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The Influence of Distributed Leadership on Teachers' Organizational Commitment: A Multilevel Approach

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Abstract

In the present study the effects of a cooperative leadership team, distributed leadership, participative decision-making, and context variables on teachers' organizational commitment are investigated. Multilevel analyses on data from 1522 teachers indicated that 9% of the variance in teachers' organizational commitment is attributable to differences between schools. The analyses revealed that especially the presence of a cooperative leadership team and the amount of leadership support played a significantly positive key role in predicting teachers' organizational commitment. Also, participative decision-making and distribution of the supportive leadership function had a significant positive impact on teachers' organizational commitment. In contrast, distribution of the supervisory leadership function and teachers' job experience had a significant negative impact.

Keywords: distributed leadership, organizational commitment, multilevel analysis

Article type: research article

The Influence of Distributed Leadership on Teachers' Organizational Commitment: A Multilevel Approach

Teacher commitment has been recognized as an effective route to school success (Fink, 1992). In past years, numerous studies indicated that teacher commitment is a critical predictor for teachers' work performance and the quality of education (Dee, Henkin, & Singleton, 2006; Tsui & Cheng, 1999). Additionally, many researchers share a common view that teachers' commitment towards the school is affected by the leadership in schools (Hoy, Tarter, & Bliss, 1990; Koh, Steers, & Terborg, 1995; Nguni, Sleegers, & Denessen, 2006). Unfortunately, most studies adopt a heroic leadership approach in which the effect of the leadership of one "superhero", the school principal, is investigated on organizational outcomes, like teachers' commitment towards the school. However, in the recent research literature the traditional heroic leadership models are replaced by shared leadership models, which stress the distribution of leadership and participative decision-making of the school team (Bush & Glover, 2003; Goleman, 2002; Gronn, 2002; Leithwood & Riehl, 2003). Leadership can no longer be regarded as an important characteristic of one solo school leader, but as a process shaped by daily interactions between the school leader and members of the school organization (Spillane, Halverson, & Diamond, 2001; 2004). Especially in large secondary schools, the school principal can no longer develop his/her leadership alone through daily interactions with all school members. Therefore, other members of the school team have to take part in these interactions and leadership should be distributed among different school team members (Firestone, 1996; Firestone & Martinez, 2007). Spillane (2006), for example, claimed that distributed leadership is best understood as a practice distributed over leaders, followers, and their situation and incorporates the activities of multiple groups of individuals. This implies a social distribution of leadership, where the leadership function is stretched over a number of individuals and the task is accomplished

through the interaction of multiple leaders. Similarly, Gronn (2002) stated that distributed leadership is an emergent property of a group or network of interacting individuals. This theoretical framing implies that the social context and the interrelationships therein are an integral part of the leadership activity (Harris, Leithwood, Day, Sammons, & Hopkins, 2007).

Although Gronn (2002) and Spillane (2006) theoretically defined distributed leadership, it remains a fuzzy concept to operationalize in empirical research. The present study conceptualizes distributed leadership as the degree to which leadership functions are distributed among formal leadership positions in the leadership team (i.e., the principal, the assistant principals, and the teacher leaders). The leadership team is defined as the group of people with a formal leadership role in the school as a whole. This is based on the research of Camburn, Rowan, and Taylor (2003), who came to the conclusion that leadership functions are normally distributed across three to seven formally designated persons.

However, based on the definitions of Gronn (2002) and Spillane (2006), it is acknowledged that distributed leadership is about more than formally distributing leadership functions. Therefore, the focus is also on the cooperation of the leadership team as a whole. In the distributed leadership literature, leadership is no longer seen as a one-man business, but a business that requires social interaction and cooperation of a whole team, leading towards an emergent property. On the one hand this collaborative structure implies that school leaders experience support from other school leaders, leading to mutual reinforcement, and thus a more effective leadership team running the school (Hackman, 1990). On the other hand, the management structure becomes more complex and more conflicts between the leadership team members can arise. Therefore, the leadership team should be a cooperative team characterized by group cohesion with clear agreements about the role divisions, and an orientation towards the same goals.

Furthermore, apart from a distribution of leadership among formal leadership positions, leadership can also be distributed amongst all organizational members. Here decision-making is governed by the interaction of individuals (Gronn, 2002; Spillane, 2006) and leadership is enacted by the entire educational community, rather than by a limited number of people at the top of the organization (Copland, 2003; Elmore, 2000; Lashway, 2003). Therefore, attention is paid to a more informal form of leadership interactions of all school team members. In order to discern this concept clearly from distributed leadership between formal leadership positions, this informal form is labeled as participative decision-making.

Although distributed leadership is a buzzword in the current educational management literature, empirical research concerning the effect of distributed leadership on teachers is scarce (Harris et al., 2007). The main purpose of the present study is to fill in this research gap and to investigate how the formal distribution of leadership functions among the leadership team, the cooperation of the leadership team, and participative decision-making of the school team is related to the organizational commitment of teachers in large secondary schools.

Theoretical Framework

Definition of Organizational Commitment

Organizational commitment has been defined as the relative strength of an individual's identification with and involvement in a particular organization (Mowday, Steers, & Porter, 1979). Mowday, Steers, and Porter (1982) characterized commitment as consisting of three components: belief in and acceptance of organizational goals and values (identification), a willingness to exert effort on behalf of the organization (involvement), and a strong desire to maintain membership in the organization (loyalty). These components imply that members of an organization wish to be active players in the organization, have an impact on what is going

on in it, feel that they have high status within it, and are willing to contribute beyond what is expected of them (Bogler & Somech, 2004). A substantial body of research indicated that higher levels of organizational commitment result in more effort and increased dedication to attain organizational goals, which is closely related to organizational effectiveness (Dee et al., 2006).

Organizational characteristics of the work place, like school leadership, are believed to have an impact on the organizational commitment of teachers (Louis, 1998). Also, the demographical context and the structural school context are expected to influence teachers' commitment to the school (Reyes, 1992).

Antecedents of Organizational Commitment

Distributed Leadership

In this study, the amount and formal distribution of leadership functions, which can influence the organizational commitment of teachers, are examined. Also, the cooperation of the leadership team is illuminated as a possible antecedent of teachers' organizational commitment. Finally, the relation between participative decision-making, which is a more informal form of distributed leadership involving all teachers in the school decision-making process, and teachers' organizational commitment is examined.

Amount and distribution of leadership functions. Previous studies documented that school leadership influences teachers' willingness and attitude toward organizational commitment (Nguni et al., 2006; Park, 2005). In the present study, the focus is limited to two core functions of successful leaders: support and supervision of teachers. This distinction is based on the transformational and instructional leadership models (Hallinger, 2003; Leithwood, Louis, Anderson, & Wahlstrom, 2004). Transformational leadership models focus on the leaders' role in fostering and setting a collective school vision and motivating and stimulating members of an organization (Bass, 1985; Burns, 1978). In the present study, the

transformational leadership functions - setting a vision and motivating followers - are labeled as supportive leadership. The supervision of teachers pertains more to instructional leadership and focuses predominantly on the role of the leader in directing, controlling, and monitoring in schools (Bamburg & Andrews, 1990; Hallinger & Murphy, 1985). In general, the supportive leadership function is likely to have a positive effect on teachers' commitment (Billingsley & Cross, 1992; Littrell & Billingsley, 1994; Rosenholtz, 1989; Singh & Billingsley, 1998). Supervisory leadership is also related to teachers' commitment. Somech (2005), for example, stated that there is a positive relation between directive leadership, which is characterized by monitoring and supervising teachers, and organizational commitment.

In this study, light is shed on the perceptions of teachers concerning the amount of both core leadership functions. Also, attention is paid to teachers' perceptions of the formal distribution of the leadership functions. Previous research assigned major benefits to distributed leadership, like Harris (2005), who came to the conclusion that a variety of studies (e.g., Crowther, Kaagan, Ferguson, & Hann, 2002; Macbeath, 1998) showed clear evidence of the positive effects of distributed leadership on teachers' self-efficacy and levels of morale, which can have a positive impact on teachers' organizational commitment. However, distributed leadership can lead to more complexity in the management structure and communication, because more members are involved in leading the school (Liontos & Lashway, 1997; Oswald, 1997; Smith & Piele, 1997; Smylie & Brownlee-Conyers, 1992). This can result in more conflicts between the leadership team members, which in turn can have a negative impact on teachers' organizational commitment.

Cooperation of the leadership team. Many studies in the management literature have shown that teachers' group cohesion (Wech, Mossholder, Steel, & Bennett, 1998), which corresponds to the openness of the team members, mutual trust, and open communication (Holtz, 2004; Kozlowski & Ilgen, 2006), has a positive impact on their organizational

commitment. In addition, teachers' role clarity (Mathieu & Zajac, 1990; Tao, Takagi, Ishida, & Masuda, 1998) and goal orientedness (Meyer & Allen, 1997) are related to the organizational commitment of teachers as well. Notably, most research is situated at the individual level of teachers and focuses on the effect of teachers' perceptions concerning their own group cohesion, role clarity, and orientedness towards the goals on their commitment to the school. Research concerning the impact of teachers' perceptions of the cooperation of the leadership team on teachers' organizational commitment is, however, limited. Therefore, the present research examines whether teachers' perceptions of the group cohesion, role clarity, and goal orientedness of the leadership team, which is labeled as the cooperation of the leadership team, affect teachers' organizational commitment.

Participative decision-making. Somech (2005) hypothesized that participative decision-making gives teachers the opportunity to be involved in and exert influence on the decision-making process. Their participation is assumed to promote commitment to the decisions that are made, since individuals tend to have a sense of ownership and therefore place greater trust in and rise to a higher level of acceptance of information discovered by them. Furthermore, Somech (2005) assumed that participative decision-making enhances teachers' sense of control or autonomy on the job and validates their professionalism, which can influence their commitment to the school. This assumption is confirmed by previous research (Bogler, 2001; Byrne, 1999; Diosdado, 2008; Firestone & Pennell, 1993; Kushman, 1992; Mathieu & Zajac, 1990; Park, 2005). Although, previous studies demonstrated that there is a significant relation between participative decision-making and organizational commitment; other research could not confirm this link (Bogler & Somech, 2004; Louis, 1998; Nir, 2002; Somech, 2005). This implies that there is not a straightforward relation between participative decision-making and teachers' organizational commitment.

Demographical and Structural School Characteristics

Much of the research on organizational commitment indicated that demographical characteristics of individual teachers, like gender and job experience, are related to their commitment to the school. In this respect, research of Reyes (1992), and Singh and Billingsley (1998) revealed that female teachers are more committed to the school compared to their male colleagues, and that more experienced teachers feel less committed to the school than less experienced teachers. Furthermore, structural school characteristics, such as school size, denomination (i.e., private versus public schools), and school type (i.e., general versus technical and/or vocational education) are assumed to affect teachers' organizational commitment (Mathieu & Zajac, 1990; Vandenberghe & Huberman, 1999). However, other researchers came to the conclusion that the effect of context variables are nearly negligible (Bogler, 2005; Culver, Wolfle, & Cross, 1990). Due to these inconsistent findings in the literature, it is our aim to investigate the relation between context variables and teachers' organizational commitment.

The effect of the size of the leadership team is also investigated. It is assumed that more members in the leadership team can lead to more support of colleagues and more collaboration, and consequently affect teachers' organizational commitment. In contrast, the more people involved in leadership functions and in the communication chain, the more chances that the weakest link results in a reduced quality of communication. Moreover, larger leadership teams can have problems with building close working relationships (Conger & Pearce, 2003), which can have a negative impact on teachers' organizational commitment.

Research Design

Purpose

The purpose of the present study is to enlighten the effect of individual perceptions of teachers concerning leadership variables (i.e., cooperation of the leadership team, the amount and formal distribution of leadership functions, and participative decision-making of all

school members), and context variables on teachers' organizational commitment, taking both the individual teacher level and the school level into account. Building on the theoretical model and the research objectives, the following research questions are put forward:

1. What is the relation between teachers' perceptions of leadership characteristics (i.e., cooperation of the leadership team, the amount and formal distribution of the supportive and supervisory leadership functions, and participative decision-making) and the organizational commitment of teachers?
2. What is the relation between demographical (i.e., job experience, gender) and school structure variables (i.e., school size, school type, denomination, size of the leadership team) and the organizational commitment of teachers?

Research Instruments

In order to assess the study variables, the Distributed Leadership Inventory (DLI) was developed (see Appendix). Measures were selected in terms of psychometric properties and variable definitions that were consistent with those in the study.

Mowday et al.'s (1979) Organizational Commitment Questionnaire, the most widely used measure of commitment (Price, 1997), was applied to assess the dependent variable in this study. The items were rated on a five-point Likert scale ranging from 0 (*strongly disagree*) to 4 (*strongly agree*).

Based on the theoretical conceptualization of a cooperative leadership team, validated subscales of group cohesion (Litwin & Stringer, 1968), role ambiguity (Rizzo, House, & Lirtzman, 1970), and goal orientedness (Staessens, 1990) were used to investigate school members perception of the cooperation of the leadership team. Each item was rated on a five-point Likert scale ranging from 0 (*strongly disagree*) to 4 (*strongly agree*).

Respondents also completed Leithwood and Jantzi's (1999) validated subscale - developing structures to foster participation in school decisions - to assess the extent to which

school members can participate in school decision-making. The items were rated on a five-point Likert scale (0 - *strongly disagree*; 4 - *strongly agree*).

To examine the individual supportive leadership function of the principal, the assistant principals, and the teacher leaders validated and reliable scales were used: strength of vision (De Maeyer, Rymenans, Van Petegem, van den Bergh, & Rijlaarsdam, 2007), supportive behavior (Hoy & Tarter, 1997), providing instructional support, and providing intellectual stimulation (Leithwood & Jantzi, 1999). For the supervisory leadership function, a scale was developed based on instructional leadership theory concerning supervising and monitoring teachers (Blase & Blase, 2002; Hallinger, 2003; Southworth, 2002). For each subgroup of the leadership team (i.e., the principal, the assistant principals, and the teacher leaders) the items were rated on a five-point Likert scale (0 - *never*; 4 - *always*).

Based on the scores of the above-mentioned scales two new variables were calculated in order to receive a general view on the amount and the distribution of the leadership functions within the leadership team (Conger & Pearce, 2003; Mayo, Meindl, & Pastor, 2003).

1. Maximum leadership. To determine the amount of support and the amount of supervision performed by the leadership team, the score of the highest rated subgroup (i.e., the principal, the assistant principals, or the teacher leaders) is used. The perceived maximum leadership sheds light on the amount of leadership teachers receive from one subgroup of the leadership team: the subgroup which is perceived as the most involved in the performance of the leadership functions. The score varies from 0 (*never*) to 4 (*always*).
2. Distribution of leadership. In order to illuminate the formal distribution of the leadership functions, the (de)centralization of the leadership team is assessed. This distribution of leadership refers to the degree to which the supportive and supervisory

leadership functions are equally distributed across the three subgroups of the leadership team. The score has a range from 0 (*centralization*) to 6 (*equal distribution of the leadership functions among the principal, assistant principals, and teacher leaders*).

The questionnaire also elicited information about demographical (i.e., years of job experience, age, gender) and school structure variables (i.e., school size, size of the leadership team, school type, denomination).

Although the DLI is mainly based on valid and reliable research instruments, the factorial constructs were retested, because the original measures examined the leadership of the solo-leaders. In contrast, our study takes a distributed perspective into account. Especially for the two core leadership functions a clear distinction is made between the supportive and supervisory functions of not only the school principal, but also the assistant principals and the teacher leaders (cf. Hulpia, Devos, & Rosseel, 2007). Information about the validity and reliability of the research instrument is displayed in Appendix.

The principals of the 46 schools were contacted and the research purpose was explained and basic information about the school and the management structure were requested. For each school the identities of the principal, the assistant principals, and the teacher leaders were established and the questionnaires were adapted accordingly. Also, all participating respondents received a covering letter explaining the study purpose, procedures, and methods to protect the anonymity.

Sample

Teachers of the second stage (i.e., 14-16 year old pupils) in 46 secondary schools in Flanders (Belgium) participated in the study. Since the present study focuses on large secondary schools, the minimum of pupils per school is 600, because these schools can

appoint an assistant principal. This provides more opportunities for formal distributed leadership.

The sample schools were selected from a list of 360 schools provided by the Flemish Ministry of Education by using a stratified random sampling, taking the geographic regions (i.e., the five districts of Flanders) and the denomination (i.e., private and public schools) into account. The mean school size of the 46 schools is 977 pupils (minimum 600, maximum 2930) and 121 teachers (minimum 55, maximum 410). The leadership team is composed of minimum 3 and maximum 23 members, with a mean of 11.

1738 teachers completed the questionnaire. 216 teachers had more than 10% missing data and were removed from the analysis. The responses of 1522 teachers were used in the analysis, representing a response rate of 64 %. The sample included 41.9% male and 58.1% female teachers, which is similar to the male-female division in the Flemish population of school members (43% and 57% respectively). The age of the teachers ranges from 22 to 65, with an average of 39. The mean length in the current job was 13 years, ranging from 0.1 to 40 years.

Data Analysis

Since the data in the present study have an inherent nested or hierarchical structure, that is teachers (level 1) are nested into schools (level 2), interplay can be assumed between teachers as individuals and the social context to which they belong (i.e., team or school) (Goldstein, 1995). To take both the teacher and the school level into account, multilevel modeling techniques were used to explore the effect of leadership and context variables on the organizational commitment of teachers. The application of hierarchical models results in efficient regression coefficients estimates, correct standard errors and significance tests, which generally will be more conservative than the traditional ones which use aggregated measures ignoring the presence of clustering (Goldstein, 1995).

A number of multilevel models were fitted, using MLwiN 2.02. The best fitting model was designed gradually. First, the unconditional null model, with only an intercept and no explanatory variables included, was used to estimate how much of the variation in teachers' organizational commitment could be attributed to differences between schools and to differences in individual teachers. This null model served as a baseline with which to compare subsequent more complex models. Second, the study variables were added to the null model. All determining variables were centered around their grand mean as is customary in multilevel analysis (Hox, 2002). Dummy variables were created for gender (male 1, female 0), school type (general education 1, technical and/or vocational education 0), and denomination (private schools 1, public schools 0). Initially, the variables were included in the model as fixed effects, assuming that their impact does not vary from teacher to teacher or from school to school. Since parsimonious models are preferred, non-significant effects were eliminated. Where a significant effect occurred, random variance at school and teacher level was allowed.

Model improvement was assessed by studying the decrease in the deviance values of the different models. The parameters of the multilevel models were estimated using Iterative Generalized Least Squares estimations (IGLS). The complete set of models allowed us to deduce which variables are significantly related to teachers' organizational commitment and at which level variance occurs. Finally, in order to compare the magnitude of the different significant effects, effect sizes were calculated.

Results

Table 1 presents the results of the multilevel analyses concerning teachers' organizational commitment. More specifically, the effects of the leadership variables (i.e., cooperation of the leadership team, amount and distribution of the two leadership functions,

participative decision-making) and context variables on the organizational commitment of teachers are explored.

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Null Model

The first step in the analysis was to examine the results of an unconditional two-level null model. The intercept of 2.98 in this random intercept null model represents the overall mean of the teachers' organizational commitment across schools. It seems that the sample teachers in general tended to report that they are committed to the school.

The analysis involved the estimation of the total variance of the dependent variable, namely 0.484, which is the sum of the two variance components (0.044 + 0.440). The null model shows that the variance at school and teacher level is significantly different from zero (respectively: $\chi^2 = 12.796$, $df = 1$, $p < .001$; $\chi^2 = 738.328$, $df = 1$, $p < .001$), which provides justification for using multilevel models. It appears that 9% of the variation in organizational commitment can be situated at school level, while 91% is attributable to differences between individuals, indicating that differences between teachers within schools largely exceeds differences between schools.

Model 1

Starting from the unconditional null model, explanatory variables were added in the second step of the analyses. First, the leadership variables were included as fixed effects. The results reveal that all variables have a significant influence on teachers' organizational commitment, except for the maximum supervision. The significant variables have a positive impact on organizational commitment. Only the distribution of supervision has a negative impact on teachers' organizational commitment. This implies that the more teachers perceive the supervision as distributed across different persons, the less commitment they report.

Compared to the null model, the inclusion of the significant leadership variables resulted in a significant model improvement (χ^2= 874.384, *df* = 5; *p* < .001).

Model 2

Model 2 retained significant results from the previous model and added demographic and structural school variables as explanatory variables. Both gender and years of job experience are significant predictors. More specifically, it appears that male teachers report higher organizational commitment than their female colleagues. The results also show that teachers with more job experience are less committed to the school than teachers with less job experience. Comparing the deviances of model 1 and 2 reveals that model 2 has a significant better fit than model 1 (χ^2= 79.911, *df* = 2; *p* < .001).

Final Model

At the final stage, random variance at school and individual level was allowed, yielding a fully random model (model 3). The fixed part gives the mean value for each distribution and consists of two fixed, unchanging terms (i.e., the average slope and intercept across all schools/teachers). The random part of the model is expanded to include two extra terms for each variable that was allowed to vary randomly, which summarizes the variability of slopes and intercepts across schools/teachers, and a covariance which assesses the degree to which the two distributions are related (Duncan, Jones, & Moon, 1998). Model 3 points out that by allowing random variance at both levels, the deviance of the model decreases significantly (χ^2= 43.86, *df* = 4; *p* < .001).

As to the fixed part of model 3, the intercept of 3.047 represents the overall mean in organizational commitment for teachers with a mean score on all the independent variables included in the model. As a consequence of allowing random variance at school and teacher level, gender is no longer significant; the other explanatory variables remain significant. The effect sizes show that especially the cooperation of the leadership team and the perceived

maximum support have an impact on teachers' organizational commitment. Both the distribution scores (i.e., formal distribution of support and formal distribution of supervision) have the lowest impact.

The random part of the model reveals complex variances at both school and teacher level. At the school level it appears that variance between schools decreases as teachers' perception of the distribution of support increases, implying that differences between schools become smaller as teachers report more distribution of support. At the teacher level, the random part shows that differences between teachers within schools decrease as teachers' perceptions of the cooperation of the leadership team, and participative decision-making increases. More specifically, this implies that differences in commitment between teachers within a school become smaller if teachers report more cooperation of the leadership team and participation. For the maximum support and the distribution of supervision the modeling of the random part did not reveal complex variances.

Discussion

Distributed leadership is a hot item in the educational management literature. However, there is a paucity of empirical quantitative research concerning the effect of distributed leadership on organizational outcomes. The main objective of the present study was investigating the effect of distributed leadership on teachers' organizational commitment. The focus was on the impact of the cooperation of the leadership team, the amount of leadership support and supervision, the formal distribution of leadership, and participative decision-making on teachers' organizational commitment. The effect of context variables was studied as well. Multilevel analysis was applied to take the nesting of teachers within schools into account.

The study findings suggested that the teachers in the present study feel committed to the school, which confirms the results of Nguni et al. (2006), and Tsui and Cheng (1999). The

fixed part of the multilevel analysis showed that the study variables significantly explained the organizational commitment of teachers. In other words, the individual perceptions of teachers concerning the leadership in schools had an effect on the degree to which teachers can identify with and involve in schools.

The study revealed that teachers' perceptions concerning the cooperation of the leadership team and the maximum amount of support are the most important predictors for teachers' organizational commitment. Previous research examining the relation between teachers' perceptions concerning the cooperation of the leadership team is scarce. Based on the findings of this study, it can be stated that teachers who believe that their school is led by a cooperative leadership team, which is characterized by group cohesion, clear and unambiguous roles of the leadership team members, and shared goal orientedness, are more committed towards their school. Also, the study revealed that the maximum amount of support teachers receive from the leadership team has an important influence on their organizational commitment, which confirms previous research (Nguni et al., 2006; Singh & Billingsley, 1998). No significant impact was, however, found for the amount of supervision, which is in contrast with Somech (2005). This result implies that the amount to which teachers feel supported by their leadership team is more important for their organizational commitment, compared to the amount to which teachers feel supervised by the leadership team. Teachers' perceptions concerning the amount to which the leadership team supervises and monitors the teachers has no effect on their organizational commitment.

Concerning the distribution of leadership functions our study revealed that the formal distribution of supportive leadership among the leadership team had a positive significant impact on teachers' commitment to the school. Teachers, who believe that support is equally distributed among the leadership team, will have a higher organizational commitment than teachers who believe that support is centralized in one person of the leadership team. In

contrast, for the distribution of supervision our results showed that there is a significant negative effect on organizational commitment. In other words, teachers who are supervised by multiple school leaders will feel less committed to the school than teachers supervised by only one person of the leadership team. Probably, teachers prefer clear supervision from one formal leader, instead of possible conflicting views and contradictory feedback from multiple members in the school. Remarkably, the formal distribution of leadership functions among the leadership team plays a role to a lesser extent in defining the commitment of teachers to the school. Therefore, the main conclusion is that the formal distribution of the supportive or the supervisory leadership function should not be an aim in itself. Leadership is more than counting up the roles of multiple leaders, as Spillane (2006) stated. Moreover, the assumed complexity, which can be caused by the distribution of leadership functions, has not by definition a negative effect on teachers' organizational commitment. An effective cooperating leadership team, and strong support of this team in schools pertained more to committed teachers.

Next, our study showed that participation in decision-making increases people's commitment to the organization. This implies that teachers, who believe they have a voice in school decision-making, feel more committed to the school than their colleagues who state that they do not have opportunities to participate in school decision-making. This finding corroborated results of previous research of Diosdado (2008) and Kushman (1992). However, our study revealed that the effect of participative decision-making is rather small, compared to the effect of the cooperative leadership team and the amount of support. This corresponds to the findings discussed in the theoretical framework of this study, in which participative decision-making has proven to be significant in some studies, whereas this was not the case in other studies. Our study revealed that the cooperative leadership team and the amount of support are more important than teachers' opportunity to participate in school decision-

making. This implies that teachers' perception concerning their own empowerment to participate in school decision-making is less influential in teachers' organizational commitment than their perceptions concerning the operation of the team who leads the school and the amount of support they receive from this leading team.

Concerning the context variables, our research revealed that teachers' job experience significantly affected organizational commitment in a negative way. This finding is in line with previous research of Reyes (1992) who came to the conclusion that more experienced teachers felt less committed to the organization than less experienced teachers. The study revealed that the number of members in the leadership team has no effect on teachers' organizational commitment. This implicates that not the size of the leadership team is important. Instead, it is the collaboration and cooperation at the level of the leadership team that influences teachers' organizational commitment. No significant link appeared to exist between the other context variables and teachers' organizational commitment.

The random part of the multilevel analysis showed that only a modest proportion of the variance in teachers' organizational commitment is actually attributable to variation between schools. This suggests that teachers' organizational commitment depends more on what individual teachers think, rather than on a group effect arising from belonging to a particular school. This implies that although variations in leadership variables may be conceptualized at the school level, what individual teachers think is more important for their organizational commitment. This finding confirms previous research of Park (2005), and Tsui and Cheng (1999). However, it should be noted that 9% of between-school variance in teachers' organizational commitment should not be underestimated. Organizational commitment of teachers is not a purely individual matter.

Conclusion

The present study examined the relation between distributed leadership variables, context variables, and teachers' organizational commitment using a multilevel approach. No previous research has examined the mechanisms through which this influence occurs. The study findings suggested that teachers' organizational commitment is mainly related to teachers' perceptions concerning the cooperation of the leadership team and the support received from the leadership team. Teachers feel committed to the school if it is led by a leadership team working in a cooperative way and where all leaders support teachers sufficiently. This is more important than an equal distribution of leadership functions among formal leaders in the school. Additionally, the study revealed that differences in teachers' organizational commitment are more situated within schools than differences between schools.

This study, however, is bound by a number of limitations and further research is needed. In this study the focus was mainly on the distribution of two core leadership functions (i.e., support and supervision). However, one might suggest that the distribution of other leadership functions (e.g., building management functions, boundary spanning functions) or certain subject matters (cf. Sherer, 2004; Spillane, 2006) can have a different relation to teachers' organizational commitment. In addition, in this study only large secondary schools were elicited. Distributed leadership in smaller secondary schools or other educational levels, like primary or higher education, which are characterized by different management structures, could be studied in further research. In this study, organizational commitment was treated as a global construct. It is recommended that future research re-examines the relationships between the independent variables and teachers' organizational commitment by elaborating the dependent variable using multidimensional constructs, similar to the research of Hartmann and Bambacas (2000). Next, the independent study variables accounted only for some proportion of influence on teachers' organizational commitment. It is expected that in

addition to the independent study variables, other variables might also be considered as relevant predictors of organizational commitment and should be examined in future research. On the one hand, for example, dispositional variables, like self-efficacy (Ross & Gray, 2006), or the relation with pupils and colleagues (Shann, 1998) can be important predictors of teachers' organizational commitment. On the other hand, organizational factors, like organizational stability (Mayrowetz, Murphy, Louis, & Smylie, 2007), development stage (Spillane, 2006), or school climate (Reyes, 1992) can influence the organizational commitment of teachers as well. Final limitations concerned the research instrument. First, it should be stressed that only teachers' perceptions regarding the leadership factors were investigated in this study. More objective measures of the leadership variables, based on the perceptions of both school internal and external respondents could be used in future research. Second, the quantitative nature of the research instrument had its limitations. Future research should use other sources for investigating the study variables. Qualitative-interpretative research methods, like interviews or observations, could extend our understanding of how organizational commitment can be influenced by leadership variables.

Nevertheless, the current study points to teacher perceptions on distributed leadership that contribute to their organizational commitment. Therefore, the present study has important theoretical implications. Distributed leadership is an ambiguous and confusing concept. In the present study, a three dimensional approach was developed. First, distributed leadership is defined as the distribution of leadership functions (i.e., support and supervision) among formal leadership positions in the leadership team. Both the quality of the team members' leadership (i.e., maximum leadership) and the degree to which leadership functions are distributed among the leadership team members (i.e., distribution of leadership), are analyzed. Second, the cooperation of the leadership team focuses on the leadership team as a whole. Third, participation in the school's decision-making includes leadership interactions among

all school team members. They clarify how all team members are involved in the school's decision-making process. Furthermore, the effect of distributed leadership on organizational outcomes, like teachers' organizational commitment, is examined empirically. Organizational commitment of teachers is a key variable in the school improvement process. Recently, several scholars (Harris et al., 2007; Mayrowetz, 2008) have indicated that studies analyzing the link between distributed leadership and organizational outcomes and school improvement are a priority in the development and validation of the concept of distributed leadership.

An important methodological implication is the use of a reliable and valid research instrument examining distributed leadership in large secondary schools. Also, the multilevel approach is a main strength of this study. Traditionally aggregated measures are used, which result in a loss of important information. In the present study, the relative contribution of factors at both individual and school level are considered, using a multilevel framework that explicitly capitalizes on the hierarchical nature of the data.

Furthermore, this study has practical implications for school leaders and policy-makers. The data presented here suggested that 9% of teachers' organizational commitment is attributable to difference between schools, this implies that "schools matter" and that the leadership characteristics in general, and the cooperation of the leadership team and the amount of support in specific, should receive adequate attention in order to improve teachers' commitment to the school. However, our results revealed that organizational commitment is mainly an individual matter. Therefore, perceptions of teachers concerning the leadership characteristics of the school should be affected. To increase teachers' level of organizational commitment, large secondary schools need to invest in the perceptions of teachers concerning the cooperation among the leadership team members. It is important that the leadership team is not only characterized by group cohesion, clear and unambiguous roles, and goal orientedness, but also that this is explicated and openly communicated to the teachers. School

leaders need to define and articulate their organizational vision, and roles, and act like a cohesive group in order to optimize individual teachers' commitment to the school organization. Additionally, teachers should feel supported by all members of the leadership team. This implies that setting a school vision and motivating followers should remain a core leadership function of all leadership members.

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Appendix

The Distributed Leadership Inventory (DLI): An Overview of the Questionnaire Items and Psychometric Characteristics of the Subscales (Hulpia, Devos, & Rosseel, 2007)

Scale	Items (*strongly disagree/0; strongly agree/4*)
Cooperation of the leadership team	There is a well-functioning leadership team in our school The leadership team tries to act as well as possible The leadership team supports the goals we like to attain with our school All members of the leadership team work in the same strain on the school's core objectives In our school the right man sits on the right place, taken the competencies into account Members of the management team divide their time properly Members of the leadership team have clear goals Members of the leadership team know which tasks they have to perform The leadership team is willing to execute a good idea It is clear where members of the leadership team are authorized to
Based on	Group cohesion (Litwin & Stringer, 1968) Role ambiguity (Rizzo, House, & Lirtzman, 1970) Goal orientedness (Staessens, 1990)
Validity & reliability	Modified model (Hulpia, Devos, & Rosseel, 2007): $\chi^2 = 138.098$ ($df = 35$; $p < .001$), CFI = 0.978, TLI = 0.972, SRMR = 0.026, RMSEA = 0.056 Cronbach's α: .93

Scale	Items
	To what amount is (1) the principal; (2) the assistant principals; (3) the teacher leaders involved in the following statements? (*never/0; always/4*)
Leadership support	… premises a long term vision ... debates the school vision ... compliments teachers … helps teachers … explains his/her reason for criticism to teachers … is available after school to help teachers when assistance is needed … looks out for the personal welfare of teachers … encourages me to pursue my own goals for professional learning … encourages me to try new practices consistent with my own interests … provides organizational support for teacher interaction
Leadership supervision	… evaluates the performance of the staff … is involved in summative evaluation of teachers … is involved in formative evaluation of teachers
Based on	Strength of vision (De Maeyer, Rymenans, Van Petegem, van den Bergh, & Rijlaarsdam, 2007) Supportive behavior (Hoy & Tarter, 1997) Providing instructional support (Leithwood & Jantzi, 1999) Providing intellectual stimulation (Leithwood & Jantzi, 1999)
Validity & reliability	Modified model (Hulpia, Devos, & Rosseel, 2007): ▪ Principal: $\chi^2 = 353.840$ ($df = 64$; $p < .001$), CFI = 0.960, TLI = 0.952,

	SRMR = 0.042, RMSEA = 0.069 ▪ assistant principals: χ^2 = 361.794 (*df* = 64; *p* < .001), CFI = 0.957, TLI = 0.948, SRMR = 0.047, RMSEA = 0.070 ▪ teacher leaders: χ^2 = 390.001 (*df* = 64; *p* < .001), CFI = 0.943, TLI = 0.931, SRMR = 0.044, RMSEA = 0.073 Cronbach's α support: .91 (teacher leaders); .93 (principals, assistant principals) Cronbach's α supervision: .79 (teacher leaders); .83 (principal); .85 (assistant principals)

Scale	Items (*strongly disagree/0; strongly agree/4*)
Participative decision-making	Leadership is delegated for activities critical for achieving school goals Leadership is broadly distributed among the staff We have an adequate involvement in decision-making There is an effective committee structure for decision-making Effective communication among staff is facilitated There is an appropriate level of autonomy in decision-making
Based on	Developing structures to foster participation in school decisions (Leithwood & Jantzi, 1999)
Validity & reliability	Modified model (Hulpia, Devos, & Rosseel, 2007): χ^2 = 57.403 (*df* = 9; *p* < .001), CFI = 0.970, TLI = 0.950, SRMR = 0.032, RMSEA = 0.075 Cronbach's α:.81

Scale	Items (*strongly disagree/0; strongly agree/4*)
Organizational commitment	My school inspires me to do the best I can I'm proud to be a part of this school team I really care about the fate of this school I find that my values and the organization's values are very similar I regularly talk to friends about the school as a place where it is great to work I'm really happy that I choose this school to work for
Based on	Organizational Commitment Questionnaire (Mowday, Steers, & Porter, 1979)
Validity & reliability	Modified model (Hulpia, Devos, & Rosseel, 2007): χ^2 = 152.077 (*df* = 43; *p* < .001), CFI = 0. 978, TLI = 0. 972, SRMR = 0. 0306, RMSEA = 0. 054 Cronbach's α: .91

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Tables

Table 1

Model Estimates of the Two-level Analysis of Teachers' Organizational Commitment

Parameter		Null model	Model 1	Model 2	Model 3 – Final model	Effect size
Fixed	Intercept	2.983 (0.036)	3.010 (0.028)	3.025 (0.032)	3.047 (0.030)	
	Cooperative leadership team		0.309 (0.032)	0.315 (0.032)	0.299 (0.032)	0.28
	Maximum support		0.300 (0.025)	0.294 (0.025)	0.311 (0.025)	0.30
	Maximum supervision		Ns	Ns	Ns	-
	Distribution of support		0.106 (0.022)	0.094 (0.022)	0.068 (0.029)	0.07
	Distribution of supervision		-0.047 (0.014)	-0.047 (0.014)	-0.041 (0.013)	0.07
	Participative decision-making		0.201 (0.029)	0.190 (0.029)	0.177 (0.028)	0.17
	Gender			0.062 (0.028)	Ns	-
	Years of job experience			-0.008 (0.001)	-0.007 (0.001)	0.11
	School size			Ns	Ns	-
	Number leadership team			Ns	Ns	-

	School type			Ns	Ns -
	Denomination			Ns	Ns -
Random	Level 2 – school				
	$\sigma^2_{\mu 0}$	0.044 (0.012)	0.009 (0.004)	0.012 (0.004)	0.013 (0.004)
	$\sigma_{\mu 0 \mu DistSupport}$				-0.008 (0.004)
	$\sigma^2_{\mu DistSupport}$				0.014 (0.006)
	Level 1 – teachers				
	$\sigma^2_{\varepsilon 0}$	0.440 (0.016)	0.253 (0.009)	0.245 (0.009)	0.242 (0.016)
	$\sigma_{\varepsilon 0 \varepsilon Part}$				-0.027 (0.009)
	$\sigma^2_{\varepsilon 0 \varepsilon CohLT}$				-0.031 (0.009)
Model fit	Deviance	3135.380	2260.996	2181.085	2137.225
	χ^2		874.384	79.911	43.86
	df		5	2	4
	p <		.001	.001	.001

Note. Per cell: regression coefficient (standard errors); Ns = not significant.