Differentiation in leader–member exchange: A hierarchical linear modeling approach

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\begin{abstract}
This paper explores possible antecedents and consequences of leader–member exchange (LMX) differentiation. LMX differentiation is a group-level construct, defined as the degree to which members working with the same leader differ in terms of their LMX relationship quality with their leader. Specifically, we hypothesize that leaders’ personal universalistic values are negatively correlated with LMX differentiation. LMX differentiation, in turn, moderates the lower-level effect that LMX has on performance evaluation. Using surveys from leaders and subordinates as well as archival data from six companies, we found support for these arguments. However, we did not find support for a hypothesized cross-level moderation effect of differentiation on the effect LMX has on interactional justice. Implications for theory and discussion of future research directions are also addressed.

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\end{abstract}
individual members differently (Chen & Kanfer, 2006). Thus, some leaders could differentiate significantly in the quality of their relationships with multiple members, resulting in a clear distinction of in- and out-groups. In contrast, other leaders may differentiate very little or not at all in their relationships with multiple members, making in- and out-group distinctions less clear. Thus, the actual degree of differentiation will vary across groups (Liden, Erdogan, Wayne, & Sparrowe, 2006). We expect that group processes and outcomes will be different across these two (extreme) types of groups: groups with significant differentiation and groups with little or none. In this sense, the degree of differentiation is itself of interest and may have important relationships with other constructs (such as group performance or fairness), relationships that “remain largely unknown” (Liden et al., 2006, p. 724). In this paper, we explicitly define differentiation of LMX as the degree to which members working with same leader have different quality LMX relationships with their leader when compared to other members of the same work group.

By definition, differentiation is a group-level construct because it captures the degree to which leader–member relationships within a work group differ. Thus, differentiation occurs at the group level and depicts one characteristic of all underlying LMX relationships in a work group. By studying differentiation, we may also uncover multi-level relationships, such as cross-level moderations. Methodologically, clarifying the level of analyses for differentiation is critical (Dansereau, Alutto, & Yammarino, 1984; Graen & Uhl-Bien, 1995; Klein, Dansereau, & Hall, 1994). A recent comprehensive review of the LMX literature found that only about 30% of studies addressed levels-of-analysis issues appropriately (Yammarino, Dionne, Chun, & Dansereau, 2005).

However, differentiation is an understudied phenomenon. Not only are the effects of differentiation on performance largely unknown, the antecedents and possible consequences of differentiation are unknown as well. To our knowledge, only a few studies have explored the nature and correlates of LMX differentiation. Boies and Howell (2006) found that differentiation moderated the relationship between mean LMX within teams and team potency as well as the relationship between mean LMX and team conflict. Liden et al. (2006) found that differentiation interacted with group-level (median) LMX to influence group performance such that for groups whose LMX median was low, greater differentiation was positively related to group performance, but for groups whose LMX median was high, there was no relationship between differentiation and performance. Ford and Seers (2006) found that intra-group agreement on LMX (which can be understood as the reverse variable of LMX differentiation) was positively correlated with member agreement levels on group climate of supportive management and on group climate of change. Although the relationships summarized addressed possible consequences of LMX differentiation, there was little or no attention paid to possible antecedents.

To enrich our knowledge of LMX differentiation and contribute to the leadership literature, in this paper, we explore both the consequences as well as possible antecedents of LMX differentiation. We focus on the impact leaders have on developing LMX with multiple members (Yukl, 2002) and thus argue that differentiation within groups may be produced by leaders. Specifically, we argue that leaders’ personal values will influence differentiation within groups. We also argue that LMX differentiation within groups has an impact on performance evaluations for members. In the following sections, we first will outline our theoretical framework and hypotheses, and then will report the results of an empirical study. We conclude by discussing the implications of our findings for LMX theory, as well as future research directions.

1. Theory and hypotheses

1.1. Universalism and LMX differentiation

LMX is developed or negotiated over time through a series of interactions (Graen & Scandura, 1987; Graen & Uhl-Bien, 1995). Throughout this process, leaders’ individual differences may influence the development of LMX. Leaders tend to develop relationships of different levels of closeness with different subordinates. The degree of differentiation among these subordinates, we contend, is related to leaders’ personal values, in particular, the value of universalism (versus particularism) (Trompenaars, 1994).

Universalism and particularism represent two endpoints on a continuum: Universalism focuses strictly on adherence to specific rules without regard for social relationships or other considerations in making judgments or decisions, while particularism fully takes context and relationships into consideration (Parsons, 1939). The decisions, judgments, and behaviors of universalists—individuals with highly universalistic values—are likely to be guided by values that a broad set of rules and policies apply equally to all in all situations. In contrast, the decisions, judgments, and behaviors of particularists—individuals with particularistic values—are likely to account for relational obligations and unique circumstances in their judgments. Particularists, by definition, tend to incorporate the unique aspects of a situation into their judgment when selecting an appropriate course of action (Parsons & Shils, 1951; Trompenaars, 1994).

Theoretically, values are relatively stable preferences that guide individuals’ perceptions, attitudes, and behaviors (Bardi & Schwartz, 2003). Becker and McClintock (1967) argued that much of the variance in human behavior can be attributed to values. According to Parsons and Shils (1951), individuals balance their value-orientation (such as universalism/particularism) before deciding what actions to take in given situations. Rokeach (1973) explicitly argued that “values are guides and determinants of social attitudes and ideologies on the one hand and of social behaviors on the other” (p. 24). Kirkman, Lowe, and Gibson (2006) meta-analyzed literature of cultural values and concluded that most studies found significant effects of values on individual or collective behaviors.

A number of empirical studies have investigated universalism and particularism in different contexts. Focusing on universalistic/particularistic values at the collective (country) level, Trompenaars (1994) used various scenarios (such as testifying in a court) and asked respondents what they would do. He found that in some countries (such as Sweden), most people
would apply a consistent rule across the board, representing a universalistic culture. However, in other countries (such as South Korea), the majority of individuals tended to consider personal relationships before deciding what to do, representing a particularistic culture. Ma and McLean Parks (2007) developed a 10-item scale measuring universalistic values at the individual level and found that individuals did make choices (behavioral intentions) consistent with their value orientations when presented with scenarios similar to those used by Trompenaars.

Applying universalistic values in the LMX context, it follows that leaders with particularistic values will be more likely to develop different types of relationships with their members. Particularistic leaders may value the distinctive features of each member and develop relationships of different quality with multiple members. The specific characteristics of members will become the basis upon which particularistic leaders establish their relationships toward the members (Yukl, 2002). In contrast, differential treatment is not aligned with universalistic values because universalists prefer for the same rules to be applied equally to all (Trompenaars, 1994). Leaders with universalistic values would be less comfortable establishing different relationships with different group members, essentially creating in-group relationships with some subordinates while leaving others as out-groups.

**Hypothesis 1.** Leaders’ universalistic values are negatively related to LMX differentiation within groups that they lead.

1.2. LMX and performance evaluation inflation

Performance evaluation is an important managerial activity, with its results used widely in making decisions such as raises and promotions (Smith, 1998). Subjective performance evaluation is perhaps more convenient and efficient for managers than objective performance measures, if the latter can be obtained at all. Ideally, performance evaluation should be closely aligned with workers’ objective performance. However, performance evaluation is predominantly conducted by workers’ direct supervisors or leaders and is subject to a number of biases (e.g., Feldman, 1986; Ilgen, Barnes-Farrell, & McKellin, 1993). It is plausible that LMX could contribute to biased performance evaluations, inflating the in-group workers’ performance evaluation results (making the performance evaluation results for in-groups better than their actual, “objective” performance, although the objective performance for in-groups may also in fact be better than out-groups, see Feldman, 1986). For example, “in-group” members belong to the close network of their leaders, thus leaders may be more sensitive to problems experienced by in-group workers (Graen & Schiemann, 1978), and therefore implicitly discount their poor performance as being based on circumstances. When evaluating performance of the “in-group” workers, leaders tend to be more in favor of in-group members and thus be more lenient in their assessments (Tajfel & Turner, 1986). Leaders may inflate the in-group members’ performance evaluations, reviewing them favorably beyond what their objective performances merit.

Consistent with this logic, empirical studies have found a stronger relationship between LMX and subjective performance evaluations than between LMX and objective performance measures (e.g., House & Aditya, 1997; Liden, Sparrowe, & Wayne, 1997; Wayne, Shore, Bommer, & Tetrick, 2004). Specifically, Duarte, Goodson, and Klich (1993) found that for out-groups, the supervisors’ performance evaluation was more consistently aligned with their objective performance, but for in-group members, supervisors’ performance evaluation was inflated and not necessarily reflective of objective performance. In a meta-analysis (Gerstner & Day, 1997), the uncorrected correlation between LMX and leaders’ performance ratings was .41, while the uncorrected correlation between LMX and objectively measured performance was only .11. These evidences suggest that if members have good relationships with their leaders, they may receive significantly better performance evaluations—perhaps better than they deserve.

**Hypothesis 2.** LMX is positively related to leaders’ subjective performance ratings, even after controlling for objective performance.

1.3. Cross-level moderation effect of differentiation

In addition to the main effect of LMX quality on performance evaluation, differentiation in a work group can influence how large the inflation in performance evaluation could be. We expect that the more differentiated a work group is in terms of LMX, the more pronounced the biases of performance evaluations will be. Previous studies have examined the main inflation effect that LMX has on performance evaluation (e.g., Duarte et al., 1993), but only one study (Liden et al., 2006) has tested interaction effects between LMX and LMX differentiation on performance. Liden and colleagues (2006) analyzed the interaction using LMX as the moderator. They argued that when LMX is low, high LMX differentiation provides hope for members to improve their relationships with leaders through performing better; in comparison, when LMX is high, members perceive their close relationships with their leaders as deserved, and thus LMX differentiation may not have an impact on individual performance.

In our paper, however, we model from a different theoretical perspective. We analyze the possible cross-level moderating effect of differentiation on biases of performance evaluations. We argue that differentiation will augment the inflation effect of LMX in performance evaluation because social identities can be created based on the in-group versus out-group membership distinction. When LMX differentiation levels are high, members of the same leader can identify both clear boundaries and different treatments between “in-groups” and “out-groups.” Tajfel and Turner (1986) explicitly argued that the more salient the out-group is (such as in situations with intense intergroup conflict), the more likely that individuals’ behaviors will favor in-groups and disparage out-groups. Wilder and Shapiro (1984) found that individuals adhered to the in-group norm and favored in-group members more when the out-group was salient. Furthermore, Mackie, Devos, and Smith (2000) found that out-group salience increased the negative emotional responses that individuals held toward the out-groups.
In summary, when differentiation is high and in-group versus out-group demarcation is pronounced, leaders may favor in-group workers to a larger degree and evaluate their performance more favorably (Tajfel & Turner, 1986). In contrast, in working groups where LMX differentiation is low, the distinction between in-group and out-group members is not clear, thus mitigating the effect. Because the degree of differentiation is defined at the group level, this represents a cross-level moderating effect (Hofmann, Griffin, & Gavin, 2000).

Hypothesis 3. Group-level LMX differentiation moderates the relationship between LMX and the leaders’ subjective performance evaluations. Specifically, the rating inflation based on LMX is higher when LMX differentiation level is high.

1.4. Members’ evaluation of leaders

Interactional justice—whether subordinates believe that their leaders have treated them in a truthful and respectful way (Bies & Moag, 1987)—is a key component of subordinates’ evaluations of their leaders and represents one facet of leadership effectiveness (Skarlicki & Latham, 1997). If in-group members receive higher performance ratings than they deserve (Gerstner & Day, 1997), these members may feel the need to reciprocate because reciprocity is a crucial component in human interactions (Gouldner, 1960), including interactions between leaders and members. Reciprocation may take a number of formats (Gouldner, 1960), one of which is to view the favor-provider in a positive way, such as in evaluations of how their leaders have treated them (Cropanzano, Prehar, & Chen, 2002).

Previous studies have found that LMX and interactional justice are positively related (e.g., Erdogan & Liden, 2006; Masterson, Lewis, Goldman, & Taylor, 2000; Murphy, Wayne, Liden, & Erdogan, 2003). It is logical that leaders treating subordinates with respect (high interactional justice) will end up with better qualities of LMX with their members (e.g., Masterson et al., 2000). It is also logical to propose that members with high-quality LMX tend to view leaders as more fair and those who are out-group members may see their leaders as treating them unfairly (Graen & Uhl-Bien, 1997). In this sense, LMX will influence members’ perceptions of their leaders’ treatment of them. Thus it is plausible that members who have established good relationships with leaders will perceive, and hence rate, their leaders more favorably.

In this study, we build our argument upon previous findings and anticipate that members’ favorable evaluations of their leaders will be influenced by differentiation—the higher level construct. In working groups where differentiation is high, in-group members are more strongly influenced by their “in-group” memberships (Tajfel & Turner, 1986). The salient demarcation encourages the in-group workers to evaluate their leaders more favorably. In contrast, when the differentiation is low and the in-group and out-group division is less clear, workers are less likely to evaluate their leaders based on this distinction. That means differentiation will have a cross-level moderating effect to the relationship between LMX and interactional justice.

Hypothesis 4. Group-level LMX differentiation moderates the relationship between LMX and members’ evaluations of their leader’s interactional justice. Specifically, the positive correlation between LMX and evaluations of the leader is larger when LMX differentiation level is high.

2. Method

2.1. Sample and procedure

We collected data from archival sources as well as from the leaders and members of six companies in China. Among the companies, four were high-tech firms, one was a mining company, and one was a diversified group. After receiving the consent of the companies’ executives and participants, we distributed questionnaires to leaders and members via e-mail. Included with each questionnaire was a cover letter that explained the purpose of the research and our promise of confidentiality. Participants were asked to send their completed questionnaires directly to the researchers.

In the member questionnaire, we asked questions about LMX and interactional justice. In the leader questionnaire, we asked questions about their universalistic values, LMX with specific subordinates, as well as subjective performance ratings of these subordinates. We asked demographic data from both leaders and members, including age, sex, education (years), and tenure in

Table 1
Distribution of useable sample in the paper: Number of groups (and members).

<table>
<thead>
<tr>
<th>Company</th>
<th>Type of jobs</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Researchers</td>
<td>Sales</td>
</tr>
<tr>
<td>High-tech company</td>
<td>4 (15)</td>
<td></td>
</tr>
<tr>
<td>High-tech company</td>
<td>2 (10)</td>
<td></td>
</tr>
<tr>
<td>High-tech company</td>
<td>4 (26)</td>
<td></td>
</tr>
<tr>
<td>High-tech company</td>
<td>4 (23)</td>
<td></td>
</tr>
<tr>
<td>Mining company</td>
<td>10 (52)</td>
<td></td>
</tr>
<tr>
<td>Diversified group</td>
<td>5 (29)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>14 (74)</td>
<td>4 (16)</td>
</tr>
</tbody>
</table>

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their current organizations (years). We obtained objective performance records (details below) of the members from the organizational archives.

Out of the six companies, 451 employees from 206 groups participated in our survey. Most (187) groups had a response rate lower than 100%. Because of our cross-level hypotheses, a high within-group response rate is essential (Liden et al., 2006). Thus, we set criteria similar to Liden and colleagues (2006) to include groups in our sample. First, 103 groups were excluded because they had less than three participants. The reason was that when only one or two subordinates responded, we could not conclude that the responses are representative of their groups and their leaders. Second, another 45 groups were excluded because less than 60% of their group members responded to the survey—we adopted the baseline set up by Liden and colleagues (2006). Third, another 14 groups were excluded because we did not have the data of their group sizes and thus had no way to judge the responding response rate in these groups. These criteria resulted in 44 qualifying groups with a total of 223 members. Among the 44 groups, 7 had within-group response rates between 60 and 69%, 9 had response rates between 70 and 79%, and the remaining 28 groups had response rates over 80%.

The members involved were responsible for different tasks, which largely fell into four broad types: researchers such as code writing programmers (all in high-tech companies), supporting staff such as clerical (in all companies except for one high-tech company), sales force (in a high-tech company), and first-line manufacturing workers (in the mining company). Table 1 summarizes how many groups (and members) in this useable sample came from each type of group tasks, and from each organization.

The resulting sample of subordinates had an average age of 26 with 15 years of education (equivalent to “some college education”). Average tenure in their respective organizations was 3 years. The employees were about equally divided between males and females. At the group level, 4 groups had 3 members, 9 groups had 4 members, and all other groups had from 5 to 10 members. The average group size was 5.07. Leaders in our survey were, on average, 33 years old with an average of 17 years of education (equivalent to “some post-graduate education”), and averaged 4 years at their organizations. One-third of the leaders were female.

2.2. Measure of objective performance

The objective performance of the members was evaluated and recorded in different ways across different companies and different types of workers. To ensure comparability within this sample, objective performance was measured by using the Z-score of each member within his or her working group. Z-scores have been used widely in research to standardize different types of performance such as performance of companies (e.g., Barrick, Bradley, Kristof-Brown, & Colbert, 2007) and of individual workers (e.g., Lam, Huang, & Snape, 2007).

The four types of workers had different measures of their objective performance. To be specific, objective performance of research workers was evaluated and recorded by composites of the quantity of their projects (e.g., lines of computer codes), and in some cases, quality measures (e.g., number or percentage of found errors) and/or other measures (e.g., estimation of revenue generated), covering the time frame of the previous quarter of the year (in three of the four companies) or the previous half year (in one company). Objective performance of supporting staff was evaluated and recorded using composites based on measures of absence, number of complaints, and, in some cases, satisfaction survey results among the people these workers serve, covering the time frame of the previous quarter of the year (three companies) or the previous half year (two companies). Objective performance of sales force workers was measured by their amount of sales with integration with percentages of return, representing their performance in the previous quarter of the year. Objective performance of manufacturing workers was measured by total number of hours on duty, covering the time frame of the previous quarter (summed across three months because that company recorded performance on a monthly basis). The composites discussed above, if applicable, were based on the companies’ administrative policies, and we simply adopted their scores, no matter which weighted measures they used. Limitations of the measures will be further discussed in the end of the paper.

2.3. Measures of other variables

All other measures in the questionnaires were translated from English to Chinese using “back translation” (Brislin, 1980, p. 431). Two bilingual research assistants who were blind to the nature of the study and hypotheses completed the translation. Disagreements were resolved by consensus-based discussions between the authors, two translators, and another bilingual expert. We used eight-point Likert-type scales with anchors at the two extreme points of “completely disagree” (representing “1”) and “completely agree” (representing “8”) (Fowler, 1993). We intentionally chose eight-point scales to avoid any tendency to respond to the middle points (Converse & Presser, 1986; Weisberg, Krosnick, & Bowen, 1996; see examples of Alden, Wiggins, & Pincus, 1990; Kim & Seidlitz, 2002; and Narver & Slater, 1990). This could be especially important in the context of China (e.g., eight-point scales in Luthans, Avolio, Walumbwa, & Li, 2005; and six-point scales in Wu et al., 2006) where individuals tend not to express their opinions directly (Hofstede, 2001; Walker, Walker, & Schmitz, 2003). For all measures, higher numbers mean higher levels in the direction of the definitions.

We measured LMX using a modified scale of LMX-7 (original items obtained from Liden, Wayne, & Stilwell, 1993, p. 674) to make our study comparable to other published studies because this scale was most frequently used in previous research (e.g., Gerstner & Day, 1997; Graen & Uhl-Bien, 1995). Sample items are “My supervisor understands my problems and needs” for member perception (hereafter, member LMX) and “I think that I understand problems and needs of this subordinate” for leader
Thus it was appropriate to aggregate member LMX and leader LMX to the group level.

We then explored within and between group variances for the variables of leader LMX and member LMX. Following the approach of within-and-between analysis (WABA, Dansereau et al., 1984), we used WABA-I to examine whether there existed group differences. The eta-square ($\eta^2$) values (Table 2) indicated that 53% (member LMX) and 75% (leader LMX) of LMX variances occurred between these working groups. Both F-values were significant at the $p<.01$ level, indicating these work groups differed significantly in their levels of LMX (both member-reported and leader-reported). The F tests, using the 30% test, were not practically significant, suggesting that the variation between groups was significantly greater than the variation within groups. Thus it was appropriate to aggregate member LMX and leader LMX to the group level.

In addition, we also analyzed $r_{WG}$, as recommended by James, Demaree, and Wolf (1984). Results indicated that the leader LMX had $r_{WG}$ ranging from .73 to 1.00, with a mean of .97 and a standard deviation of .06. Member report LMX had $r_{WG}$ ranging from .41 to .99, with a mean of .91 and a standard deviation of .13. These numbers also warranted the appropriateness of aggregating the data. Following Liden et al. (2006), we used group medians of LMX (both member- and leader-rated) to represent the group-level LMX.

### Table 2
Within- and between-groups analysis of variance results (WABA-I).

<table>
<thead>
<tr>
<th></th>
<th>$\eta$</th>
<th>$\eta^2$</th>
<th>$E$</th>
<th>$F$</th>
<th>Inference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Between</td>
<td>Within</td>
<td>Between</td>
<td>Within</td>
<td></td>
</tr>
<tr>
<td>Member LMX</td>
<td>0.73</td>
<td>0.69</td>
<td>0.53</td>
<td>0.48</td>
<td>1.05</td>
</tr>
<tr>
<td>Leader LMX</td>
<td>0.87</td>
<td>0.50</td>
<td>0.75</td>
<td>0.25</td>
<td>1.74</td>
</tr>
</tbody>
</table>

We conducted a series of analyses to compare groups and members between those included and excluded, and then among those included, across different companies and types of jobs. We also analyzed variances explained by between- and within-work group memberships. These analyses demonstrated the appropriateness of further analyses.

Interactional justice, as perceived by members, was measured using nine items from Niehoff and Moorman (1993), with an alpha of .86. An example item is “When decisions are made about my job, my supervisor treats me with kindness and consideration.” Leaders’ subjective evaluation of members’ performance was measured by four-item scale from Liden et al. (1993), with an alpha of .72. An example item is “This subordinate is superior (so far) to other new subordinates that I’ve supervised before.” Finally, we measured leaders’ universalistic values using the 10-item scale developed by Ma and McLean Parks (2007), with an alpha of .74. An example item is “having absolute standards of right and wrong.”

LMX differentiation captures, from one perspective, the profile of LMX in a work group, thus it shall be computed in an appropriate aggregation form from the lower-level construct, LMX (Bliese, 2000). Similar to aggregating personality variables to a higher level in teams, the best method of aggregation depends on the nature of the construct and the task (Moynihan & Peterson, 2001). Here, the phenomenon of interest is how group members (in this case, perceptions of group members [member LMX], or leaders’ perceptions toward group members [leader LMX]) differ from one another. Consequently, dispersion (such as variance) is the appropriate method to aggregate. In this paper, we created a LMX differentiation measure by using the standard deviation of LMX within groups. The standard deviation of LMX within groups is the square-root of variance of LMX within groups, and has the same scale as the original measures of LMX.3

### 3. Results

#### 3.1. Preliminary analyses

We conducted a series of analyses to compare groups and members between those included and excluded, and then among those included, across different companies and types of jobs. We also analyzed variances explained by between- and within-work group memberships. These analyses demonstrated the appropriateness of further analyses.

We first compared the variables of interest between the participants who were members of the groups included in the sample and those who were not. No significant difference existed between LMX (both member reported and leader reported) and leaders’ values of universalism. However, members in the excluded groups reported higher levels of interactional justice for their supervisors, had better objective performance, and obtained better leader performance ratings (all $p < .05$). This could be caused by the self-selection bias, because the majority of the excluded groups had fewer members who responded to the survey: if the non-responding members had lower levels of performance (both subjective and objective) and perceived to be treated less fairly by the self-selection bias, because the majority of the excluded groups had fewer members who responded to the survey: if the non-responding members had lower levels of performance (both subjective and objective) and perceived to be treated less fairly by their supervisors, the responding members’ responses tend to represent the in-group members of these work groups. Limitations and implications of the significant comparisons will be further analyzed in the discussion section.

Within-groups analysis of variance results (WABA-I). Results indicated that the leader LMX had $r_{WG}$ ranging from .73 to 1.00, with a mean of .97 and a standard deviation of .06. Member report LMX had $r_{WG}$ ranging from .41 to .99, with a mean of .91 and a standard deviation of .13. These numbers also warranted the appropriateness of aggregating the data. Following Liden et al. (2006), we used group medians of LMX (both member- and leader-rated) to represent the group-level LMX.

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3 To make our analyses comparable to previous research, we also conducted all our analyses using variances (Liden et al., 2006), within-group agreement coefficient ($r_{WG}$, which can be seen as a reversed coded measure of differentiation) (Boies & Howell, 2006), and the average of item standard deviation (Ford & Seers, 2006) replacing standard deviations, and obtained virtually the same results. Inconsistency was found only for $r_{WG}$: when using $r_{WG}$ as the operationalization of LMX differentiation, the moderating effect in Hypotheses 3, which was significant using all other approaches, rendered non-significant result. Future studies can examine more rigorously which measure is more meaningful and appropriate for empirical studies. Given the current evidence, we argue for using standard deviation because it has the same scale as the variables based on which standard deviation is calculated. For example, the traditional example of the “68% rule” is based on mean plus and minus one standard deviation. Variance cannot be used in such a way, however.
We further conducted ANOVA analyses comparing the group-level variables across the six companies and the four types of jobs. No significant difference existed with respect to groups’ median LMX (again, both leader- and member-reported), leaders’ universalistic values, group size, and group response rate.

We conducted a confirmatory factor analysis to test the independence of member LMX and interactional justice because the two were highly correlated. A measurement specifying the two latent variables obtained reasonable fit indices (chi-square was 232 with $df = 103$, $p < .01$; CFI was .90; and RMSEA was .07). This model was significantly better than the nested model of having all items measuring the two variables loading on one latent variable. The nested model obtained unacceptable fit indices (chi-square was 462 with $df = 103$, $p < .01$; CFI was .70; and RMSEA was .13). The difference in chi-square was 230 with 1 degree of freedom ($p < .01$). These results demonstrated that member LMX and interactional justice are two different variables, although they were highly correlated.

### Table 3

<table>
<thead>
<tr>
<th>Individual level</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
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<tbody>
<tr>
<td>1 Member LMX</td>
<td>6.20</td>
<td>1.13</td>
<td>(.83)</td>
<td>(N.A.)</td>
<td>(N.A.)</td>
<td>(N.A.)</td>
</tr>
<tr>
<td>2 Leader LMX</td>
<td>6.91</td>
<td>0.85</td>
<td>.35**</td>
<td>(.81)</td>
<td>(.86)</td>
<td>(.72)</td>
</tr>
<tr>
<td>3 Interactional justice</td>
<td>6.17</td>
<td>1.03</td>
<td>.44**</td>
<td>−.03</td>
<td>(N.A.)</td>
<td>(N.A.)</td>
</tr>
<tr>
<td>4 Subjective performance rating</td>
<td>5.96</td>
<td>1.05</td>
<td>.03</td>
<td>.54**</td>
<td>−.09</td>
<td>(.72)</td>
</tr>
<tr>
<td>5 Objective performance (Z-scores)</td>
<td>−.37</td>
<td>1.12</td>
<td>−.14</td>
<td>−.04</td>
<td>−.20*</td>
<td>.18*</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Group level</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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<tbody>
<tr>
<td>1 Standard deviation of Leader LMX</td>
<td>0.35</td>
<td>0.36</td>
<td>(N.A.)</td>
<td>(N.A.)</td>
<td>(N.A.)</td>
<td>(N.A.)</td>
</tr>
<tr>
<td>2 Standard deviation of Member LMX</td>
<td>0.68</td>
<td>0.62</td>
<td>.11</td>
<td>(N.A.)</td>
<td>(N.A.)</td>
<td>(N.A.)</td>
</tr>
<tr>
<td>3 Median of leader LMX</td>
<td>6.91</td>
<td>0.78</td>
<td>−.08</td>
<td>−.07</td>
<td>(N.A.)</td>
<td>(N.A.)</td>
</tr>
<tr>
<td>4 Median of member LMX</td>
<td>6.16</td>
<td>0.80</td>
<td>−.08</td>
<td>−.59**</td>
<td>.26</td>
<td>(N.A.)</td>
</tr>
<tr>
<td>5 Group size</td>
<td>5.86</td>
<td>1.97</td>
<td>.12</td>
<td>.07</td>
<td>−.23</td>
<td>−.10</td>
</tr>
<tr>
<td>6 Leaders’ universalistic values</td>
<td>3.66</td>
<td>0.65</td>
<td>.18</td>
<td>−.41**</td>
<td>−.08</td>
<td>.14</td>
</tr>
</tbody>
</table>

Reliability coefficients are shown in diagonal cells within brackets ($) and in **bold fonts**. $N = 203$ for individual-level cells and $N = 38$ for group-level cells.

* $p < .05$.

** $p < .01$.

### 3.2. Descriptive statistics

The means, standard deviations, and correlations among the variables at Level-1 and Level-2 appear in the two sections of Table 3. Several patterns of the descriptive statistics warrant attention. First, participants in the study rated their members or leaders fairly positively. Leader LMX, member LMX, and interactional justice all had means higher than six out of eight-point scales. The pattern of correlations, however, suggested that social desirability was not a great concern. Many correlations (and, as will be shown, regression coefficients) were significant and theoretically sound. If social desirability had seriously distorted the data, we would not have had sufficient variance and covariance among variables to obtain significant results.

Second, the correlation between leader LMX and member LMX was significant ($r = .35, p < .01$). This is comparable to the mean sample-weighted correlation of .29 obtained in Gerstner and Day’s (1997) meta-analysis.

Third, at the group level, group median of member LMX had a negative relationship with LMX differentiation. The beta was $−.59 (p < .01)$. That is, when group members rated their leaders more positively in general (by median), these groups had lower levels of LMX differentiation. This is consistent with (although larger than) the correlation of $−.28 (p < .01)$ found by Liden and colleagues (2006) (note that they measured differentiation by group variance; in our dataset, the correlation between LMX median and LMX within-group variance was $−.53$). This negative correlation was possibly caused by the ceiling effect (Weisberg et al., 1996): because participants generally evaluate their leaders or subordinates positively, only among groups with low-quality LMX relationships could we obtain large variance within groups (and the groups had high levels of differentiation).

Lastly, results also indicated that common method variance existed. For example, member-rated (but not leader-rated) LMX had a positive and significant correlation with interactional justice ($r = .44, p < .01$). In addition, leader-rated (but not member-rated) LMX had a positive and significant correlation with subjective performance rating ($r = .54, p < .01$).

### 3.3. Tests of hypotheses

Hypothesis 1 was tested using multivariate regression because it involved only work-group-level variables. The dependent variable was the LMX differentiation score within each group, and the predictors were leaders’ universalistic values and control variables (group size and group median of LMX, cf. Liden et al., 2006). Results indicated that leaders who held universalistic values
were less likely to have highly different LMX (reported by the members) with their multiple subordinates. The coefficient (B) was −0.36 (standard error = 0.11), p < .01. When we used leader LMX to calculate the median LMX as well as differentiation, none of the predictors significantly influenced differentiation.

Hypothesis 2 was tested using multivariate regression again, with all variables at the individual level. Hypothesis 2 argued that when controlling for “objective” performance, leaders rate their in-group members more favorably than out-group members and thus LMX inflates leaders’ subjective performance ratings. Consistent with hypothesis 2, the coefficient of member LMX on subjective performance rating was 0.11 (standard error = 0.07), p = .05. In addition, results revealed that leaders’ performance ratings reflected, to some extent, their subordinates’ objective performance, with a coefficient of 0.16 (standard error = 0.07), p < .05. When we used the leader LMX to replace the member LMX, the results were virtually the same, just with stronger significance levels. Thus the subjective performance ratings reported by the leaders reflected both (1) objective performance, which represented the “valid” part of performance evaluation and (2) the closeness of their relationships with the members, which represented their biases.

Hypotheses 3 and 4 examined cross-level moderating effects (Kozlowski & Klein, 2000), and were tested by slopes-as-outcomes models in HLM (Hofmann et al., 2000).5 Hypothesis 3 argued that LMX differentiation moderates (or more specifically, augments) the effect of LMX’s inflation of subordinate performance ratings. In the slopes-as-outcomes model, the Level-1 (individual level) dependent variable was leaders’ performance ratings toward each of the subordinates. Level-1 predictors included LMX and members’ objective performance. The Level-2 (work-group level) model used the coefficient of LMX as the dependent variable. Level-2 predictors included group LMX differentiation (as hypothesized) and two control variables (group size and group median of LMX). Consistent with Hypothesis 3, in the Level-2 regression, the coefficient for LMX differentiation was 0.61 (standard error = 0.16), p < .01 if we use member-rated LMX in computing LMX median and differentiation. The coefficient for LMX differentiation was 1.15 (standard error = 0.59), p < .05 if we used leader-rated LMX in computing LMX median and differentiation. This means, when LMX differentiation is high, the relationship between LMX and leaders’ subjective performance rating is stronger, and thus subjective performance evaluation is inflated to a larger extent. We plot the effect of interaction (based on member-rated LMX) in Fig. 1.

Hypothesis 4 argued that LMX differentiation augments the relationship between LMX and subordinates’ ratings of leaders’ interactional justice. In the slopes-as-outcomes model, the Level-1 (individual level) dependent variable was members’ ratings of interactional justice. The Level-1 predictor was LMX. The Level-2 (work-group level) model used the coefficient of LMX as the dependent variable. Level-2 predictors included group LMX differentiation (as hypothesized) and two control variables (group size and group median of LMX). When we used leader-rated LMX, neither the main effect at Level-1 nor the moderating effect at Level-2 was significant. When we used member-rated LMX, the main effect at Level-1 was significant (coefficient = 0.54, standard error = 0.12, p < .01), but the moderating effect was not (coefficient = -0.07, standard error = 0.14, n.s.). Implications of such findings will be further discussed later.

4. Discussion and conclusions

4.1. Findings and implications

In this paper, we explored the antecedents and consequences of LMX differentiation. We found that leaders with universalistic values were less likely to differentiate among members, thus linking leaders’ personal characteristics with the work groups’ LMX development. We also found that leaders tended to provide better performance evaluations to members with better LMX beyond what their objective performance could merit. In addition, this effect was stronger when the groups’ LMX was more differentiated.

5 An alternative to test the cross-level moderating effects is to use the multivariate extension to WABA (Schriesheim, 1995), which allows the moderator to be a continuous variable (cf. Schriesheim, Castro, & Yammarino, 2000).
4.1.3. LMX as perceptions or relationships

Leaders based on their values so that biases based on relationship closeness can be avoided. A correlation of .37 in a meta-analysis (Gerstner & Day, 1997), raising the question of whether LMX is something however, perceptions of leaders and of members were used. These two aspects of perceptions were found to have an averaged leader and member report is appropriate. When we conceptualize LMX as a real and concrete constructs (i.e., two perceptions). When we de... between interactional justice and LMX used the same-source data (e.g., Erdogan & Liden, 2006; Liden et al., 2006; Masterson et al., 2000; Murphy et al., 2003). In this sense, many arguments about LMX were actually addressing the... and member as correlates of interactional justice, we found a significant correlation. Actually, all of the observed correlations between interactional justice and LMX used the same-source data (e.g., Erdogan & Liden, 2006; Liden et al., 2006; Masterson et al., 2000; Murphy et al., 2003). In this sense, many arguments about LMX were actually addressing the “perceptions” rather than “relationships.” Future studies on LMX shall clarify whether LMX is best defined as a relationship or a perception (and if a perception, of whom) and operationalize LMX in a consistent approach.

4.1.4. LMX and individualized leadership

The relationship between universalism and differentiation, we have theoretical reasons to believe that leaders... of differentiation, pushing the research of differentiation beyond extant studies. Empirically, the relationship demonstrates that LMX differentiation can be predicted. Such a finding also demonstrates the predictive usefulness of the scale of universalism, which was recently developed by Ma and McLean Parks (2007). Practically, for organizations where in performance evaluation is of great concern, it may be desirable to select leaders based on their values so that biases based on relationship closeness can be avoided.

4.1.1. Differentiation as a construct

Compared to the intensive research on LMX, only a few studies have focused on group-level differentiation (e.g., Boies & Howell, 2006; Ford & Seers, 2006; Liden et al., 2006). All of these studies, however, have found effects that differentiation could have on other important constructs. By definition, differentiation represents the distribution of LMX quality within work groups. Consequently, studying differentiation provides the opportunity to reveal unfound dynamics at the group level as well as cross levels, improving multi-level theories and models (Schriesheim et al., 1999; Yammarino et al., 2005). Differentiation provides an opportunity for scholars to clarify the levels of analysis and build better multi-level theories and models.

Focus on differentiation resonates with calls to pay greater attention to the out-groups in leader–member relationships. Previous LMX research has focused on the in-groups rather than the out-groups (Miner, 2002, p. 350). Because high-quality LMX requires additional investment of the leader’s already limited time and social resources, leaders only can develop high LMX with a portion of members while leaving the remainder to be lower-quality LMX (Graen & Uhl-Bien, 1995). Members with high-quality LMX may have incentives to perform better, are more satisfied, and become committed to the organization. However, members with low-quality LMX may be disaffected, have grievances, and feel unfairly treated (Cleyman, Jex, & Love, 1993). In our research, we did find that LMX differentiation augmented LMX-based inflation in performance evaluation. This calls for more scientific attention on the out-groups, so that LMX studies can provide a fuller picture of group dynamics.

4.1.2. Initiation and development of LMX

We hypothesized and found support for the possible antecedent of LMX differentiation, that is, the universalistic values of the leaders. Current studies on LMX differentiation (e.g., Boies & Howell, 2006; Liden et al., 2006) have not considered the possible antecedent of differentiation yet. Although this study used cross-sectional data and we cannot draw any causal conclusions about the relationship between universalism and differentiation, we have theoretical reasons to believe that leaders’ values lead to differentiation. Personal values develop mainly in childhood and early adulthood (Rokeach, 1973). In the development process of LMX and differentiation, leaders’ personal values are exogenous and given. It is unreasonable and unlikely that the group LMX differentiation determines the leaders’ values of universalism.

The finding that leaders’ values of universalism were associated with group LMX differentiation has theoretical, empirical, and practical implications. Theoretically, we proposed the antecedent of LMX differentiation, pushing the research of differentiation beyond extant studies. Empirically, the relationship demonstrates that LMX differentiation can be predicted. Such a finding also demonstrates the predictive usefulness of the scale of universalism, which was recently developed by Ma and McLean Parks (2007). Practically, for organizations where in performance evaluation is of great concern, it may be desirable to select leaders based on their values so that biases based on relationship closeness can be avoided.

4.1.3. LMX as perceptions or relationships

LMX has been defined as a relationship, which makes it a dyadic-level construct (Schriesheim et al., 1995). In measuring LMX, however, perceptions of leaders and of members were used. These two aspects of perceptions were found to have an averaged correlation of .37 in a meta-analysis (Gerstner & Day, 1997), raising the question of whether LMX is something “real,” or just two constructs (i.e., two perceptions). When we define LMX as perceptions of leaders and of members, the operationalization of using leader and member report is appropriate. When we conceptualize LMX as a real and concrete “relationship” but measure it using perceptions (from either source), we may commit the folly of theorizing ‘A’ but testing ‘B’ (Schriesheim, Castro, Zhou, & Yammarino, 2001).

An example of this issue can be observed from the relationship between LMX and interactional justice. When we used the member LMX as correlates of interactional justice, we found a significant correlation. Actually, all of the observed correlations between interactional justice and LMX used the same-source data (e.g., Erdogan & Liden, 2006; Liden et al., 2006; Masterson et al., 2000; Murphy et al., 2003). In this sense, many arguments about LMX were actually addressing the “perceptions” rather than “relationships.” Future studies on LMX shall clarify whether LMX is best defined as a relationship or a perception (and if a perception, of whom) and operationalize LMX in a consistent approach.

4.1.4. LMX and individualized leadership

LMX departs from previous leadership studies, especially the perspective of averaged leadership style, because it proposes leaders tend to develop different relationships with different members. In this sense, LMX theory has “assumed” that different qualities of relationships must occur within work groups (Dansereau, 1995). However, studies on differentiation have demonstrated that leaders may not necessarily develop different relationships with multiple members. It is possible (and legitimate) that leaders develop relationships of similar quality with multiple members. In our study, work groups did demonstrate different levels of differentiation, and some groups differed only a little in terms of LMX. Even though there is no absolute criterion for how low a differentiation is low enough, the study on differentiation raises questions on the necessity of assuming high differentiation as an a priori condition for leadership.

Reflecting the correction of this assumption, individualized leadership perspective has emerged as a recent development of LMX approach and departed from earlier LMX studies (Dansereau, 1995; Dansereau et al., 1995; Mumford, Dansereau, & Yammarino, 2000). Individualized leadership perspective does not require LMX differentiation to occur; on the contrary, individualized leadership tries to understand leadership from how leaders and members become distinct from their respective others (that is, each follower is independent of other followers, and each leader is viewed as unique). Thus the research on LMX
differentiation implies that individualized leadership may be fairly useful in interpreting the relationships between leaders and members—relationships that could be (but are not necessarily) different among dyads in the same group.

4.1.5. Inflation in performance evaluation

We found that members having better quality of relationships with their leaders obtained performance evaluations beyond their objective performances merited. Performance evaluation is an important element of management, and is supposed to obtain a measure of and help increase employee performance. However, rating in-group members’ performance higher than they deserve could result in negative outcomes to organizations, such as turnover of the out-group members (Hom & Griffeth, 1995), reduced effort and performance (Tepper & Taylor, 2003), and envy of out-groups toward in-groups and conflict between them (Vecchio, 2005).

In addition, the cross-level moderating effect (Hypothesis 3) demonstrated that the inflation tended to be larger when leaders developed highly differentiated LMX with members in the same group. Although this paper is not the first to propose a possible inflation in performance evaluations based on LMX (Duarte et al., 1993), it explicitly articulates the theory underlying the processes and links the inflation with group-level LMX differentiation. In this study, the effects of LMX were clearly defined, modeled, and empirically confirmed at different levels.

4.2. Study limitations and future research

A number of limitations in this paper call for caution to be exercised before generalizing the results. First, we used standardized objective performance scores rather than quantifiable and directly observed performance measures that are comparable across the whole sample. Because we collected data from multiple organizations and about different types of jobs, this was the most appropriate approach to combine the data. Standardized numbers were based on the performance measures adopted at their companies. Even though we had no conclusive evidence that these measures represented the full range and scope of the jobs, this approach satisfied our need to separate out the possible influence leaders had on an objective measure. We assumed that these companies had included the most important work requirements as main components of their composites of objective performance evaluations, and therefore the recorded evaluations were reasonably accurate measures of their “objective” performance at work.

Actually, seeking a “best” objective performance measure could be impossible: management scholars have long been searching for appropriate measures of “objective” performance but have not yet reached a consensus (cf. Bommer, Johnson, Rich, Podsakoff, & MacKenzie, 1995). Objective performance is evaluated and recorded using both quantity (e.g., sales) and quality (e.g., number of errors) measures. For any job, objective measures “tend to be narrowly focused and are typically representative of low-order factor structures, and both theoreticians and practitioners are cautioned not to rely solely on objective measures” (Bommer et al., 1995, p. 602). In this sense, our treatment of objective evaluations represented the best we could do with this dataset, but future studies using more homogenous respondents with clearer and more precise objective performance measures are desirable.

Second, we had low response rates in some groups and had to discard responses from some members, so self-selection bias could be a problem. Comparisons found that in the groups that we discarded mainly because of low within-group response rates, members who responded reported higher levels of interactional justice for their leaders and had higher objective and subjective performance evaluations. The most plausible cause was that out-group members were not motivated to respond. In this sense, using a majority response rate within groups as a criterion of including the responses included can hopefully better represent perceptions of both in-groups and out-groups.

Third, our sample was cross-sectional; hence, causal interpretations are not strictly admissible. However, the causal relationships implied are consistent theoretically and make sense. In some cases, reciprocal causation may also exist, creating an enhancement effect which can be explored in future research. Interactional justice has been modeled as an antecedent of LMX (Masterson et al., 2000); we believe that it can also serve as a consequence. Because both our study and other studies (e.g., Masterson et al., 2000) used cross-sectional data, none can successfully demonstrate a causal relationship although we believe there exists one. While the true relationship may be reciprocal, the nature of LMX and interactional justice may be so close that their nomological framework should be delineated more clearly. For example, a laboratory study or a longitudinal field study that begins with zero-history leader–member dyads could help untangle this relationship.

Fourth, our modest sample size may limit statistical power. Kreft (1996) suggested that, in general, large sample sizes are required: a sample size of 30 groups containing 30 individuals each may be needed for a sufficient power (.90) to detect cross-level interactions. When the number of groups is larger, the requirement of each group’s size can be smaller. Obviously, our sample size is not big enough to meet Kreft’s (1996) standards. However, the significant results obtained for Hypotheses 1 and 3 revealed that this may not be a serious problem. Hofmann and Stetzer (1996) have found significant relationships with a sample consisting of as few as 21 groups. A larger sample size could raise our power to find true relationships and might provide a better opportunity to test our Hypothesis 4, for which we obtained no significant result in our sample.

Finally, although we believe our theoretical model to be a culture-free one, we collected our data only in China. China is unique in terms of its social, economic, and cultural characteristics (cf. Tsui & Lau, 2002), and our study may not be completely universal. For example, the high power distance (Hofstede, 2001) in China may influence the development and outcomes of LMX. This could be a disadvantage in generalizing the findings presented in this paper. However, it also could be an advantage in providing the literature with new information about organizational behavior in a less-studied context. Certainly, comparison studies conducted in other countries would help paint a clearer picture about differentiation and its effects on performance evaluations.
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References


