Transactional and Transformational Leadership in Nursing: Structural Validity and Substantive Relationships

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Summary: Confirmatory factor analysis in a large sample of nurses ($N = 1059$) working in Belgium was conducted to examine the dimensionality and nomological validity of Bass's (1985) transactional and transformational leadership model. Three transactional factors (Passive and Active management-by-exception, and Contingent reward) and three transformational factors (Charisma, Intellectual stimulation, and Individualized consideration) from the Multifactor Leadership Questionnaire (Form 5X-rater) were examined. Results showed that the six-factor solution displayed the best absolute fit indices. However, because of high interscale correlations and lack of differential relationships with criterion variables, transformational facets and Contingent reward could reasonably be combined to form a single factor, Active leadership. Complementary analyses conducted to detect potential higher-order factors in the MLQ model revealed that Active leadership is best viewed as a second-order factor subsuming transformational and Contingent reward leadership.

The transactional/transformational leadership model has received growing attention among researchers over the past decade. Building on Burns (1978), Bass (1985) defined transactional leaders as individuals who identify the needs of their followers and transact with them based on objectives to be met. That is, they exchange valued rewards against standard performance. In contrast, transformational leaders are seen as motivating their followers by transcending their self-interests, elevating their needs, and making them aware of the mission of the larger entity to which they belong (Bass, 1995). Transformational leadership goes beyond simple leader–followers transactions by envisioning a future, fostering identification, and developing and intellectually stimulating employees. As a result, it is expected to augment transactional leadership in achieving heightened levels of effectiveness (Waldman, Bass, & Yammarino, 1990).

Bass (1985) developed the Multifactor Leadership Questionnaire (MLQ) to empirically address the validity of his model. Although different versions of the MLQ are now available (for details, see Bass, 1995; Bycio, Hackett, & Allen, 1995), some core dimensions of transactional and transformational leadership are common to all versions. Transformational leadership features three dimensions:

a) *Charisma*, defined as the extent of faith and credibility generated by the leader,

b) *Individualized consideration*, conceived of as the individual support and attention provided to followers in the pursuit of challenging goals,

c) *Intellectual stimulation*, viewed as the degree to which the leader favors new ways of doing and thinking.

Transactional dimensions comprise

a) *Contingent reward*, indicating that followers are rewarded in return for the accomplishment of relevant objectives,

b) *Management-by-exception*, whereby the leader leaves his/her subordinates to do their job as long as performance goals are reached.

After Bass's (1985) initial work, Hater and Bass (1988) split management-by-exception into two factors: an *active* form, reflecting a propensity to react to subordinates' behavior by picking up mistakes; and a *passive* mode, referring to leaders who await that the situation goes wrong before engaging in corrective action.

Factorial Structure of the MLQ

One primary purpose of this study was to assess the factorial structure of the MLQ in a French-speaking environment. That purpose appears warranted because we know very little about the validity of the MLQ model outside English-speaking cultures. This study thus provides a contribution to the assessment of the universality of the MLQ model across cultures (Bass, 1997). Within this perspective, we used the MLQ-5X (Bass & Avolio, 1991), the most recent version of the MLQ instrument. Charisma, Individualized consideration, Intellectual stimulation, Contingent reward, Active management-by-exception (MBEA), and Passive management-by-exception (MBEP) constituted the scales used for measuring leader behaviors. Confirmatory factor analysis (CFA) was employed for testing the relative fit of competing structures of the instrument. This approach was deemed suitable because a strong controversy existed regarding the underlying structure of the MLQ (e. g., Bycio et al., 1995; Carless, 1998; Tepper & Percy, 1994).

Different kinds of measurement problems have been reported regarding the MLQ. These can be summarized as follows. First, although transformational scales and Contingent reward have been found in previous research to be internally consistent (mean $\alpha \geq .82$; see Lowe, Kroeck, & Sivasubramaniam, 1996), weaker reliabilities have been reported for Management-by-exception scales, especially for MBEP (αs in the range .58–.70 in Bass, Avolio, & Atwater, 1996; Bass & Yammarino, 1991; Den Hartog, Van Muijen, & Koopman, 1997; Koh, Steers, & Terborg, 1995). Second, in both exploratory (Den Hartog et al., 1997) and confirmatory (Tepper & Percy, 1994) analyses, Management-by-exception scales have been found to be a source of problems in factor solutions.

Third, most studies have reported high intercorrelations among transformational facets. In a recent meta-analysis of the MLQ literature, Lowe et al. (1996) reported uncorrected intercorrelations among transformational scales ranging from .68 to .85. Moreover, Contingent

reward usually correlated strongly with transformational facets (from .63 to .70; see Lowe et al., 1996). In a related vein, Bycio et al. (1995) showed that a model whereby Contingent reward and transformational items were allowed to load on one general factor was as tenable as the original MLQ model. Fourth, past research has shown that transformational facets and Contingent reward displayed similar patterns of correlations with various criteria (Bycio et al., 1995; Lowe et al., 1996), raising doubts about the discriminant validity of these scales.

In this study, we examined the factorial structure of the MLQ using a large sample of hospital nurses ($N = 1059$) working in Belgium. This allowed us to test whether the transactional-transformational leadership paradigm is valid outside the boundaries of nonprofessional organizations and English-speaking countries (cf. Bass, 1997). Based on current theoretical and empirical work, we assessed rival MLQ models that could be compared using a nested sequence approach (Bentler & Bonett, 1980). The comparison process began with a one-factor model. This is the most parsimonious view of Bass's theory. Next, we tested three alternative two-factor models. First, we proposed a model incorporating the higher-order transactional versus transformational distinction. This is consistent with the common practice of averaging the transformational scales to create a single score (Yammarino & Dubinsky, 1994; Yammarino, Dubinsky, Comer, & Jolson, 1997) and with the basic argument that transactional leaders exert their influence on subordinates through transactions, whatever they are. Second, we evaluated two two-factor models based on the passive versus active leadership distinction. Both theoretical positions (Burns, 1978) and empirical research (e. g., Bycio et al., 1995) support this distinction. The two active-passive leadership models were:

a) one in which transformational facets and Contingent reward defined Active leadership, and Management-by-exception scales defined Passive leadership,

b) one in which MBEP alone represented the first factor and the remaining scales defined the second one.

Third, we created a model where MBEP and MBEA constituted two separate factors, and transformational facets and Contingent reward represented a third factor. Although this representation hasn't been tested yet in the literature, the weak correlations traditionally reported between MBEA and MBEP (e. g., Howell & Avolio, 1993; Koh et al., 1995) support their being treated as separate factors, aside from transformational scales and Contingent reward. Finally, a six-factor model in which all transactional and transformational facets were treated as separate factors was evaluated. This model fits the first-order factor analytic results presented by Bass (1985) and the partial least squares results displayed by

Howell and Avolio (1993). Moreover, it is in line with Bass's (1995) contention that, besides the patterns of intercorrelations among the scales, each transactional and transformational facet refers to some specific category of behaviors.

Finally, we tested the possibility that one or more second-order factors subsumed the first-order factors in the MLQ model. Some evidence supports such a possibility. For example, Bass (1985, p. 215) reported results from a higher-order factor analysis of MLQ data that represented an active-passive distinction: Management-by-exception formed one (passive) factor, and Contingent reward and transformational scales formed another (active) factor. Similarly, based on a large-scale data set, Avolio, Bass, and Jung (1999) found support for a three correlated second-order factors model underlying the MLQ-5X scales (Charisma/Inspiration and Intellectual stimulation vs. Individualized consideration and Contingent reward vs. Management-by-exception and Laissez-faire). In this study, we tested potential higher-order factor models on an exploratory basis, using the best first-order factor model as baseline for comparison (cf. Marsh & Hocevar, 1985, for details).

Relationships to Outcome Variables

Another purpose of this study was to examine the relationships of transactional and transformational factors to a set of outcomes. These outcomes included attitudinal variables, quitting intentions, perceived unit effectiveness, and altruism. This study provides a contribution to the literature in that it examines these relationships within a specific occupational group (nursing) that has been somewhat neglected in past research on transformational leadership.

Attitudinal Variables

Two leader-focused criteria, namely subordinates' extra effort and satisfaction with the leader, were examined. Add-on effects of transformational leadership to transactional behaviors in predicting these variables have been reported in several studies (Bass, 1985; Bass & Avolio, 1989; Bycio et al., 1995; Koh et al., 1995; Yammarino & Bass, 1990). In particular, past research (e. g., Bycio et al., 1995) suggests that both transformational facets and Contingent reward should be positively related to these variables.

In a related vein, some evidence exists that both satis-

faction (Medley & LaRochelle, 1995; Morrison, Jones, & Fuller, 1997; Podsakoff, MacKenzie, & Bommer, 1996; Podsakoff, MacKenzie, Moorman, & Fetter, 1990; Singer, 1985) and commitment (Barling, Weber, & Kelloway, 1996; Basu & Green, 1997; Bycio et al., 1995; Podsakoff et al., 1996; Yammarino et al., 1997) are positively linked to transformational leadership. Transformational leaders are expected to elevate subordinates' needs on Maslow's hierarchy from basic needs to self-actualization (Bass, 1985). It logically follows that such a process should result in more satisfaction at work. Similarly, because they generate awareness among followers of the objectives of the larger organization, transformational leaders are likely to foster employee commitment to it. However, in keeping with previous research (Bycio et al., 1995; Morrison et al., 1997; Singer, 1985; Yammarino et al., 1997), we hypothesized that both transformational facets and Contingent reward would be positively related to job satisfaction and commitment.

Quitting Intentions

Intentions to quit have been seldom investigated as correlates of transformational leader behaviors. Nevertheless, there seems to be linkages between leadership processes and intent to leave. For example, because transformational leaders get subordinates to do more than they initially expected to do, they motivate them to perform above expectations (Bass, 1985) and thus to enjoy their work and unit. This could result in lower intentions to quit the unit. Similarly, transformational leadership could influence intent to leave the organization as well. This might be a consequence of transformational leaders transmitting the value and sense of the organization's mission to followers. Awareness of that mission among subordinates is thought to lower the desire to quit the organization.

From the preceding discussion it follows that transformational leadership should be negatively associated with intentions to quit the unit and the organization, and is expected to augment transactional leadership in predicting a negative relationship with these variables (Bycio et al., 1995). Similarly, to the extent that Contingent reward provides transactional rewards, it may lead to high-quality exchanges between leaders and followers (Basu & Green, 1997), and as such should also relate negatively to intent to leave the unit and the organization (Bycio et al., 1995).

Perceived Unit Effectiveness

There is now substantial evidence that transformational leadership positively affects unit performance in a vari-

ety of organizations (Hater & Bass, 1988; Howell & Avolio, 1993; Keller, 1992; Lowe et al., 1996). In fact, to the extent that transformational leaders stimulate their followers to consider old problems from new perspectives, encourage them to realize the best of themselves, show the value of the unit's and organization's mission, and are attractive role models, they are able to influence various aspects of effectiveness (Howell & Avolio, 1993). However, unit effectiveness has yet to be examined as an outcome of transactional-transformational leadership processes in nursing departments. In this study, we addressed two aspects of effectiveness that are relevant to health-care organizations: goal attainment and staff retention. We measured these aspects using a self-report measure specifically developed for health care services (see Method section). Goal attainment refers to the degree to which the unit achieves its mission in terms of patient care. Staff retention deals with the attraction and retention of high-performing nurses and physicians in the unit. We expect transformational leadership to be positively associated with both of these criteria and to augment transactional leadership because of its superior motivating influence on followers.

Altruism

Because our survey population was a helping profession, we also investigated the links between leader behaviors and altruism. Three forms of altruism were examined: work-related altruism (e. g., helping coworkers with a heavy workload), altruism related to nonwork domains (e. g., helping coworkers with personal problems), and altruism directed toward patients (e. g., helping patients who are in need of some specific care). It is argued that these forms of altruism reflect most jobs in nursing care (Kramer, 1981). As previous research has shown (Podsakoff et al., 1996; Podsakoff et al., 1990), transformational leadership might be positively related to altruism, an important category of organizational citizenship behavior (Organ, 1988). The reason for that stems from the fact that transformational leaders get subordinates to do more than is expected and formally required of them (Podsakoff et al., 1996).

Method

Participants and Procedure

The study was conducted in 17 Belgian hospitals, representing a large variety of hospital characteristics. After obtaining the agreement of the nursing director, we sent a survey questionnaire to all nurses working for these hospitals. A cover letter accompanying the survey explained the purpose of the study and asked nurses to respond to the MLQ by describing the typical behavior of their superior (the nurse to whom they report). Questionnaires were returned via the internal mail system of each hospital and then sent back to the researchers' office. At the end of the study, a research report including the aggregate results was transmitted to the nursing directors. A total of 2617 questionnaires were delivered, of which 1230 were returned, for an overall response rate of 47%. Response rates across hospitals varied from a low of 37% to a high of 71%.

There were 1059 usable questionnaires. For a subset of 824 respondents, the referent leader for each questionnaire was identifiable. These responses referred to 131 leaders, for an average respondents/leader ratio of 6.29. With regard to dependent variables data, different Ns are reported (see Results section) because in some hospitals the assessment was limited to the MLQ in association with some selected outcomes. This was because some nursing directors expressed the wish to limit the time spent on completing the questionnaires and to limit their interest to only some dependent variables. Specifically, Ns for correlational data varied from 689 to 1059. Of the respondents, 84% were staff nurses, 16% were head nurses, 88% were females, and 64% were employed full time. Average age of respondents was 34.15 years ($SD = 7.65$), and average hospital tenure was 9.48 years ($SD = 7.30$).

Measures

Leadership

Transactional and transformational leadership was measured via 6 scales of the MLQ5X-rater (Bass & Avolio, 1991). For purpose of the study, the MLQ items were first translated and back-translated independently by two French-English bilinguals. Discrepancies among versions were observed for less than 10% of the items (randomly dispersed across the scales), which were solved after some discussion among the translators. The appropriateness of the final version of the MLQ was further verified by 15 nurses, who were asked to identify items with unclear content. This check revealed no additional problems regarding item readability.

Transactional scales comprised Contingent reward (9 items), MBEA (7 items), and MBEP (7 items). Transformational scales included Attributed Charisma (8 items), Intellectual stimulation (10 items), and Individualized consideration (9 items). For each statement, respondents were asked to report the frequency with which their lead-

er displayed the behavior described. Anchors of the response scales were as follows: not at all (0), once in a while (1), sometimes (2), fairly often (3), frequently if not always (4).

Outcomes

Extra effort (3 items) was measured using the same rating scale as for the leadership statements. Satisfaction with the leader (2 items) was assessed using a scale anchored as follows: very dissatisfied (0), somewhat dissatisfied (1), neither satisfied nor dissatisfied (2), fairly satisfied (3), very satisfied (4). Extra effort and satisfaction with the leader items were embedded in the MLQ. Overall job satisfaction was measured with one item from Shortell and Rousseau (1989): "Overall, how satisfied are you in your job?" Respondents reported their level of agreement with the statement using a 5-point scale ranging from 1 (very dissatisfied) to 5 (very satisfied). Two aspects of perceived unit effectiveness (Shortell & Rousseau, 1989; Shortell, Rousseau, Gillies, Devers, & Simons, 1991) were addressed: goal attainment (e. g., "Our unit almost always meets its patient care treatment goals"; 6 items), and staff retention (e. g., "We do a good job of retaining nurses in the unit"; 4 items). Given that the perceived effectiveness items were initially developed for intensive care, some of them were slightly modified for suitability for all care units.

Intentions to leave the unit (3 items) and the organization (3 items) were captured by items that differed only by the object of withdrawal (e. g., "I think often about quitting my unit"). Affective commitment was assessed using four items from Allen and Meyer (1990) that we slightly modified (e. g., "I feel emotionally attached to this institution"). Finally, work-related altruism (e. g., "I help my colleagues who have been absent"), non-work-related altruism (e. g., "I take a personal interest in my colleagues"), and patient-related altruism (e. g., "I put extra effort at assisting distressed patients") were each measured by four items. Effectiveness, intent to leave, commitment, and altruism statements were all rated on a 5-point scale ranging from 1 (strongly disagree) to 5 (strongly agree).

Data Analysis

CFA of Leadership Data

To examine the factor structure of leadership data, we evaluated the fit of alternative MLQ models using CFA by LISREL 8 (Jöreskog & Sörbom, 1993). Specifically, we compared the following representations of the data: (a) a one-factor model; (b) three two-factor solutions: transactional vs. transformational leadership, Manage-

ment-by-exception vs. the remaining scales, and MBEP vs. the remaining scales; (c) a three-factor structure (MBEA, MBEP, and the remaining scales); and (d) the original six-factor representation of the MLQ. A null model where all indicators were constrained to independence was used as a baseline for comparison purposes.

Note that, in line with the recent work of Avolio et al. (1999), we also tested the viability of potential higher-order factor models, using the procedure outlined by Marsh and Hocevar (1985). Specifically, Marsh and Hocevar (1985) suggested that this can be done by computing a "target coefficient" (T) which represents the ratio between the χ^2 value of the "baseline" first-order factor model and the χ^2 value of the proposed higher-order factor model. If the value of T is close to 1.0, this indicates that the higher-order factor model is a more parsimonious explanation of the data than the model including only lower-order factors. In the present case, it seems reasonable to expect a second-order factor to underlie transformational and Contingent reward leadership (Avolio et al., 1999; Bass, 1985).

As noted by Bagozzi and Heatherton (1994), the assessment of models with large degrees of freedom and sample size may produce unsatisfactory fit, partly because of the high levels of random error accrued across items. As there were 50 MLQ items to be analyzed, we decided to reduce this number by creating aggregate indicators for each construct. Specifically, we created three aggregate indicators per construct by averaging across subsets of two to four items (depending on the number of indicators that defined the construct) randomly grouped. The practice of averaging items to create "item composites," which is recommended for treating complex factor models (for examples, see Brooke, Russell, & Price, 1988; Mathieu, 1991; Mathieu & Farr, 1991), improves the measurement properties of the models (for a synthesis, see Landis, Beal, & Tesluk; 2000), without affecting the comparison process of models of theoretical interest.

A covariance matrix calculated among the 18 leadership indicators was used as input for the estimation of theoretical models by maximum likelihood. Model fit was first assessed via a χ^2 test. However, when large sample sizes are used (as was the case here), this index almost invariably produces significant values. Thus, the relative fit of each theoretical model was evaluated by additional indices: (a) the nonnormed fit index (NNFI; Bentler & Bonett, 1980), (b) the comparative fit index (CFI; Bentler, 1990), and (c) the goodness-of-fit index (GFI) and root-mean-square residual (RMSR; Jöreskog & Sörbom, 1986). The relative merit of the proposed models was compared using a nested sequence approach (Bentler & Bonett, 1980), i. e., by determining what in-

cremental fit is gained when progressing from a more restricted to a less restricted model. For any two nested models, this was achieved by computing a χ^2 difference test, and by comparing how the other fit indices differed on practical grounds.

Exploratory Factor Analysis of Outcome Measures

We conducted separate analyses for constructs whose dimensionality was not straightforward. In each case, a principal components analysis (with oblique rotation when more than one factor was extracted) was performed. The analysis of perceived effectiveness items revealed that, as expected, two factors underlay the data: goal attainment (6 items; $\alpha = .81$) and staff retention (4 items; $\alpha = .69$). The analysis of intent to leave items revealed only one factor, no distinction being perceived by respondents between leaving one's unit and quitting one's organization. This may be due to the lack of intra-organizational opportunities for most nurses wishing to quit their unit (Todor & Dalton, 1986). Thus, we composed a single score for these items, labeled intent to leave the organization (6 items; $\alpha = .89$). The analysis of affective commitment data revealed a single factor (4 items; $\alpha = .91$). Finally, as expected, altruism items were found to split into three factors: work-related altruism (4 items; $\alpha = .79$), nonwork-related altruism (4 items; $\alpha = .83$), and patient-related altruism (4 items; $\alpha = .76$).

Relationships with Outcome Variables

Hierarchical regression analysis was used to test the augmentation hypothesis (Bass, 1985; Bycio et al., 1995; Waldman et al., 1990). Transactional scales were entered as a first step, then transformational scales were added to the equation. The significance of the add-on effect of transformational leadership was evaluated by means of an F test. Cohen and Cohen's (1983, p. 56–57) formula

was used for comparing the size of correlations between leadership scales and outcome variables.

Results

CFA

Table 1 reports the results of the LISREL analysis of the proposed leadership models, based on a covariance matrix of 6×3 aggregate variables.

As can be seen, two-factor models all exhibit incremental improvements over the one-factor representation. However, substantial gains in fit are observed mainly when moving from two- to three- and six-factor models. For instance, the three-factor model (MBEP, MBEA, and Active leadership) exhibits significant and practical improvement over the best two-factor solution (MBEP vs. the remaining scales), $\Delta\chi^2 (2) = 691.46, p < .01$ (Δ GFI = .05, Δ NNFI = .06, Δ CFI = .05). This model loses only two degrees of freedom but still improves substantially over two-factor models. Further, a look at the CFI (which is quite independent from sample size; Gerbing & Anderson, 1992), reveals a value in the mid .80's, which is quite reasonable given the parsimony of this representation. Moreover, the RMSR for this model (.065) is reasonably close to the .05 benchmark for good fit to the data. Nonetheless, the six-factor model is the best representation of the data, and outperforms the three-factor model on both statistical and practical grounds, $\Delta\chi^2 (12) = 1,191.13, p < .01$ (Δ GFI = .12, Δ NNFI = .09, Δ CFI = .09). Fit indices for this model all exceed the commonly accepted standard of .90 (Medsker, Williams, & Holahan, 1994) and the RMSR is below .05. So, no doubt that in absolute terms, the six-factor solution is the best one. (The complete factor solutions are available upon request from the first author.) However, the high inter-

Table 1. Confirmatory factor analysis of the MLQ-5X items based on 18 aggregate indicators: Goodness-of-fit statistics.

Model	χ^2	*df*	GFI	NNFI	CFI	RMSR
Null model	13,920.16	153	.20	NA	NA	.46
One-factor	3,353.10	135	.69	.74	.77	.095
Two correlated factors[a]	3,273.08	134	.69	.74	.77	.096
Two correlated factors[b]	3,042.74	134	.72	.76	.79	.10
Two correlated factors[c]	2,895.59	134	.73	.77	.80	.089
Three correlated factors[d]	2,204.19	132	.78	.83	.85	.065
Six correlated factors	1,013.23	120	.90	.92	.94	.041

Note. N = 1,059, based on listwise deletion of missing data. GFI = goodness-of-fit index; NNFI = nonnormed fit index; CFI = comparative fit index; RMSR = root-mean-square residual; NA = not applicable.
[a]Transactional versus transformational leadership
[b]Management-by-exception (active and passive) versus the remaining scales
[c]Passive management-by-exception versus the remaining scales
[d]Passive management-by-exception, active management-by-exception, and the remaining scales

Table 2. Average variance indices and factor intercorrelations for the six-factor model of the MLQ-5X.

Factor	$\rho_{vc}(\eta)$	1	2	3	4	5	6
1. Passive Management-by-exception	.42	–					
2. Active Management-by-exception	.25	–.41	–				
3. Contingent reward	.40	–.48	.45	–			
4. Attributed charisma	.43	–.75	.42	.70	–		
5. Intellectual stimulation	.49	–.73	.50	.76	.84	–	
6. Individualized consideration	.46	–.67	.45	.84	.87	.93	–

Note. N = 1,059. Values for $\rho_{vc}(\eta)$ (Fornell & Larcker, 1981) represent the average variance accounted for by the hypothesized factors in their respective indicators. Intercorrelations are based on the 50-item six-factor solution.

factor correlations found for the six-factor representation (see below), the reasonable fit of the three-factor structure, and the support of empirical (Bycio et al., 1995) and theoretical (Burns, 1978) work for the Active leadership construct, suggest that both the six- and three-factor solutions are of interest. We thus examined these two models more closely.

In order to examine the psychometric properties of the retained three- and six-factor models at the item level, we relied on the 50-item solutions (interscale correlations are shown in Table 2). In the six-factor representation, the average error variance of Contingent reward items was .60, while that of transformational facets ranged from .51 (for Intellectual stimulation) to .57 (for Charisma). Relatedly, within the three-factor solution, error variance averaged .62 for Active leadership. A similar pattern was found for MBEP, in which items displayed an average error variance of .58 for both models. In contrast, MBEA had larger error components since average error variance reached .75 in both factor solutions. This suggests that the MBEA scale has a weak proportion of construct variance despite its having an acceptable α (.70; see Table 3). Table 2 shows the estimated interfactor correlations for the six-factor model. As can be seen, intercorrelations were quite high among transformational facets (.84–.93) and among Contingent reward and transformational factors (.70–.84). Correlations involving Management-by-exception scales were generally moderate, except those relating MBEP to transformational facets, which were high, albeit negative (from –.67 to –.75). MBEP also correlated strongly and negatively with Active leadership (–.72) in the three-factor solution, whereas MBEA was moderately related to Active leadership (.49). In sum, the pattern of correlations involving Contingent reward and transformational facets on the one hand, and MBEA and MBEP on the other hand, did appear to be comparable across factor representations.

The discriminant validity of leadership scales was examined in two ways. First, we tested whether interfactor correlations were significantly less than 1 (see Anderson & Gerbing, 1988). All intercorrelations were indeed significantly less than unity. However, a more stringent test of discriminant validity is provided by Fornell and Larcker's (1981) procedure. In essence, these authors argued that the proportion of variance a construct is able to account for in its indicators should exceed the amount of variance it shares with other constructs. Thus, for any construct, the value of $\rho_{vc}(\eta)$ (cf. Table 2) should be greater than the squared correlations between this construct and the others. As can be deduced from Table 2, each transformational scale had much more in common with other transformational facets than with its own indicators. On average, the common variance among transformational scales was 69% higher than the amount of variance they accounted for in their respective indicators. Similarly, transformational scales shared (on average) 29% more variance with Contingent reward than with their own indicators. Finally, on average, transformational scales also had 12% more in common with MBEP than with their indicators. Interestingly, Contingent reward shared far less variance with MBEP (.23) than with its indicators (.40). However, only MBEA uniformly met Fornell and Larcker's requirement for discriminant validity. With regard to the three-factor model, only MBEP and Active leadership had more variance in common (.52) than with their respective indicators (.42 vs. .38). As a whole, this analysis confirms that the discriminant validity of transformational scales is problematic.

As explained by Avolio et al. (1999), it could be that the strong correlations among transformational and Contingent reward leadership factors are due to some higher-order factor accounting for their covariance. As our data differed somewhat from those of Avolio et al. (1999) (e. g., we do not have a Laissez-faire factor in this study, the latter being viewed by some authors as "nonleadership" [e. g., Yammarino, Spangler, & Bass, 1993]), and given the results of the assessment of first-order factor models, only two higher-order factor models were plausible. First, transformational factors and Contingent reward may be subsumed within a second-order Active leadership factor (hereafter called "Model 1"). Second, it might be that Charisma and Intellectual stimulation related to a Transformational second-order factor where-

Table 3. Means, standard deviations, and intercorrelations for the study variables.

Variable	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Passive management-by-exception	1.40	0.81	83																
2. Active management-by-exception	2.16	0.65	−12	70															
3. Contingent reward	1.61	0.77	−39	34	86														
4. Attributed charisma	2.45	0.78	−66	24	59	86													
5. Intellectual stimulation	2.26	0.78	−65	33	64	73	91												
6. Individualized consideration	2.28	0.83	−61	28	70	78	81	88											
7. Active leadership	2.15	0.70	−66	34	83	88	90	93	96										
8. Extra effort	1.98	1.03	−55	30	66	72	76	82	84	88									
9. Satisfaction with the leader	2.69	1.14	−73	30	52	77	71	70	77	69	88								
10. Job satisfaction	4.18	0.78	−27	08	20	31	27	30	31	26	35	−							
11. Goal attainment	3.89	0.63	−33	24	29	32	33	34	36	31	45	45	81						
12. Staff retention	3.44	0.77	−22	16	25	26	27	26	30	24	30	30	54	69					
13. Intent to leave the organization	1.33	0.68	28	−04	−24	−32	−33	−32	−35	−28	−31	−30	−32	−28	89				
14. Affective commitment	2.85	1.08	−05	11	18	16	18	18	20	15	11	16	27	27	−22	91			
15. Work-related altruism	4.38	0.55	−06	18	13	15	14	16	16	13	14	26	36	30	−12	27	79		
16. Nonwork-related altruism	3.92	0.75	02	18	15	08	08	13	13	09	07	16	31	23	−09	26	53	83	
17. Patient-related altruism	4.25	0.54	−02	16	05	07	07	06	07	05	05	25	29	27	−10	23	52	36	76

Note. Ns range from 689 to 1059. Values on the diagonal are internal consistency estimates (Cronbach αs); as job satisfaction was measured with a single item, no reliability estimate is provided for that variable. For reliability estimates and correlations, decimals have been omitted.

as Individualized Consideration and Contingent reward referred to a Developmental/Transactional second-order factor (see Avolio et al., 1999; hereafter called "Model 2"). On the other hand, it was very unlikely that MBEA and MBEP could define a common Avoidant or Passive second-order factor since these factors correlated negatively in this study ($r = -.41$; cf. Table 2).* Our test for higher-order factors was thus restricted to transformational and Contingent reward leadership.

We used a 4×3 indicators covariance matrix (excluding MBEA and MBEP indicators) as input to assess these models. The fit of the baseline model comprising only first-order factors was high, $\chi^2 (48) = 503.66$, $p < .01$ (GFI = .93, NNFI = .94, CFI = .96). Model 1 yielded a good fit too but was statistically weaker than the baseline model, $\Delta\chi^2 (2) = 7.48$, $p < .05$ (GFI = .92, NNFI = .94, CFI = .96, $T = .978$) while Model 2 did not differ significantly from it, $\Delta\chi^2 (1) = .75$, *ns* (GFI = .93, NNFI = .94, CFI = .96, $T = .999$). However, in Model 2, the correlation between the two higher-order factors was extremely high ($r = .97$, $SE = .02$), which makes

their distinction problematic if not impossible. The presence of a single higher-order factor underlying transformational and Contingent reward leadership (Model 1) is thus more plausible. In Model 1, the correlations of first-order factors with the higher-order Active leadership were high (.88 for Charisma, .94 for Intellectual stimulation, .99 for Individualized consideration, and .81 for Contingent reward), which reveals that the second-order factor accounts for much covariance among these factors.

Relationships with Outcome Variables

Means, standard deviations, intercorrelations, and α coefficients for the study variables are shown in Table 3. As we examined both three- and six-factor models, descriptive statistics for Active leadership are also presented in Table 3.** Further, tests of the augmentation hypothesis for the six-factor model are reported in Table 4, whereas the same tests for the three-factor model are presented in

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* Note that MBEA and MBEP correlated positively in Avolio et al.'s (1999) study ($r = .41$).
** The identification of a higher-order Active leadership factor does not change anything in the procedures used for conducting correlational and regression analyses.

Table 4. Augmenting transactional leadership using transformational leadership: Hierarchical regression results.

Leadership scale	Extra effort	Satisfaction with the leader	Job satis-faction	Goal attain-ment	Staff reten-tion	Intent to leave organ.
Transactional leadership						
Passive management-by-exception (*r*)	–.55	–.73	–.27	–.33	–.22	.28
Active management-by-exception (*r*)	.30	.30	.08	.24	.16	–.04
Contingent reward (*r*)	.66	.52	.20	.29	.25	–.24
Transactional leadership (*R*)	.74	.78	.29	.41	.30	.32
Transformational leadership						
Attributed charisma (*r*)	.72	.77	.31	.32	.26	–.32
Intellectual stimulation (*r*)	.76	.71	.27	.33	.27	–.33
Individualized consideration (*r*)	.82	.70	.30	.34	.26	–.32
Transformational leadership (*R*)	.84	.81	.32	.36	.29	.36
Transactional + transformational leadership (*R*)	.85	.84	.33	.41	.31	.36
ΔF[a]	206.86***	92.29***	9.74***	2.10	2.64*	7.74***

Leadership scale	Affective commit-ment	Work-related altruism	Nonwork-related altruism	Patient-related altruism		
Transactional leadership						
Passive management-by-exception (*r*)	–.05	–.06	.02	–.02		
Active management-by-exception (*r*)	.11	.18	.18	.16		
Contingent reward (*r*)	.18	.13	.15	.05		
Transactional leadership (*R*)	.19	.20	.21	.16		
Transformational leadership						
Attributed charisma (*r*)	.16	.15	.08	.07		
Intellectual stimulation (*r*)	.18	.14	.08	.07		
Individualized consideration (*r*)	.18	.16	.13	.06		
Transformational leadership (*R*)	.19	.17	.14	.08		
Transactional + transformational leadership (*R*)	.22	.23	.23	.17		
ΔF[a]	3.80**	2.86*	2.23	.42		

Note. Except for the ΔF line, entries are either raw correlations (*r*) or multiple correlations (*R*). [a]Tests if transformational leadership contributes significant variance over that accounted for by transactional leadership; for ΔF tests, *df*s are respectively 3, 1052; 3, 867; 3, 1047; 3, 990; 3, 980; 3, 689; 3, 687; 3, 687; 3, 687; 3, 682. *$p < .05$; **$p < .01$; ***$p < .001$.

Table 5. The latter modeled the add-on effect of Active leadership over Management-by-exception scales.

Attitudinal Variables

Table 3 shows that transformational facets and Contingent reward were strongly related to extra effort and satisfaction with the leader. However, Contingent reward was significantly less related to these outcomes ($p < .01$). As hypothesized, transformational leadership was found to contribute significant variance over and above that accounted for by transactional leadership in extra effort and satisfaction with the leader (cf. Table 4). This augmentation effect was also observed when using the three-factor model (cf. Table 5).

Table 3 also shows that transformational facets correlated only moderately with job satisfaction, although they did so significantly more strongly than Contingent reward ($p < .01$). As expected, transformational leadership contributed significant variance over that accounted for by transactional scales in job satisfaction (cf. Table 4). An add-on effect of Active leadership was also observed in the prediction of this variable (cf. Table 5).

Concerning the prediction of affective commitment, transformational scales showed modest, albeit significant, correlations with this criterion (see Table 3). As expected, however, transformational leadership augmented the effect of transactional leadership. The augmenting effect of Active leadership over Management-by-exception scales was also significant (cf. Table 5) and stronger than that observed for transformational leadership (cf. Table 4).

Quitting Intentions

As shown in Table 3, transformational facets correlated significantly and negatively with intent to leave the organization. Contingent reward correlated less strongly than transformational factors with that outcome ($p < .01$). As expected, transformational leadership augmented the effect of transactional leadership on intent to leave the organization (cf. Table 4). Similarly, Table 5 shows

that Active leadership added to Management-by-exception scales in explaining this variable.

Perceived Unit Effectiveness

Table 3 shows that transformational and transactional factors were moderately related to goal attainment and staff retention. Transformational facets did not augment the effect of transactional components on goal attainment but added significantly to transactional leadership in predicting staff retention (cf. Table 4). However, the augmentation effect in the latter case was modest in magnitude. So, contrary to expectations, transformational leadership added little to transactional leadership in explaining perceived unit effectiveness. In contrast, Active leadership augmented the effect of MBEA and MBEP for both goal attainment and staff retention (cf. Table 5).

Altruism

Correlations between leadership scales and altruism dimensions were generally modest (cf. Table 3). Transformational leadership added to transactional scales only in accounting for work-related altruism (cf. Table 4). In contrast, when Contingent reward and transformational scales were allowed to define a single factor (Active leadership), an augmentation effect was observed for work-related altruism and nonwork-related altruism (cf. Table 5).

Discussion

Factorial Structure of the MLQ

This study offered a structural test of Bass's (1985) transactional/transformational leadership model within a French-speaking and nursing context. Empirically, it is shown that the six-factor structure is the best model with respect to the values of fit indices provided by LISREL. However, this model also displayed several weaknesses in terms of discriminant validity. First, as in other studies (Lowe et al., 1996), factor intercorrelations were quite high, especially among transformational facets. Second, following Fornell and Larcker's (1981) procedure, the average variance accounted for by leadership factors in their indicators was often far less that the amounts of variance these factors had in common. Third, transformational scales and Contingent reward did generally exhibit relationships of a similar magnitude with outcome variables. In contrast, the three-factor model including MBEA, MBEP, and Active leadership, was found to be a better representation of the data – from a discriminant validity perspective. Incidentally, the inspection of error components among MLQ indicators revealed that in both the three- and six-factor solutions, MBEA had the largest proportion of error variance (.75). This suggests that additional the-

Table 5. Augmenting management-by-exception using active leadership: hierarchical regression results.

Leadership scale	Extra effort	Satisfaction with the leader	Job satis-faction	Goal attain-ment	Staff reten-tion	Intent to leave organ.
Management-by-exception						
Passive management-by-exception (*r*)	−.55	−.73	−.27	−.33	−.22	.28
Active management-by-exception (*r*)	.30	.30	.08	.24	.16	−.04
Management-by-exception (*R*)	.60	.76	.28	.39	.26	.29
Active leadership (*r*)	.84	.77	.31	.36	.30	−.35
Management-by-exception + active leadership (*R*)	.84	.83	.32	.41	.31	.36
ΔF[a]	1222.85	309.40	29.99	20.32	29.99	38.23

Leadership scale	Affective commit-ment	Work-related altruism	Nonwork-related altruism	Patient-related altruism
Management-by-exception				
Passive management-by-exception (*r*)	−.05	−.06	.02	−.02
Active management-by-exception (*r*)	.11	.18	.18	.16
Management-by-exception (*R*)	.12	.19	.18	.16
Active leadership (*r*)	.20	.16	.13	.07
Management-by-exception + active leadership (*R*)	.22	.22	.22	.16
ΔF[a]	26.53	8.10	11.90	.24

Note. Except for the ΔF line, entries are either raw correlations (*r*) or multiple correlations (*R*). [a] Tests if active leadership contributes significant variance over that accounted for by management-by-exception scales; for ΔF tests, *df*s are respectively 1, 1055; 1, 870; 1, 1050; 1, 993; 1, 983; 1, 692; 1, 690; 1, 690; 1, 690; 1, 685. *$p < .05$; **$p < .01$; ***$p < .001$.

oretical and empirical work is needed on this dimension.

The high interscale correlations among transformational and Contingent reward factors can be due to the fact that these factors reflect a common higher-order factor (Active leadership). Our test of this possibility suggests that this might indeed be the case. However, our results regarding this issue are not completely consistent with the findings reported by Avolio et al. (1999) using the same version of the MLQ (i. e., the MLQ-5X). Avolio et al. (1999) found evidence for the superiority of a model including two correlated higher-order factors subsuming transformational and Contingent reward leadership (represented in our tests by Model 2). Several reasons could be advocated for explaining this difference. First, the set of factors was not exactly consistent across the two studies (we did not have the Laissez-faire and Inspiration factors). Second, Avolio et al. (1999) reduced considerably the number of items to be analyzed through CFA: while they started with 80 items, they ended up with a 36-item set. So, there were differences in item content across the two studies. Third, there are substantial reasons that could potentially account for the observed differences. Our examination of the MLQ model was conducted in a French-speaking environment and within a specific occupational culture (nursing), whereas Avolio et al.'s (1999) study was mainly based on American and nonprofessional samples. This means that some difference might be attributable to the varying nature of national cultures and samples across the two studies.

Although our MLQ assessment did not include some recently developed transformational scales (cf. Avolio et al., 1999), it incorporated the key features of the model (cf. Alban-Metcalfe & Alimo-Metcalfe, 2000). Besides the disagreements among authors concerning the appropriate number of scales to be included in MLQ assessments, research progress will be made only if systematic comparisons across populations, industries and countries are undertaken. This requires that the MLQ measurement model invariance be examined using a sequencing approach (for a review of the measurement invariance literature, see Vandenberg & Lance, 2000). This approach is presumably more efficient than the more traditional eyeball comparison of the findings accumulated using the various versions of the MLQ.

Relationships to Outcome Variables

In general, the analysis of relationships between leadership scales and outcome variables revealed that (1) transformational facets correlated roughly at the same level with criteria and (2) Contingent reward displayed a pattern of correlations with outcomes that closely reproduced that of transformational facets. This may indicate a lack of discriminant validity among transformational scales and Contingent reward.

Attitudinal Variables

As expected, results showed that transformational scales added to transactional leadership in predicting extra effort and satisfaction with the leader. The effect sizes were also consistent with those reported in previous studies. In contrast, leadership scales did not explain overly high proportions of variance in job satisfaction and commitment. However, in both cases, transformational leadership contributed significant variance over and above that accounted for by transactional scales. As hypothesized, Contingent reward was also positively related to job satisfaction and commitment.

It is worth noting that transactional and transformational scales as a set were more strongly related to job satisfaction than to affective commitment. In this respect, correlations observed in this study concerning the relationships with affective commitment were much weaker than those reported by Bycio et al. (1995). This might be because of the lack of power Belgian head nurses generally have regarding appraisal, promotion, or salary decisions concerning their subordinates. As a result, they may not be able to generate commitment to the organization despite their having transformational talents.

Quitting Intentions

As hypothesized, transformational leadership added to transactional scales in predicting intent to leave the organization. Transformational facets and Contingent reward were negatively related to this variable whereas MBEP correlated positively with it. This confirms that both providing valued rewards and transmitting a sense of mission are efficient ways of retaining employees within their organization.

Perceived Unit Effectiveness

The two dimensions of effectiveness, goal attainment and staff retention, were weakly to moderately related to leadership behaviors. Moreover, transformational leadership factors were found to add to transactional scales only in staff retention's equation. In fact, transactional dimensions accounted for more variance in both effectiveness criteria than transformational scales. Several explanations for these findings can be proposed. First, work in hospital units is often characterized by prompt reactions to changes in patients' health status. In a sense, effectiveness originates in timely reactions to urgency situations. Conceived this way, effectiveness is more at-

tuned to exchange-oriented leadership behaviors. This may explain why transactional factors were more highly related to perceived unit effectiveness. Second, the effectiveness measure itself appears retrospectively to capture few aspects that might be intuitively related to transformational leadership, such as the accomplishment of complex or innovative projects (Keller, 1992). Finally, the effectiveness of health-care units depends on many other factors than leadership behaviors, including technological availability, patient diagnostic diversity, and nurse-to-patient staffing ratio (Shortell, Zimmerman, Rousseau, Gillies, Wagner, Draper, Knaus, & Duffy, 1994).

Altruism

Altogether, relationships involving leadership scales and altruism factors were modest in magnitude. In fact, transformational facets added significantly, albeit slightly, to transactional scales in predicting work-related altruism but had no augmentation effect in the equation pertaining to the other forms of altruism. In contrast, Active leadership added over MBEA and MBEP in both work- and nonwork-related altruism equations. The small size of relationships involving leadership scales and altruism may be explained by the fact that, long before being employed in health care, nurses have interiorized altruistic values that direct their behavior toward listening to others' needs (Kramer, 1981). Leadership behaviors may have little to do with this process. Similarly, the sense of obligation toward one's profession might be a better predictor of altruism, at least toward patients. One may also hypothesize that some substitutes for leadership play a role. For example, Podsakoff et al. (1996) demonstrated that organizational formalization is a moderator of the relationship between transformational behaviors and altruism. Future investigators should examine whether additional moderators of this relationship (e. g., professional orientation) could be identified.

Limitations and Future Directions

One limitation of this study is that results may be affected by common method variance effects. In this respect, Lowe et al. (1996) showed that the use of common sources and methods tend to produce inflated estimates of relationships between leadership behaviors and effectiveness. Thus, future research should examine how transactional and transformational leadership factors relate to more objective measures of performance in the field of health care. Such criteria may include nursing turnover, and patient risk-adjusted mortality rates and length of stay (Shortell et al., 1994). However, common

method variance cannot be solely accountable for the results reported herein. Indeed, the pattern of relationships between leadership scales and outcome variables varied widely and were stronger for leader-focused criteria, followed by goal attainment, quitting intentions, job satisfaction, and staff retention, and the weakest for commitment and altruism. This pattern is hardly explained by common method effects alone. Rather, the nature of criteria should be invoked.

Although this study enlightened some of the areas where transformational leader behaviors can be influential, work remains to be done to uncover which processes underlie the leader's impact on followers. In particular, the interest of researchers should be directed toward mediation processes. For example, it might be that transformational leadership acts primarily through motivational processes such as empowerment (Conger & Kanungo, 1988). Empowered followers might be more effective, develop more positive work attitudes, and be more likely to display organizational citizenship behaviors. These hypotheses could be tested in relation to theoretical models that carefully specify how transactional and transformational facets differentially relate to empowerment, and how the latter affects followers' criterion variables.

Finally, more efforts should be dedicated to identifying potential moderators of the relationships between leadership behaviors and criterion measures, such as substitutes for leadership (Podsakoff et al., 1996) or the culture of units (Howell & Avolio, 1993). This might strengthen the prediction of criterion variables.

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