Are leadership constructs really independent?

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Abstract

Purpose – The aim of this study is to contribute to the construct validity of leadership styles. Although several theories of leadership emerged in the past decades, integrative research on leadership constructs is rare. Thus, for the first time, the present study critically tests whether the leadership constructs of transformational and transactional leadership, consideration and initiating structure, and leader-member-exchange are convergent, or whether they exhibit discriminant validities, as hypothesized by theory.

Design/methodology/approach – Applying hierarchical structural equation modeling to the multitrait-multimethod (MTMM) approach, the present study explored the convergent and discriminant validity of leadership constructs based on data from multiple sources. Altogether, \( N = 148 \) dyads of leaders and subordinates from various industries in Germany participated in the present study.

Findings – Results demonstrated evidence for the convergence of the leadership constructs.

Practical implications – In leadership feedback projects in organizations, practitioners should utilize multiple rating perspectives for adequate descriptions of leadership behaviors.

Originality/value – Interestingly, approximately the same amount of variance in the data was due to the rating sources as it was to the leadership constructs, suggesting strong method effects in leadership research. The present study was among the first MTMM approaches that addressed the construct validity of several leadership constructs simultaneously and thus, allows new insight into the overall network of leadership theories.

Keywords Leadership, Construct validity, Multitrait-multimethod, Germany

Paper type Research paper

Are leadership constructs valid in the sense that they are empirically independent? Are at least some of the various leadership constructs not redundant? While during the past 50 years numerous leadership theories have been developed and considerable progress has been made in the research field of leadership, some fundamental questions remain. One of the problems associated with leadership research is that the majority of empirical studies conducted found strong relationships between various leadership constructs that had been hypothesized to be distinct from each other. For example, Bass (1985) proposed transformational leadership to be distinct from transactional leadership. Among other things, transformational leaders utilize a positive vision of the future, individualized consideration, and intellectual stimulation to motivate their followers to perform beyond expectations. In contrast, transactional leaders rely on a quid-pro-quo approach to leadership: clearly defined tasks and an exchange relationship with their followers. Bass and Avolio (1990) have argued that transactional leadership is a necessary first step in transformational leadership. Therefore, in almost all empirical studies transformational leadership was
strongly and positively related to transactional leadership (e.g. Bycio et al., 1995; Tepper and Percy, 1994).

These convergences with regard to content and empirical relationships exist not only within one leadership theory, but also between leadership theories. Campbell and Fiske (1959) argue that the validity of a construct can be questionable given high correlations with other constructs from which it was intended to differ. More specifically, the strong positive relationships affect the convergent and discriminant validity of the different leadership constructs. Campbell and Fiske (1959) describe convergent validity as the degree to which multiple measures of the same concept are in agreement. According to Nunnally and Bernstein (1967), measures should have convergent and discriminant validity. Discriminant validity is the degree to which measures of different concepts are distinct, and is indicated by low correlations between the measure of interest and other measures that are supposedly not measuring the same construct (Heeler and Ray, 1972).

For the purpose of the present study, discriminant validity is operationalized as a small \(|r| \geq 24\) (Cohen, 1988) correlation between constructs, while medium (i.e. \(0.24 < |r| < 0.36\)) or large (\(|r| \geq 0.37\)) correlations indicate convergence of the respective leadership measures.

To date, the discriminant validity of the different leadership constructs has not been established appropriately. As a consequence, researchers cannot rely on completely validated theories on leadership. Moreover, this leads to the question of whether the respective leadership theories might include constructs that share common elements or are based upon certain dimensions of theoretical overlap. More critically, it might be speculated that these constructs would be partially redundant because the underlying processes (e.g. motivating followers) are at least partially the same.

However, within theoretical and empirical literature on leadership, these critical questions have been neglected so far. In general, the construct validity of any given construct is a critical element of the scientific approach. Despite the importance of this aspect of validity, no systematic research on this issue in the field of leadership yet exists. Consequently, experts in the field of leadership have been calling for research addressing this issue (Graen et al., 2010; House and Aditya, 1997; Judge et al., 2004; Sashkin, 2004; Yukl, 1999, 2002). Thus, the present work aimed at closing this gap and contributing to the question of the construct validity of leadership constructs. The present study is among the first to investigate the convergent and discriminant validity for different leadership constructs across leadership theories.

First, several major leadership theories currently being extensively researched are briefly discussed. Problems with the construct validity of these theories are highlighted. Next, limitations of the empirical literature focusing on these leadership theories are presented. In order to overcome these limitations, an empirical study was conducted so that for the first time, results regarding the convergent and discriminant validity of multiple leadership constructs from several leadership theories were available. The analysis strategy that formed the core of the present study (multitrait-multimethod (MTMM) analysis, based on structural equation modeling (SEM)) allowed for considerable confidence in the validity coefficients obtained and the conclusions that can be drawn from the results. In sum, the present study is the first systematic research effort to explicitly test the construct validity of five theoretically distinct leadership constructs.

Leadership theories and constructs

Transformational and transactional leadership

The constructs of transformational and transactional leadership were first developed by Burns (1978). Subsequently, Bass (1985) built on Burns’ work and developed the full
range leadership theory (FRLT), including several subconstructs of transformational and transactional leadership. Currently, transformational and transactional leadership represent the most researched constructs of leadership today (Antonakis et al., 2003; Avolio and Bass, 2002; Avolio and Yammarino, 2002; Judge and Piccolo, 2004; Waldman and Yammarino, 1999). Transformational leaders motivate their followers with a positive, value-based vision of the future. Followers trust in their leader's vision and are motivated to perform beyond expectations (Bass, 1985; Podsakoff et al., 1996; Shin and Zhou, 2003). One facet of transformational leadership refers to individualized consideration, where the leader carefully evaluates – and acts upon – his/her followers' needs (Avolio and Bass, 1995). As for transactional leadership, this leadership style is based on clearly defined transactions between leader and led (Bass, 1985). Meta-analytical empirical evidence emerged supporting the criterion-oriented validity of transformational and transactional leadership with regard to both subjective (Dumdum et al., 2002; Judge and Piccolo, 2004; Lowe et al., 1996) and objective (Barling et al., 1996; Tosi et al., 2004) performance. For example, in a sample of employees and leaders from a German public transport company, it was found that transformational leadership was positively related to branch-level profit, as well as to followers' job satisfaction (Rowold and Heinitz, 2007).

However, the construct validity of the transformational-transactional leadership theory is problematic. For example, one meta-analysis (Judge and Piccolo, 2004) reported the corrected correlation between transformational and transactional leadership ($\rho = 0.80$). This relationship could be interpreted as a lack of discriminant validity, because from theory, these constructs were hypothesized to be distinct constructs (Bass, 1985). Furthermore, Brown and Keeping (2005) confirmed that the measurement of transformational leadership is highly influenced by the affect raters feel toward their leader. Thus, the theory of transformational leadership has been criticized for inadequate construct validity (Bycio et al., 1995; House and Aditya, 1997; Lievens et al., 1997; Tejeda et al., 2001; Tepper and Percy, 1994; Yukl, 1999).

**Consideration and initiating structure**

After empirical research failed to provide strong support for the relationship between leaders' stable characteristics (e.g. personality traits) and criteria of effective leadership in the 1940s (e.g. Stogdill, 1948), leadership research looked for behavior-related constructs of effective leadership. As a consequence, the leadership styles of consideration and initiating structure emerged from numerous studies conducted at the University of Michigan Institute for Social Research (Likert, 1955, 1961), and the Ohio State University in the 1940s and 1950s (Fleishman, 1973). Put simply, consideration characterizes follower-centered leadership behavior where the leader takes into account his/her followers' needs and abilities. In contrast, initiating structure refers to structuring work tasks for the respective subordinates and setting deadlines (Fleishman, 1953; Seltzer and Numeroff, 1988). A recent meta-analysis (Judge et al., 2004) that went beyond limitations of earlier research (e.g. Stogdill, 1948) revealed that both consideration and initiating structure are positively and strongly related to subjective indicators of performance. More specifically, consideration is more associated with followers' levels of job satisfaction and motivation, while initiating structure is more related to various criteria of performance. Interestingly, this meta-analysis also found that in some cases the corrected correlations between consideration and initiating structure were as high as $\rho = 0.46$. Apparently, this strong empirical convergence is not in line with the theoretical distinctiveness of the two constructs.
Several scholars noted a close similarity between consideration and individualized consideration, a facet of transformational leadership (House and Aditya, 1997; Yukl, 2002). Both leadership styles are highly follower-oriented, active leadership behaviors. In line with this idea, several empirical studies revealed an overlap between the constructs of consideration and transformational leadership. For example, based on data from US managers, Seltzer and Bass (1990) reported highly positive correlations between subscales of transformational leadership and consideration ($0.47 < r < 0.69$; $p < 0.01$). Also, Geyer and Steyrer (1994) found a positive correlation between transformational leadership and initiating structure. These results were replicated by Keller (2006) in a sample of research and development project team members in the USA. In sum, it has been shown that initiating structure and consideration have some overlap with transformational leadership, although more theoretical and empirical research seems necessary to clarify this issue.

From a theoretical perspective, transactional leadership and initiating structure have some degree of overlap, too. Both leadership styles refer to short-term, work-related behaviors such as goal setting. However, to our knowledge, only one empirical study has as yet explored this issue. Based on a sample of employees of a German energy supply company, Rowold and Kersting (2008) reported a correlation of 0.36 ($p < 0.01$) between transactional leadership and initiating structure. Thus, given this scarcity of empirical research, further exploration regarding this issue seems to be warranted.

**Leader-Member-Exchange (LMX)**

LMX was defined as a positive, mutually trustful relationship between leaders and led (Graen and Uhl-Bien, 1995; Liden and Graen, 1980). This leadership theory was designed in order to address some shortcomings of earlier leadership theories. For example, while prior theories implicitly assumed that leaders exhibit identical behavior toward each of their followers, LMX explicates for the first time that leaders treat each follower differently. More specifically, in each team, leaders distinguish between followers from their in-group and their out-group. Thus, leaders form close relations with followers from their in-group (and exchange more resources), while they have more formal relationship with members from the out-group (and, consequently, exchange less resources).

Several empirical studies found positive relationships between LMX and performance (e.g. Erdogan et al., 2004). Also, a literature review revealed that LMX has positive relationships with several performance indicators on the individual level (e.g. job satisfaction, job performance; cp. Gerstner and Day, 1997). From a theoretical perspective, both transformational leadership and LMX elicit trust in followers. Thus, it might be argued that these two leadership constructs rely at least partially on identical processes (see Graen et al., 2010). In line with this idea, empirical research found strong positive correlations between the constructs of LMX and transformational leadership. Based on a study of various industries in China, Wang et al. (2005) reported a correlation of $r = 0.71$ ($p < 0.01$) between LMX and transformational leadership. Comparable results were obtained by Howell and Hall-Merenda (1999), based on a sample of bank employees ($r = 0.53$; $p < 0.05$). Interestingly, the same study reported a positive relationship between LMX and a facet of transactional leadership, namely, contingent reward ($r = 0.45$; $p < 0.05$). It might be argued from theory that both LMX and transactional leadership rely on a positive, mutually trustful relationship between leader and led (Bass, 1985; Graen, 1995).
However, besides the Howell and Hall-Merenda (1999) study, more empirical research seems necessary before firm conclusions can be drawn. Also, no empirical research yet exists that explores the relationships between LMX, and consideration and initiating structure, respectively.

**Theoretical overlap between leadership theories**

Overall, the convergences of the leadership styles described above indicate meaningful theoretical overlap and imply the existence of underlying dimensions. The review of integrative leadership literature (Graen et al., 2010; House and Aditya, 1997; Yukl, 1999; Yukl, 2002; Antonakis and House, 2002; Sashkin, 2004; Hunt and Conger, 1999) confirms similarities and differences between leadership constructs as well. It seems that there are “core dimensions” which are either explicitly or implicitly part of every leadership theory. These dimensions of theoretical overlap are summarized in Table I and are discussed in turn. It should be noted that these dimensions by no means represent an exhaustive or mutually exclusive list.

Table I illustrates that leadership constructs have more meaningful similarities than differences. This makes sense because each leadership construct was developed for the same purposes, namely accounting for leaders’ behaviors at work and explaining variance in followers’ motivation. This convergence in substance of the leadership constructs has been ignored so far. The present study hypothesizes conceptual overlap between each of the six leadership constructs and describes the convergent and discriminant validities of the respective leadership constructs.

**Limitations of leadership research**

There are a few studies that investigated the construct validity of a leadership style in the form of discriminant and convergent validity. Alban-Metcalfe and Alimo-Metcalfe (2000), Alimo-Metcalfe and Alban-Metcalfe (2001) investigated the construct validity of transformational leadership. The study provided evidence for the convergent and discriminant validity of different aspects of transformational leadership. Rafferty and Griffin (2004) provided initial support for the discriminant validity of the five subdimensions of transformational leadership they identified. Other studies have investigated the construct and discriminant validity of the MLQ. While several large-sample studies found support for adequate factorial validity (e.g. Antonakis et al.,

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<th>Dimensions of leader’s behavior</th>
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**Notes:** TF, transformational leadership; TA, transactional leadership; LF, laissez-faire; C, consideration; IS, initiating structure; LMX, Leader-Member-Exchange; + , theoretically relevant for leadership construct; −, irrelevant to leadership construct.
other empirical studies found varying models of the MLQ-5X factor structure (e.g. Geyer and Steyrer, 1994; Tejeda et al., 2001), questioning the factorial validity of the MLQ-5X. For example, Den Hartog and Van Muijen (1997) tested the factor structure of the MLQ and reported a structure comprising a transformational, a transactional, and a laissez-faire factor, but no separate dimensions of transformational and transactional leadership. Due to theoretical arguments and empirical results, Carless (1998) criticized the weak discriminant validity and the use of the MLQ-5X. These studies have in common, that they focus on only one leadership paradigm, whereas the convergences between different leadership styles and theories remain unclear.

This brief review of prior research reporting information about the convergent and discriminant validity of leadership constructs revealed that in virtually all empirical studies conducted so far, the respective relationships between leadership constructs could be interpreted as convergent. This is both surprising and problematic, because from theory, these constructs were explicitly designed to be independent from each other (Seltzer and Bass, 1990). Despite these convergences in substance, research on discriminant and convergent validity focussed only on one given leadership theory. As demonstrated above, few empirical studies exist that hint at the possibility that these leadership constructs are empirically interrelated. Another limitation of the leadership literature is that for some of the convergences (e.g. relationship between LMX and consideration), no empirical research yet exists. As a consequence, any given leadership construct cannot be compared with all the other constructs in terms of convergent and discriminant validity. This limits our understanding of the nomological network of leadership constructs. Clearly, considerably more empirical research is necessary to complete our knowledge about both the convergent and discriminant validities of leadership constructs as well as the nomological network of leadership.

One possible explanation for the hitherto observed positive interrelationships between leadership constructs is that these constructs were assessed by the same rating source. More specifically, in “the typical leadership study” (Hunter et al., 2007), the various leadership constructs (e.g. transformational and transactional leadership) are assessed from the same source (Avolio et al., 1991). That is, the subordinate assesses these leadership behaviors of his/her respective supervisor. Thus, the intercorrelations between leadership constructs may be inflated due to same-source bias. The present study aimed at addressing this gap. Consequently, the leadership constructs were assessed by multiple rating perspectives in order to exclude same-source bias as a potential explanation for the problematic convergent validities of the leadership constructs.

The MTMM approach
Since the late 1950s, MTMM has been applied to test construct validity. Especially, the convergent and discriminant validity of constructs have been explored (Campbell and Fiske, 1959). The term trait is often used as a synonym for construct in the MTMM literature. In MTMM research, several constructs are assessed by several methods. Consequently, the interrelationships between the study’s constructs are utilized to analyze convergent and discriminant validity. For example, regardless of the method applied, the study variables that represent one specific construct should be highly convergent. In contrast, different constructs should not be intercorrelated, regardless of the method, thus yielding support for discriminant validity. The advantage of MTMM
research is that due to the integration of different assessment methodologies, accurate estimations of convergent and discriminant validities can be obtained. MTMM analyses improve research because a more thorough understanding of the psychometric effects of one respective construct is given. Also, since several constructs are included in one MTMM analyses, the interrelationships between constructs can be estimated with methodological rigor.

Since MTMM analyses have these advantages, MTMM has been applied to support the construct validity of constructs from various fields such as personality (Biesanz and West, 2004) and job performance (Conway, 1996). Surprisingly, MTMM has been applied very rarely to the field of leadership. An example is the study of Rowold and Heinitz (2007) conducting a correlation-based MTMM. They found transformational leadership to be convergent to charismatic leadership, as assessed with the Conger and Kanungo Scales (Conger and Kanungo, 1998). They also reported an unexpected convergence between transactional and charismatic leadership. However, several limitations of this study should be noted. First, Rowold and Heinitz’ (2007) analyses relied on single-source (i.e. subordinate’s perspective) data. They proposed that two subordinates with one common supervisor could be viewed as two independent methods. However, it is well known from leadership research that subordinates working in one team are heavily interdependent (Graen, 1995). Also, relying on one single method for MTMM analyses seems to represent an oversimplification (Podsakoff et al., 2003). Third, the MTMM relied on analyses of zero-order correlations. Several limitations of this approach have been discussed in the methodological literature (Marsh, 1993; Marsh et al., 1992). The criteria are based on the premises that no correlations between trait and method factors exist, all traits are equally influenced by method factors and the method factors are uncorrelated (Schmitt and Stults, 1986). Additionally, no precise standards are provided for determining how well the criteria are met (Bagozzi et al., 1991).

An advancement in the MTMM approach that addresses the problems described above, has been the application of SEM to MTMM. The use of SEM provides a more powerful method for addressing construct validity than the approaches used before. Confirmatory factor analysis (CFA) using SEM makes fewer assumptions and provides more diagnostic information about reliability and validity than the approach of Campbell and Fiske (1959). In contrast to the classical procedure, the CFA model allows methods to affect measures of traits to different degrees and to correlate freely among themselves. SEM provides advantages like: measures of the overall degree of fit are provided, useful information is supplied on whether and how well convergent and discriminant validity are achieved (i.e. through $\chi^2$ difference tests, the size of factor loadings for traits, and the estimates for trait correlations). Using the CFA approach, it is possible to partition the variance into trait, method, and error components (i.e. through squared factor loadings and error variance) (Bagozzi et al., 1991). Thus, given this scarcity of MTMM leadership research as well as its methodological limitations, and given the limitations of leadership research summarized above, additional MTMM research focussing on leadership constructs seems warranted.

**Study goals and hypothesis**

The present study examined the convergent and discriminant validity of the leadership constructs of transformational and transactional leadership, consideration and initiating structure, and LMX. As noted above, one possible explanation for the strong positive intercorrelations of these leadership constructs may be that empirical research
assessed these constructs with the same method. Thus, utilizing the MTMM approach, the present study tested the construct validity of leadership constructs with methodological rigor by including subordinate and self-ratings of the respective leadership construct. For more precise estimates of the interrelationships between leadership constructs, SEM was utilized. For a more thorough understanding of the validity of each of these leadership constructs, the amount of variance due to the construct itself, the methods applied, and error was calculated. It should be noted that for several of the leadership constructs included in the present study, no research existed testing their respective interrelationships with certain other constructs (e.g. LMX and initiating structure). Thus, the present study aimed at providing information that could help to complete our understanding of the nomological network of leadership constructs.

It was expected that in the MTMM analysis, the leadership constructs would exhibit discriminant validity. The reason for this lies in the fact that each of the constructs were explicitly conceptualized as discriminant constructs. For example, Bass (1985) developed his theory of transformational and transactional leadership on the idea that these leadership constructs would be necessary for our current understanding of effective leadership in organizations, beyond the hitherto established constructs of consideration and initiating structure. Also, Bass (1985) proposed the construct of transformational leadership to be independent of transactional leadership. He argued that the frequency of one of these constructs would not depend on the frequency of the respective other construct but on situational (e.g. work-related) demands:

\[ H1. \text{ The constructs of transformational and transactional leadership, consideration, initiating structure, and LMX have discriminant validity.} \]

**Methods**

**Samples and procedures**
The participants of the present study were recruited via a newspaper article published in a major business magazine in Germany. This article included a link to the online survey. Each leader who completed the survey received a standardized report about his/her leadership profile (i.e. strengths and weaknesses). Also, the leader was to invite a subordinate to take part in this survey. This procedure yielded a total sample of \( n = 148 \) pairs of leaders and their respective subordinates. Leaders’ mean age was 44.55 years (SD = 8.62); 77.2 percent were male, 22.8 percent were female. The leaders had a mean job tenure of 10.79 years (SD = 7.59). Altogether, 11.3 percent had a junior high school, 29.0 percent a high school graduation, and 60.0 percent a university diploma. The leader sample consisted of 76.6 percent middle or top managers and 23.4 percent first-level supervisors. The mean age of the subordinates was 37.9 years (SD = 11.90) and the average tenure was 16.59 years (SD = 9.34). As for gender, 49.7 percent of the subordinates were male and 50.3% were female. 41.1.2% had a junior high school, 19.4 percent a high school graduation, and 39.5 percent a university diploma.

**Measures**

*Transactional and transformational leadership.* For the assessment of transactional leadership, four items from a German validated version (Heinitz and Rowold, 2007) of the Transformational Leadership Inventory (TLI; cf. Podsakoff *et al.*, 1990;
Podsakoff et al., 1996) were utilized (sample item: “[…] provides me with positive feedback if I perform well”). The TLI was also implemented to assess transformational leadership (22 items, sample item: “[…] has inspiring plans for the future”). The internal consistency of the transformational leadership subscale was $\alpha = 0.88$ for the self-rating and $\alpha = 0.96$ for subordinate perspective. The transactional leadership scale’s reliability was $\alpha = 0.77$ for self-rating and $\alpha = 0.91$ for assessment by subordinates.

**Consideration and initiating structure.** The leadership style of consideration was assessed with 22 items from a German validated version (Fittkau-Garthe and Fittkau, 1971) of the SBDQ (Fleishman, 1953) (sample item: “[…] shows interest in the individual well-being of his/her subordinates”). Initiating structure was assessed with 12 items from the same questionnaire (sample item: “[…] assigns specific tasks to his/her subordinates”). The Cronbach’s $\alpha$ for the self-assessment of consideration was $\alpha = 0.82$ and for the subordinate’s rating $\alpha = 0.95$. Initiating structure had a reliability of $\alpha = 0.56$ for the self-perspective and $\alpha = 0.84$ for the subordinate perspective.

**LMX.** For the assessment of LMX, a German validated version (Schyns, 2002) of Graen and Uhl-Bien’s (1995) LMX scale was used (seven items, sample item: “I trust my leader enough to defend his/her decisions”). The reliability was $\alpha = 0.68$ for the self and $\alpha = 0.94$ for the subordinate perspective.

With the exception of initiating structure, all reliabilities were within the acceptable range ($0.68 < \alpha < 0.94$). Thus, that the reliability of initiating structure (self-assessment) was slightly below this threshold should be kept in mind when interpreting the results.

**Data analysis**
For the purpose of establishing the measurement model and support adequate factorial validity of the instruments, CFA were utilized. We tested whether the model with five leadership constructs (i.e. target model) fitted the data reasonably well.

Given the high number of indicators for the first-order model, the items were combined into two parcels per leadership construct (Bandalos, 2002; Landis et al., 2000; Little et al., 2002). That is, within one respective leadership construct, the various items for the assessment of this construct formed one of two indicators for this scale. The separation of each total score into two parcels for each leadership style resulted in 10 measures. The loadings of the two parcels of the respective leadership style were constrained to be equal (i.e. $\tau$ equivalence); this procedure yielded an over-identified model with 150 degrees of freedom. Figure 1 provides an overview of the principles that were part of the statistical procedures described above. For the sake of comprehensibility, only three leadership styles (i.e. transformational, transactional, and laissez-faire leadership) were included in Figure 1. It should be noted that in the actual analyses, all five leadership constructs were included simultaneously.

To assess the condition of multivariate normality of the data, an omnibus test based on Small’s statistics (see Looney, 1995) was performed. The results showed a significant violation of the multivariate normality ($\chi^2 = 211.38$, df = 56, $p < 0.001$). To account for the missing multivariate normality, the parameters of the proposed model are estimated using the unweighted least squares (ULS) discrepancy function (Byrne, 2001). ULS was applied because it is robust for use with data not normally distributed, with relatively small sample sizes (Ximénez, 2006). Finally, bootstrapping (see Hancock and Nevitt, 2001) was used to generate $\chi^2$ and parameter estimates, standard errors of parameter estimates, and significance tests for individual parameters.
To assess the model fit, several fit indices were computed (see Kline, 2005). First the $\chi^2$ values were calculated. Next, the goodness-of-fit (GFI) and the adjusted GFI (AGFI) were utilized to test model fit. Among others, Hu and Bentler (1999) postulate a value of 0.90 as minimum for appropriate fit (see Byrne, 2001; Hair et al., 1998; Hu and Bentler, 1995). The standardized root mean square residual (SRMR) was calculated as well. Values below 0.08 indicate good fit (Hu and Bentler, 1999).

For the purpose of comparing rivaling models, two criteria were utilized. As a first step, the $\Delta \chi^2$-difference test was applied. The $\Delta \chi^2$ was calculated by subtracting the respective model $\chi^2$ from that of the five-factor model; likewise, $\Delta df$ was calculated by subtracting model df from that of the five-factor model (Kline, 2005). However, the $\chi^2$-difference test has been criticized because it might be biased by sample size. Thus, as a second step, the $\Delta$GFI, $\Delta$AGFI, and the $\Delta$SRMR were computed. As described by Cheung and Rensvold (2002), these indices of differences should exceed values of 0.01 before differences between the respective competing models can be established.

**Results**

*Factorial invariance*

Before conducting the MTMM analysis, evidence for factorial validity of the measurement model and for factorial invariance has to be established. The two measurement models, one for the self-rating perspective and one for the subordinate perspective, were tested separately. As described above, two parcels were modeled as indicators for one respective leadership construct, with $\tau$ equivalent loadings. Table II reveals that both the self and the subordinate perspective model showed a close fit to the data.

Next, factorial invariance was tested. Factorial invariance can assume different forms (Steenkamp and Baumgartner, 1998; Vandenberg and Lance, 2000). The most basic form is configural invariance. Whether the specified model has the same non-zero and zero factor loadings for the two rating forms is to be tested. Also, all factor loadings should be sufficiently high. Establishing configural invariance would imply that the leadership items measure the same leadership constructs across rating perspectives. Data from the two rating perspectives were combined into one (multi-group) CFA to test the configural invariance.

**Notes:** TF, transformational leadership; TA, transactional leadership; LF, laissez-faire; S, self-rating; F, follower’s rating
As can be seen from Table II, the model fitted the data reasonably well. Also, all factor loadings were positive and strong ($M = 0.76; SD = 0.13; \text{minimum} = 0.40; \text{maximum} = 0.99$).

The next form of factorial invariance is metric invariance, where the factor loadings are required to have the same loadings across rating perspectives. As can be seen from Table II, the AGFI was slightly too low and the SRMR was too high for establishing metric invariance. It should be noted, however, that configural invariance was a sufficient condition for the following MTMM analyses. In sum, these results were interpreted as evidence for adequate configural invariance.

**MTMM analyses**

In MTMM research, several SEM approaches are feasible (Marsh and Bailey, 1991; Marsh *et al.*, 1992). These models have in common that the indicators represent items designed to assess one single trait which is measured with one respective method. For example, one indicator is one parcel of items designed for the assessment of transformational leadership, as observed from the subordinate perspective. These MTMM models differ in the way interrelationships between traits or between method factors are allowed or not. First, a correlated trait correlated methods (CTCM) model exists. The indicators load on their respective trait as well as on their respective method factors. Also, in the CTCM model, the traits are allowed to correlate, as are the method factors. Next, the uncorrelated trait correlated method (UTCM) model is basically the same as the CTCM model, with the exception that the traits are not allowed to correlate. Third, the correlated trait uncorrelated methods (CTUM) model is also very similar to the CTCM model, with the exception that the methods are not allowed to be intercorrelated. Fourth, in the uncorrelated trait uncorrelated method (UTUM) model, neither the traits nor the methods are allowed to intercorrelate.

In applications of these four MTMM models, it has often been observed that these models yield problems with identifications (e.g. under identification), no convergence, or no meaningful results (e.g. correlations $> 1.0$; cf. Marsh *et al.*, 1992). Thus, in order to overcome these problems, a correlated uniqueness (CU) model has been proposed, where instead of method factors, correlations between error terms within one
respective method are allowed. These CUs represent the method factors. As in CTCM, the traits are allowed to correlate in the correlated traits, correlated uniqueness (CTCU) model. Finally, in the uncorrelated traits, correlated uniqueness (UTCU) model, the traits are not allowed to be intercorrelated, while the uniqueness should be intercorrelated within one respective method. It should be noted that in MTMM research, it is well known that each of these six possible models might yield problems with identification, etc. (Eid, 2000; Marsh et al., 1992).

As no prior research had been conducted on the issue of MTMM of leadership styles, each of these six possible MTMM models was tested. The results are summarized at the bottom of Table II. It was found that only three models converged and yielded meaningful results, i.e. the UTCM, the CTUM, and the UTUM. A closer inspection of the absolute fit indices of these three MTMM models revealed that the CTUM showed the best fit to the data. That is, the GFI and AGFI were highest for this model, while the SRMS and the \( \chi^2 \), respectively, were lowest for this model. Especially, the AGFI of the CTUM was 0.02 better than any other model. This meets the criterion for distinguishing fit indices of competing models (Cheung and Rensvold, 2002). Thus, it was concluded that the CTUM model was most appropriate for the present study. Figure 1 depicts main characteristics of this model.

**Factor loadings**
Further analyses of the CTUM model revealed insight into the factor loadings of the trait factors as well as the method factors.

Proportions of trait variance for each leadership construct were computed by squaring factor loadings, and these were averaged to obtain a summary proportion of trait variance for each trait (i.e. leadership style). The last row in Table III revealed that the lowest variance explained was for initiating structure, and the highest for transactional leadership. In sum, all five leadership constructs explained considerable variance in the data.

It should be noted that many of the indicators had high loadings on the two method factors, indicating strong method effects. In fact, as summarized in the last row of Table III, 15 percent of variance in the indicators of self-ratings was explained by the method, while 55 percent of variance in the indicators of subordinate ratings was explained by the method. Apparently, a considerable portion of variance was due to the methods applied in this study.

**Variance components**
In order to further explore the issue of variance, the various variance sources were analyzed. As summarized in Table IV, for each of the indicators, the amount of variance due to trait, method, and error was calculated. The different amounts of variance for each leadership construct were computed by squaring the factor loadings. For example, the trait variance of TF self (parcel 1) was calculated by squaring the respective factor loading of 0.96 (see Table III), resulting in a value of 0.91.

Table IV reveals that on average, the traits accounted for 36 percent of the variance in the data. Also, a similar amount of variance in the data was explained by the two method factors (i.e. 37 percent). Interestingly, only 10 percent of the variance in the data was due to error. In combination, these analyses regarding factor loadings, sources of variance, and components of variance revealed that on average, both the leadership constructs and the methods applied accounted for approximately equal amounts of variance in the data. Thus, while the convergent validity of the five leadership constructs
<table>
<thead>
<tr>
<th></th>
<th>TF</th>
<th>TA</th>
<th>C</th>
<th>IS</th>
<th>LMX</th>
<th>Self-rating</th>
<th>Subordinate-rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>TF self</td>
<td>0.96* (0.78*)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.16 (0.37)</td>
<td>0.89* (0.89*)</td>
</tr>
<tr>
<td>TF subordinate</td>
<td>0.21 (0.17)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TA self</td>
<td></td>
<td>0.84* (0.86*)</td>
<td></td>
<td></td>
<td></td>
<td>0.09 (0.10)</td>
<td></td>
</tr>
<tr>
<td>TA subordinate</td>
<td></td>
<td>0.90* (0.88*)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-0.03 (-0.03)</td>
</tr>
<tr>
<td>C self</td>
<td></td>
<td></td>
<td>-0.77* (-0.89*)</td>
<td></td>
<td></td>
<td>0.05 (0.31)</td>
<td></td>
</tr>
<tr>
<td>C subordinate</td>
<td></td>
<td></td>
<td>-0.19 (-0.21)</td>
<td></td>
<td></td>
<td></td>
<td>0.84* (0.91*)</td>
</tr>
<tr>
<td>IS self</td>
<td></td>
<td></td>
<td></td>
<td>0.39 (0.43)</td>
<td></td>
<td>-0.06 (0.89*)</td>
<td></td>
</tr>
<tr>
<td>IS subordinate</td>
<td></td>
<td></td>
<td></td>
<td>0.23 (0.16)</td>
<td></td>
<td></td>
<td>0.89* (0.16)</td>
</tr>
<tr>
<td>LMX self</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-0.64 (-0.51)</td>
<td>0.51 (0.40)</td>
<td></td>
</tr>
<tr>
<td>LMX subordinate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-0.19 (-0.18)</td>
<td>0.91* (0.86*)</td>
<td></td>
</tr>
<tr>
<td>Variance explained</td>
<td>0.40</td>
<td>0.76</td>
<td>0.37</td>
<td>0.10</td>
<td>0.25</td>
<td>0.15</td>
<td>0.55</td>
</tr>
</tbody>
</table>

Notes: Values indicate the standardized factor loadings for parcel 1 of the respective trait, values in brackets for parcel 2. TF, transformational leadership; TA, transactional leadership; C, consideration; IS, initiating structure; LMX, Leader-Member-Exchange. *p < 0.05
constructs could be supported by the data, also considerable method effects existed due to self and subordinate ratings.

**Discriminant validity**

In order to explore the interrelationships of the five leadership styles (i.e. hypothesized discriminant validity), the correlations between the latent second-order constructs (i.e. leadership constructs) could be utilized (see Table V).

Overall, the leadership styles were highly interrelated (mean $|r| = 0.51$). Thus, $H1$, i.e. that the leadership constructs would be discriminant, had to be rejected. Although the correlations did not reach levels of statistical significance, their absolute values could be interpreted as large effect sizes (Cohen *et al.*, 2002).

**Discussion**

Utilizing advanced SEM-based MTMM methodology, the present study was the first empirical work to explore the convergent and discriminant validity of five leadership constructs. The results of the MTMM analyses can be discussed from a methodological perspective: It was found that approximately equal amounts of variance in the leadership data were due to the methods applied (i.e. self and subordinate ratings) and to the constructs (i.e. five leadership constructs). For the first time, due to the methodological rigor of the MTMM analyses applied, the relative contribution of

<table>
<thead>
<tr>
<th>Measures</th>
<th>Trait</th>
<th>Method</th>
<th>Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>TF self</td>
<td>0.91 (0.61)</td>
<td>0.03 (0.13)</td>
<td>0.01 (0.06)</td>
</tr>
<tr>
<td>TA self</td>
<td>0.71 (0.73)</td>
<td>0.01 (0.01)</td>
<td>0.14 (0.12)</td>
</tr>
<tr>
<td>C self</td>
<td>0.62 (0.78)</td>
<td>0.00 (0.09)</td>
<td>0.07 (0.02)</td>
</tr>
<tr>
<td>IS self</td>
<td>0.15 (0.18)</td>
<td>0.00 (0.80)</td>
<td>0.15 (0.00)</td>
</tr>
<tr>
<td>LMX self</td>
<td>0.41 (0.26)</td>
<td>0.26 (0.16)</td>
<td>0.05 (0.13)</td>
</tr>
<tr>
<td>TF subordinate</td>
<td>0.04 (0.03)</td>
<td>0.79 (0.79)</td>
<td>0.09 (0.14)</td>
</tr>
<tr>
<td>TA subordinate</td>
<td>0.82 (0.77)</td>
<td>0.00 (0.00)</td>
<td>0.09 (0.11)</td>
</tr>
<tr>
<td>C subordinate</td>
<td>0.03 (0.04)</td>
<td>0.71 (0.83)</td>
<td>0.19 (0.07)</td>
</tr>
<tr>
<td>IS subordinate</td>
<td>0.05 (0.03)</td>
<td>0.50 (0.79)</td>
<td>0.14 (0.11)</td>
</tr>
<tr>
<td>LMX subordinate</td>
<td>0.03 (0.03)</td>
<td>0.84 (0.74)</td>
<td>0.10 (0.17)</td>
</tr>
<tr>
<td>Mean</td>
<td>0.36</td>
<td>0.37</td>
<td>0.10</td>
</tr>
</tbody>
</table>

**Notes:** Values indicate the standardized factor loadings for parcel 1 of the respective trait, values in brackets for parcel 2. TF, transformational leadership; TA, transactional leadership; C, consideration; IS, initiating structure; LMX, Leader-Member-Exchange

<table>
<thead>
<tr>
<th>Factor</th>
<th>TF</th>
<th>TA</th>
<th>C</th>
<th>IS</th>
<th>LMX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transformational leadership (TF)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transactional leadership (TA)</td>
<td>0.51</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consideration (C)</td>
<td>0.41</td>
<td>0.29</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Initiating structure (IS)</td>
<td>0.86</td>
<td>0.66</td>
<td>0.50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leader-Member-Exchange (LMX)</td>
<td>0.73</td>
<td>0.45</td>
<td>0.37</td>
<td>0.48</td>
<td></td>
</tr>
</tbody>
</table>

**Note:** All correlations were not significant, $p < 0.05$
method and construct variance in leadership research could be estimated. Apparently, a considerable method bias exists for the five leadership constructs of transformational and transactional leadership, consideration and initiating structure, and LMX. It appears that in empirical studies, data for these constructs is as strongly influenced by the method applied as it is influenced by the leadership construct itself.

Stated differently, when studying the phenomenon of leadership, it is as important to ask “Who observes leadership?” as it is to ask “Which kind of leadership is displayed?” This result is in sharp contrast to the vast majority of leadership research that has been conducted so far. Prior research focused heavily on the description and definition of various leadership constructs. A limitation in this line of research was that it had been implicitly assumed that the underlying leadership behaviors of these constructs could be observed regardless of the rating perspective. However, the results of the present study demonstrate that the constructs themselves are heavily biased by the rating perspective. It should be noted that the assessment of leadership constructs was only marginally (i.e. 10 percent on average) biased by error.

In addition to this methodological perspective, the results can be interpreted with regard to the nomological network of leadership constructs. The present study was the first to systematically explore convergent and discriminant validities of five leadership constructs. Thereby, insight into the problem of potential overlap between different leadership theories was made possible. That is, an important limitation of previous leadership literature was that while it could have been assumed implicitly that different theories were to some degree overlapping, this idea has never been addressed explicitly within a systematic research effort. Overall, the discriminant validities hypothesized from theory could not be supported in the present study. All leadership constructs were to some degree convergent, despite the fact that multiple rating perspectives for the assessment of these constructs were applied. In detail, it was found that transformational and transactional leadership correlated positively, \( r = 0.51 \). In comparison to the high corrected correlation of 0.80 reported by Judge and Piccolo (2004), this observed MTMM correlation is relatively low. A possible explanation for this difference in convergence is that in contrast to virtually all prior studies that formed the basis for Judge and Piccolo’s (2004) meta-analysis, the present study relied on multiple-perspective data assessment. Thus (mono-)method effects account for the hitherto observed high intercorrelations between leadership constructs. This explanation seems to hold for the observed correlation between transformational leadership and consideration (\( r = 0.41 \)). This MTMM-based correlation is somewhat lower than correlations reported in prior studies (e.g. Seltzer and Bass, 1990; 0.47 < \( r < 0.69 \); \( p < 0.01 \)). However, several correlations between leadership constructs resulting from this MTMM study were comparable to correlations from prior studies. First, the present study found a correlation of \( r = 0.73 \) between transformational leadership and LMX. This is in line with prior research, which reported correlations of \( r = 0.71 \) (Wang et al., 2005) and \( r = 0.53 \) (Howell and Hall-Merenda, 1999), respectively. Second, while Rowold and Kersting (2008) reported a correlation of 0.36 between transactional leadership and initiating structure, the present study found an even stronger convergence (\( r = 0.66 \)). Third, the convergence (i.e. \( r = 0.45 \)) between transactional leadership and LMX found in the present study is identical to the results reported by Wang et al. (2005, \( r = 0.45 \); \( p < 0.05 \)). In sum, these comparisons reveal that despite the MTMM methodology applied in the present study, the convergences between leadership constructs were as strong as the relationships reported in studies which might be affected by mono-method biases.
### Implications for theory

What implications do these results have for leadership research in general? First, since according to the results of the present study leadership constructs are heavily biased by the respective rating perspective applied, leadership theories should be specified with regard to various rating perspectives. So far, leadership theories have generally relied on the assessment of leadership behavior from the subordinate perspective (e.g. Bass and Avolio, 2000). However, the rating perspectives of the target leader, his/her supervisors, and his/her colleagues have a unique point of view on the leadership process (see Mount et al., 1998). For example, the target leader’s supervisor has access to strategic and visionary planning of the target leader. Also, the target leader has insight into his/her decision making and other cognitive processes relevant to leadership, etc. More complete theories of effective leadership in today’s organizations should explicitly describe which leadership behaviors can be observed from the above mentioned rating perspectives. Also, it should be articulated which leadership processes are responsible for rating-perspective-specific effects of these leadership processes. For example, in transformational leadership, leaders articulate a vision which they then communicate. Which part of this visionary communication can be perceived from the self, the followers, the colleagues, and the leader’s boss’ perspective, and why? As a speculation, only some part of a leader’s vision would be communicated to the leader’s boss, because this part has implications for the overall strategy of the leader’s company. Other parts of the vision would be communicated to other members of the leaders’ network, creating opportunities for unique assessments.

Why are the five leadership constructs highly convergent? One possible explanation for this result might lie in the fact that the leadership theories included in the present study share common elements or are based on underlying dimensions (see Table I). In fact, a close reading of the integrative leadership literature (e.g. House and Aditya, 1997; Rowold and Heinitz, 2007; Yukl, 1999, 2002) which revealed the dimensions that were common to all five leadership constructs, might explain their high convergences.

First, all leadership constructs refer to the leader’s level of activity directed to a larger degree toward their respective subordinates (Bass, 1985; Antonakis et al., 2003). For example, while consideration is a class of behaviors that refers to subordinate-centered well-being and a friendship-like relationship, initiating structure refers to defining tasks and setting deadlines with the subordinate. Although both constructs were hypothesized to be distinct, they share the process of a leader-led interaction. A second reason for the high convergence between leadership constructs is that several constructs are implicitly based on controlling followers. That is, at least the constructs of transactional leadership (Bass, 1985) and initiating structure (Fleishman, 1973) rely on assigning tasks to the subordinate and consequently, controlling whether these tasks are accomplished (cf. Table I).

While an exhaustive theoretical comparison of all leadership constructs was beyond the scope of this paper, these two examples of overlap in content of the respective definitions of the leadership constructs demonstrate that these constructs have some degree of redundancy. Thus, leadership research can be criticized because this redundancy has not been articulated explicitly by the respective authors of the leadership theories. Neither does a critical comparison of leadership theories exist. Both issues have been articulated by leadership scholars (e.g. Judge et al., 2004; Yukl, 2002). Consequently, future theoretical work should analyze the conceptual overlap, in order to sort out the underlying mechanisms and ultimately, to provide a condensed set of classes of leadership behaviors (see Rowold and Heinitz, 2007). According to the
results of the present study, it might be expected that less than five leadership constructs would be sufficient to explain leadership behavior. However, this proposition remains to be tested by empirical data.

**Implications for practice**
Practitioners are often confronted with several possible instruments for the assessment of leadership constructs. One implication of the present study for practice is that from a construct validity perspective, transformational and transactional leadership, consideration, initiating structure, and LMX are similar. Thus, practitioners should base their decision about assessment tools for leadership constructs on the respective criterion validity. While both transformational leadership as well as consideration/ initiating structure have similar levels of strong criterion validity, economic criteria such as number of items per survey can be utilized to select an instrument for the assessment of effective leadership. More specifically, in comparison to the MLQ-5X, Podsakoff’s TLI is freely available, has fewer items, and includes more transformational leadership facets.

Also, with regard to rating perspective, the results of the present study have implications for practitioners. It was argued above that in the domain of leadership, the rating perspective applied is as important as the leadership construct assessed. Thus, practitioners should include several rating perspectives in their leadership programs and balance the pros and cons of each of these perspectives (i.e. 360° feedback). For example, it is well known that within self-ratings of leadership, leaders tend to present an overly positive picture of their own behaviors. By definition, followers are the recipients of leadership behavior and are supposed to act on this behavior (e.g. enhanced levels of followers’ motivation). Moreover, the target leader’s supervisors might be able to see behaviors that other raters probably would not (e.g. engaging in strategic planning). A careful evaluation of these pros and cons of each rating perspective is recommended before specific assessment strategies are chosen. However, as a minimum, both self-ratings and follower ratings should be included in instruments for leader’s development.

**Limitations and directions for future research**
As with every study, the present study has some limitations. Although the present study represents the first MTMM effort on leadership with two rating perspectives, future research should capitalize on the MTMM approach by including additional rating perspectives. While it was important to include self and subordinate ratings as the two most commonly implemented perspectives in the field of leadership, additional rating perspectives could be valuable for our understanding of method effects in leadership research. Also, from 360° feedback research the rating perspectives of self (e.g. target leader), leader’s supervisor, colleague, external stakeholders (e.g. customers), and subordinate have been suggested as being useful to obtain information about the target leader’s behavior. Next, it is a well-researched fact that personality constructs influence dimensions of leadership (Bono and Judge, 2004; Judge et al., 2002). Thus, future research should include personality traits of leaders such as extroversion in order to allow for a more thorough understanding of the leadership process.

Second, although the present study included five leadership constructs, it would be interesting to include additional constructs. As these five leadership constructs yielded convergences, it might be important to choose more discriminant leadership constructs
such as abusive supervision (Tepper et al., 2007), authentic leadership (Walumbwa et al., 2008), and factors of substitutes for leadership theory (Dionne et al., 2002). Only by including discriminant constructs, will future research be able to yield a more complete and balanced nomological network of leadership constructs. Another suggestion for future research may be the examination of the convergence of constructs derived from leadership behavior, such as the leadership behavior of an innovation champion or the behavior of a change champion (Howell et al., 2005; Howell and Boies, 2004). Champion innovation behavior is proposed to stem from leadership behavior, thus it is possible to examine whether the classic leadership styles investigated are related to champion behavior or not.

Third, other aspects of validity should be taken into account as well. For example, the results from meta-analyses provide insight into the respective criterion validity of leadership constructs (Judge et al., 2004; Judge and Piccolo, 2004). Especially for practitioners, criterion-oriented validity is one of the most important aspects of validity. From a theoretical perspective, it would be interesting to know the relative criterion validity of leadership constructs. That is, while prior meta-analytic research found criterion validities for sets of two or three leadership styles, it would be important to explore the relative criterion-oriented validity of more (e.g. five) leadership constructs.

The recommendation to use the rating perspectives of self (e.g. target leader), leader's supervisor, colleague, external stakeholders (e.g. customers) must be evaluated in practice, especially in terms of a time and financial point of view. Cost-utility analysis can help to investigate the feasibility of this approach and make the cost-usability balance clear to decision makers. The present study relied on a self-assessment form of initiating structure that was below common standards for internal consistency. As prior studies utilizing this survey reported satisfactory levels of reliability, it is speculated that it was the sample characteristics of the present study that yielded the unsatisfactory internal consistency estimate. Nevertheless, future studies should address this issue by including more reliable instruments for the assessment of initiating structure from the self-perspective.

Also, the question remains whether culture might moderate the relationships between leadership constructs. It should be noted that there is now empirical evidence that as regards leadership and culture, results from Germany can be compared to those obtained in the USA (i.e. both belong to the “western” culture, e.g. high individualism; cp. Atwater et al., 2005; Brodbeck et al., 2002; Kuchinke, 1999; Rowold and Kersting, 2008). Nevertheless, it would be interesting to explore the nomological network of leadership constructs in other cultures such as China, Taiwan, and India (Walumbwa and Lawler, 2003).

References


**Further reading**


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