTOM
	Without Changed Items	0.73 (.27)	0.69 (.28)	3.06**	0.02	0.07	TOP > BOTTOM
Avoidance	All Items	0.27 (.22)	0.31 (.23)	−2.58*	−0.05	−0.01	BOTTOM > TOP
	Without Changed Items	0.25 (.22)	0.29 (.24)	−3.46**	−0.07	−0.02	BOTTOM > TOP

The TOP 10% (n = 690) and BOTTOM 10% (n = 689) were selected from a sample of 6,899 focal managers based on the effectiveness ratings given by others. The means and SDs are based on the average item raw scores for each style

[a] *t*-test for two independent samples

[b] *CI* = Confidence interval of the difference between the means; *LL* = Lower limit,; *UL* = upper limit

[c] None of the items from the original Conventional scale were changed

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

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Data availability The data for this project are proprietary but may be obtained with Data Use Agreements with Human Synergistics. Researchers interested in access to the data may contact the corresponding author. It can take some months to negotiate data use agreements and gain access to the data. The author will assist with any reasonable replication attempts.

Compliance with ethical standards

Conflicts of interest The authors report affiliation or involvement in an organization with a financial interest in the subject matter or materials discussed in this manuscript. Specifically, Janet L. Szumal and Cheryl A. Boglarsky have affiliation with the publisher of the materials discussed and examined in the manuscript as employees of Human Synergistics, Inc., the publisher and distributor of the *Life Styles Inventory*®. Robert A. Cooke is owner and CEO of Human Synergistics.

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