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The Relationship between Principal Leadership and Teacher Collaboration in Turkish Primary Schools: A Multilevel Analysis

Sedat Gumus[†]
Mustafa Kemal University

Okan Bulut
University of Minnesota

Mehmet Sukru Bellibas
Michigan State University

The purpose of the current study is to reveal the relationship between the specific leadership behaviors of principals and teacher collaboration in Turkish primary schools, controlling for several school characteristics, such as school size and average class size, and the demographic characteristics of teachers, such as level of education and years of experience. The data of this study come from the 2008 administration of Teaching and Learning International Survey (TALIS) conducted by the Organization for Economic Cooperation and Development. A hierarchical linear modeling (HLM) was used for analyzing the TALIS data where teachers are nested within schools. The results of this study indicate that there is an important link between various components of principal leadership and teacher collaboration in Turkish primary schools. In general, the implementation of instructional leadership approach by principals associated positively with teacher collaboration, while administrative leadership attitudes negatively correlated with teacher collaboration.

[†] Address for correspondence: Sedat Gumus, Mustafa Kemal Universty, College of Education, Hatay, Turkey.
Email:gumussed@gmail.com

Introduction

It is conventional wisdom among educational researchers that teachers are the most important school factors influencing student learning, since they are at the heart of teaching and learning activities in schools. Teachers' individual competencies on pedagogical and content knowledge and their ability to teach are the key elements for their success. It is, therefore, obvious that teachers' success depends strongly on their ability to improve their knowledge and capacity, but they cannot achieve this without working collaboratively to enrich their instructional practice (Lee, 1990). This fact has turned into a prominent slogan, "Isolation is the enemy of improvement" that appears in many educational studies (Jamentz, 2002). This slogan suggests that teachers' relationships with their colleagues regarding their profession are crucial for them to be involved in continuous improvement of their instructional capacity. Specifically, effective collaboration on professional tasks can enable teachers to receive feedback from their colleagues, reflect on their teaching strategies, and develop new instructional techniques (Goddard, Goddard, and Tschannen-Moran, 2007).

Beyond the strong theoretical emphasis, extant research has also verified empirically the many positive impacts of teacher collaboration on both teachers and students (Goddard et al., 2007; Johnson, 2003; McHenry, 2008; Miller, et al., 2010). However, there is still a considerable gap in the literature with regard to identifying the contextual factors associated with meaningful teacher collaboration in schools (Cha and Ham, 2012). More interestingly, researchers have not paid enough attention to the possible influence of principals on teacher collaboration, although it is a well-known fact that leadership plays an extensive role in school effectiveness and that it affects student success indirectly, mostly via its impact on teachers (Louis et. al., 2010). In this context, investigating

how school principals might foster or impede teacher collaboration in their schools is essential for prominent efforts to increase student learning.

Despite many theoretically claimed and empirically verified benefits of teacher collaboration for both teachers and students, current literature is lacking in terms of exploring the factors associated with teacher collaboration and in identifying the context in which the highest level of collaboration among teachers could be possible. Specifically, there is little evidence regarding whether principals can influence collaboration among teachers, and if so, what components of their leadership are more critical for promoting collaborative working conditions in schools. In the Turkish context, the absence of research on teacher collaboration and possible related factors, such as principal leadership, is also explicit. This study, therefore, is an important attempt to fill this gap in the literature by investigating the factors affecting teachers' professional collaboration in Turkish primary schools, with special attention toward the role of principal leadership.

Literature Review

We begin by defining the concept of teacher collaboration and discuss its prerequisites and possible outcomes based on the current literature. We then describe the role of school principals on teacher collaboration in detail and review the existing literature on the relationship between principal leadership and teacher collaboration.

Teacher collaboration

Collaboration involves volunteer interactions of at least two co-equal parties toward achieving a common goal (Friend and Cook, 2003). In educational settings, collaboration includes

teachers' joint efforts on core tasks, such as instruction in the classroom (Cha and Ham, 2012). Professional collaboration among teachers could be either indirect, which could take place before or after school or in the teacher planning period, or direct, which includes peer coaching or supervision and different types of cooperative teaching practices (Gable and Manning, 1997). Teacher collaboration can also be categorized as formal and informal. Teachers could set up formal teams to collaborate to improve their teaching, while collaboration could also occur while teachers talk informally about their classroom practices (Goddard et al., 2007).

Teachers' professional collaboration has been found to be an important part of efforts to enhance teacher motivation (De Jesus and Lens, 2005), increase teachers' self-efficacy (Shachar and Shmuelevitz, 1997), provide moral support for teachers (Johnson, 2003), and augment teacher job satisfaction (Ackerman, 2011). Extant research also identified collaboration among teachers as an important factor affecting positively the implementation of reform initiatives in schools (Gable and Manning, 1997; Little, 1993). Finally, and perhaps most importantly, the learning experiences teachers attain because of their collaborative efforts could make them more competent in terms of improving student learning (Printy, 2008). Current research also supports this notion by suggesting a close relationship between teacher collaboration and student learning. For example, Goddard et al. (2007) found that when teachers collaborate on different tasks related to their practice, such as curriculum development and instructional improvement, students' mathematic and reading achievement increased to a certain level.

Given the strong evidence on many positive outcomes of teacher collaboration, both researchers and policy makers have been encouraging teachers to change their traditional

practice, which has been mostly isolated, toward more collaborative and open interactions with each other (Pappano, 2007). Therefore, identifying the factors that can facilitate this dramatic transition is very important. Teachers are the ones who can determine the level and quality of collaboration. Their commitment and eagerness to work together are vital for a productive and effective collaboration (Brownell, Yeager, Rennells, and Riley, 1997). However, there are other prerequisites of creating working places in which teachers are encouraged to collaborate more with their colleagues.

In the process of creating collaborative atmosphere in schools, it is important to have teachers who share common goals, feel equally accountable, and share the responsibility of outcomes, whether negative or positive. Teachers should believe that their contribution is important and valued to engage in effective and productive collaboration with their colleagues (Cook and Friend, 1991). In this context, the necessity of having teachers participate in decision-making processes in schools and holding them accountable for the outcomes makes the principals' role in fostering teacher collaboration undeniable. Although administrative demand does not ensure a collaborative working condition automatically, it is safe to suggest that principals can play a key role in creating a safe and productive environment, which enables meaningful professional discussions and collaboration among teachers (Pappano, 2007).

Principals' roles in teacher collaboration

Over the last 30 years, school leadership and its impact on teaching and learning have received substantial attention from researchers, especially in school improvement studies. As a result, a number of important leadership concepts, such as instructional leadership, distributed leadership, transformational leadership, and the more recently shared

instructional leadership, have emerged (Hallinger, 2005; Leithwood, 1990; Marks and Printy, 2003; Spillane, 2005). As scholars acknowledge that the ultimate purpose of school improvement is to contribute to student learning, they have devoted significant efforts to investigate the link between principals' leadership and student achievement in recent years (Hallinger and Heck, 2010; Harris, 2005; Heck, 1990; Leithwood and Jantzi, 2000; Leithwood, Patten, and Jantzi, 2010).

Studies have investigated the relationship between school leadership and student achievements but have not been able to manifest a direct relationship. Findings of these studies are usually either insignificant or contradictory (Kurt, Duyar, and Calik, 2011). However, more recent studies yielded the conclusion that leadership is linked indirectly to student achievement, which appeared to emerge mostly through principals' influences on teachers (Hallinger and Heck, 1996, 2010; Leithwood et al., 2010; Louis, et. al., 2010). Louis et al. (2010), for example, found that school leaders have significant potential to contribute to student achievement, but such contribution occurs mostly through principals' impact on teachers' motivation and work setting.

Creating a collaborative working condition in which teachers learn from each other and improve their instruction can be one way for principals to promote student achievement (Lee, 1990). The importance of having an environment in which teachers can share their knowledge and ideas, discuss instructional problems, and support each other's growth is obvious. This, however, requires a leadership vision that values teachers' efforts of working together (Brownell et al., 1997). Beyond recognizing teachers' efforts, principals should also allocate sufficient amount of time, space, and resources that teachers need in order to engage in productive

collaborative activities (Brownell et al., 1997; Gajda and Koliba, 2008). There is also need for motivational reinforcement from school principals to achieve meaningful and successful collaboration among teachers (McHenry, 2009).

Drawing upon collaboration research, Piccardi (2005) summarized the traits and characteristics that school leaders should possess to improve collaboration in schools. Some of these characteristics were stated as being central and accessible in the school, practicing shared leadership and decision-making, acting as an instructional leader and resource for teachers, and being able to model learning and collaboration. Similarly, Gajda and Koliba (2008) suggested that teachers are more likely to work together when principals create a shared understanding for the meaning of collaboration; coordinate groups and clarify the purpose; ensure that collaboration process is meaningful and productive; and provide support for individuals. McHenry (2009) also found that the most important trait of leadership that fosters collaboration among teachers is to give positive feedback to teachers with regard to their instructional practice.

As a result, there is enough evidence to believe that principals may influence the professional collaboration among teachers in their schools. Therefore, this study aims to find out if this notion is true by employing a multilevel modeling method on a large-scale dataset from Turkish primary schools. Specifically, this study investigates the relative effects of instructional and administrative leadership of school principals on teacher collaboration in Turkish primary schools. The following section provides comprehensive information about the data and methods used in this study.

Data and Methods

Data source

The data for this study come from the 2008 administration of Teaching and Learning International Survey (TALIS) conducted by the Organization for Economic Co-operation and Development (OECD). The purpose of TALIS is to help participating countries to review and develop policies to increase the effectiveness of their schools. TALIS 2008, therefore, focused on the leadership and management of schools, the appraisal of teachers' work in schools, and the professional development of teachers (OECD, 2010). Twenty-four countries participated in the first TALIS implementation in 2008, including Turkey. This study used the Turkish sample consisting of 2,970 teachers from 183 schools. Table 1, Table 2, and Table 3 show the descriptive statistics of teachers, principals, and schools in our sample.

Research questions

This study aimed to explain the relationship between teacher collaboration and principal leadership in Turkish primary schools, and to do so three research questions were developed: 1) How much do schools in Turkey vary in collaboration among teachers? 2) Do the teacher-level factors, such as teacher's gender and job status affect teacher collaboration? 3) Does school principals' usage of different administrative and instructional leadership styles influence the level of collaboration among teachers? To address these questions, the effects of teacher- and principal-related predictors were investigated within the hierarchical linear modeling (HLM) framework. The following section explains the details of HLM models used in this study.

Table 1. *Description of the Sample of Turkish Teachers used in the Study*

	Men (*N*=1317)		Women (*N*=1653)		Total (*N*=2970)	
	N	%	N	%	N	%
Age						
< 25	52	3.9	125	7.6	177	6.0
25–29	330	25.1	536	32.4	866	29.2
30–39	510	38.7	627	37.9	1137	38.3
40–49	223	16.9	281	17.0	504	17.0
50–59	197	15.0	82	5.0	279	9.4
60+	5	.4	2	.1	7	.2
Status						
Contract	206	16	305	19	511	17.7
Permanent	1083	84	1301	81	2384	82.3
Teaching Experience (in years)						
1 or less	60	4.6	98	6.0	158	5.4
1–5	305	23.3	481	29.3	786	26.7
6–10	377	28.8	429	26.2	806	27.3
11-15	197	15.1	288	17.6	485	16.5
16–20	84	6.4	146	8.9	230	7.8
21+	285	21.8	197	12.0	482	16.4
Education						
Bachelor or lower	1235	93.8	1526	92.8	2761	93.2
Master's or higher	81	6.2	119	7.2	200	6.8

HLM models

In this study, HLM was used for analyzing TALIS 2008 data. HLM focuses on the effects of social variables on behavior or performance in a certain domain. HLM allows the variance in hierarchical data structures where persons (e.g., students or

Table 2. *Description of the Sample of Turkish Principals used in the Study*

	Men (*N*=164)		Women (*N*=16)		Total (*N*=183)	
	N	%	N	%	N	%
Principalship Experience (in years)						
1 or less	5	3.1	2	12.5	7	3.9
1–5	48	29.4	7	43.8	55	30.4
6–10	27	16.6	1	6.3	29	16.0
11-15	33	20.2	5	31.3	39	21.5
16–20	25	15.3	1	6.3	26	14.4
21+	25	15.3	0	0	25	13.8
Education						
Bachelor or lower	160	97.6	14	87.5	175	96.6
Master's or higher	4	2.4	2	12.5	6	3.3

Table 3. *Description of the Sample of Schools in the Study*

	Public (*N*=136)	Private (*N*=46)	Total (*N*=183)
	Mean	Mean	Mean
Total Enrollment	1407.1	393.8	1147.4
Average Class Size	33.1	22.6	30.4

teachers) are nested within a higher level (e.g., classes or schools) to be examined. In a HLM model, the relative variation in the dependent variable between Level 1 and Level 2 units can be evaluated simultaneously in the same model. In a two-level HLM model, Level 1 has the individual-level predictors and an individual-level outcome. At Level 2, between-group predictors are used to predict between-group variance in Level 1 intercepts and slopes (Gavin and Hofmann, 2002).

In TALIS 2008, teachers were nested within schools. Therefore, teachers were used as Level 1, and schools were used as Level 2 in HLM analyses. Two variables were used as dependent variables: index of exchange and co-ordination for teaching (TCEXCHAN) and index of professional collaboration (TCCOLLAB). While TCEXCHAN represents the activities that entail a lower level of interaction among teachers, such as exchange of teaching materials and attendance at team conferences, TCCOLLAB requires higher-level interaction, such as teaching jointly as a team and observing other teacher's classes and providing feedback. Each of these indices was formed based on a scale with five items measuring cooperation among staff in TALIS (See Appendix for the description of these items). The indices were computed based on the factor scores obtained from confirmatory factor analysis of the scales.

In this study, three HLM models were fitted to measure the variation in TCEXCHAN and TCCOLLAB indices among teachers and schools. All three HLM models were run using HLM6 software (Raudenbush, Bryk, and Congdon, 2004). The first HLM model was a random-effects ANOVA model (i.e., unconditional model) that did not include any Level 1 or Level 2 predictors. This model was used to compute the intra-class correlation coefficient (ICC) that represents the proportion of the variance in between schools (see Raudenbush and Bryk, 2002). Model 1 can be depicted in equation form as follows:

Level 1 (Teachers): $Y_{ij} = \beta_{oj} + r_{ij}$
Level 2 (Schools): $\beta_{oj} = \gamma_{00} + u_{0j}$

where Y_{ij} is the dependent variable (TCEXCHAN or TCCOLLAB) for teacher i in school j; β_{oj} is the mean of the

dependent variable in school j; r_{ij} is the variation in the dependent variable among teachers; and u_{0j} is the variation in the dependent variable among schools.

The second model included only Level 1 predictors related to teachers: teacher's gender (female=0, male=1); teacher's job status (permanent=1, contract=0); teacher's job experience (1 year, 1–5 years, 6–10 years, 11–15 years, 16–20 years, more than 20 years); and teacher's education level. The original education level variable in TALIS 2008 had five categories: Below International Standard Classification of Education (ISCED) level 5; ISCED level 5B; bachelor's degree; master's degree; and ISCED level 6. This variable was recorded as a binary variable by grouping master's degree and ISCED level 6 as one group and the rest of the categories as another group (master or higher=1, bachelor or below=0). All of the Level 1 predictors were grand-mean centered. In equation form, Model 2 can be shown as:

$$Y_{ij} = \beta_{oj} + \beta_{1j}(Gender) + \beta_{2j}(Status) + \beta_{3j}(Experience) + \beta_{4j}(Education) + r_{ij}$$
$$\beta_{oj} = \gamma_{00} + u_{0j}$$
$$\beta_{1j} = \gamma_{10}$$
$$\beta_{2j} = \gamma_{20}$$
$$\beta_{3j} = \gamma_{30}$$
$$\beta_{4j} = \gamma_{40}$$

where β_{1j} through β_{4j} are the slope estimates for the effects of Level 1 predictors. All these predictors were used as fixed effects; that is, they were not allowed to vary across schools.

The third model included Level 2 predictors in addition to Level 1 predictors described above. Level 2 predictors were

school type (private or public); school size (continuous); average classroom size (continuous); and five indices of school principal's leadership styles. Primary predictors for this study were the leadership styles of principals. The TALIS dataset includes five indices corresponding to different school leadership styles. These indices are: (i) management of school goals, (ii) instructional management, (iii) direct supervision of instruction, (iv) accountable management, and (v) bureaucratic management. While the first three leadership indices are defined as components of instructional leadership, the last two are defined as components of administrative leadership (OECD, 2010).

Five indices describing the leadership and management styles of school principals were derived from questions that asked school principals about the frequency that they engaged in a range of school management activities and behaviors, and how strongly they agreed with statements about their role in the school. Principals' responses to four to six survey items for each dimension were used to calculate these five indices. Confirmatory factor analysis was used to compute factor scores for each dimension. Sample survey items for each leadership dimension are respectively: (i) I ensure that teachers work according to the school's educational goals, (ii) I inform teachers about possibilities for updating their knowledge and skills, (iii) I observe instruction in classrooms, (iv) An important part of my job is to ensure that teachers are held accountable for the attainment of the school's goals, (v) It is important for the school that I check for mistakes and errors in administrative procedures and reports.

As in Model 2, all Level 1 predictors were grand-mean centered. Model 3 can be shown in the equation form as follows:

$$Y_{ij} = \beta_{oj} + \beta_{1j}(Gender) + \beta_{2j}(Status) + \beta_{3j}(Experience) + \beta_{4j}(Education) + r_{ij}$$

$$\beta_{oj} = \gamma_{00} + \gamma_{01}(SchoolType) + \gamma_{02}(SchoolSize) + \gamma_{03}(AvClSize) + \gamma_{04}(Manggoals) + \gamma_{05}(Instrmang) + \gamma_{06}(Supinstr) + \gamma_{07}(Accrole) + \gamma_{08}(Burrulef) + u_{0j}$$

$$\beta_{1j} = \gamma_{10}$$

$$\beta_{2j} = \gamma_{20}$$

$$\beta_{3j} = \gamma_{30}$$

$$\beta_{4j} = \gamma_{40}$$

where schooltype, schoolsize, avclsize, manggoals, instrmang, supinstr, accrole, and burrulef are school type, school size, average classroom size, index of management of school goals, index of instructional management, index of direct supervision of instruction, index of accountable management, and index of bureaucratic management, respectively.

Results

The results from Model 1 (see Table 4) indicated that the Level 1 variance was 0.843 and the Level 2 variance was 0.221 for the index of exchange and co-ordination for teaching (TCEXCHAN). For the index of professional collaboration (TCCOLLAB), the Level 1 variance was 0.515 and the Level 2 variance was 0.212. The results also indicated that the Level 2 variances for both TCEXCHAN and TCCOLLAB are significantly different from zero (TCEXCHAN: χ^2 (182) = 957.74, $p < .001$; TCCOLLAB: χ^2 (182) = 874.06, $p < .001$). These variance components can be used to calculate the ICC; that is, the ratio of Level 2 residual variance to the total residual variance. The ICC values for TCEXCHAN and TCCOLLAB were computed as 0.207 and 0.291, respectively. The ICC values showed that 20.7%

variability in TCEXCHAN and 29.1% variability in TCCOLLAB could be attributed to the variability between schools. These high percentages of the Level 2 variances implied that Level 1 and Level 2 predictors are needed to explain the sources of ambiguous variation in collaboration among the Turkish teachers at their schools.

The changes in Level 1 and Level 2 variance estimates across the three models show that Level 2 predictors were able to explain most of the variation in TCEXCHAN and TCCOLLAB indices across schools. To compare the fit of the HLM models, deviance, AIC, and BIC indices can be used. The smaller these indices are the better a model fits. Based on the results in Table 4, Model 3 seems to have the best model-fit among our three models. Including Level 2 variables in the model reduced the amount of unexplained variation up to 60% for TCEXCHAN and 80% for TCCOLLAB.

Tables 5 and 6 show the results from the last two HLM models. Model 2 included Level 1 predictors: teacher's gender, experience, employment status, and education level. The results of this model revealed that gender and employment status were the significant predictors of the variation in TCEXCHAN and TCCOLLAB indices among teachers and schools. Gender was positively related to TCEXCHAN and TCCOLLAB, whereas the slope for employment status was in the negative direction. These results mean that female teachers tend to cooperate and collaborate more than male teachers do, and that permanently employed teachers tend to cooperate and collaborate with other staff less than teachers who work temporarily under an employment contract. Teachers' education level and year of work experience were not significant predictors of cooperation and collaboration among the Turkish teachers. Using the Level 1

Table 4. *Variance and Model-Fit Results from the HLM Models for Two Dependent Variables*

Variance	TCEXCHAN			TCCOLLAB		
Estimates	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Level 1	0.843	0.842	0.840	0.515	0.514	0.513
Level 2	0.221	0.199	0.084	0.212	0.108	0.043
AIC	8224.76	7939.60	7840.08	6747.33	6507.89	6409.31
BIC	8242.75	7981.57	7930.03	6765.32	6549.86	6499.26
Deviance	8218.76	7925.60	7810.08	6741.33	6493.89	6379.31
Df	3	7	15	3	7	15

predictors in Model 2 reduced the total amount of variance by 10% in TCEXCHAN and 49% in TCCOLLAB.

To explain more variation in Level 2 for the TCEXCHAN and TCCOLLAB indices, Model 3, in addition to the Level 1 predictors, included several Level 2 predictors. Three of these predictors (school type, school size, and average classroom size) were related directly to school characteristics. Other predictors were the indicators of school principals' instructional and administrative leadership styles. The results of Model 3 indicated that for both TCEXCHAN and TCCOLLAB, school type and average classroom size were significant predictors of the variation among the schools. Both school type and average classroom size had a negative relationship with the TCEXCHAN and TCCOLLAB indices. The teachers in public schools obtained lower scores in the TCEXCHAN and TCCOLLAB indices than the teachers in private schools did. Results also show that the teachers work in schools with small number of students in the classrooms carry out more exchange and coordination activities for teaching and they collaborate more with other teachers compared with the teachers working in schools with higher number of students in the classrooms. The other school-related variable, school size, was not a significant predictor of the variation in TCEXCHAN and TCCOLLAB indices.

The remainders of the Level 2 variables were the five indices of school principals' leadership styles. For TCEXCHAN, three of the five indices were significant in Model 3: management of school goals, direct supervision of instruction, and bureaucratic management. The indices of management of school goals and direct supervision of instruction were positively related to the variation in the TCEXCHAN, whereas bureaucratic management had a negative relationship with the TCEXCHAN. In the schools where school principals

Table 5. *Results from the HLM Models for the Index of Exchange and Co-Ordination for Teaching (TCEXCHAN)*

Fixed Effects	Model 1		Model 2		Model 3	
	Estimate	SE	Estimate	SE	Estimate	SE
Intercept (γ_{oo})	–0.932*	0.039	-0.935*	0.037	-0.008	0.134
Gender (γ_{1o})	–	–	0.131*	0.036	0.125*	0.036
Status (γ_{2o})	–	–	-0.135*	0.057	-0.052	0.057
Experience (γ_{3o})	–	–	0.019	0.012	0.021	0.012
Education (γ_{4o})	–	–	-0.007	0.071	-0.019	0.070
Schooltype (γ_{o1})	–	–	-	-	-0.274*	0.043
Schoolsize (γ_{o2})	–	–	-	-	-0.001	0.002
Aveclsize (γ_{o3})	–	–	-	-	-0.019*	0.004
Manggoals (γ_{o4})	–	–	-	-	0.121*	0.045
Instrmang (γ_{o5})	–	–	-	-	-0.068	0.040
Supinstr (γ_{o6})	–	–	-	-	0.112*	0.054
Accrole (γ_{o7})	–	–	-	-	0.048	0.046
Burrulef (γ_{o8})	–	–	-	-	-0.091*	0.046

*<.05

Table 6

Results from the HLM Models for the Index of Professional Collaboration (TCCOLLAB)

Fixed Effects	Model 1		Model 2		Model 3	
	Estimate	SE	Estimate	SE	Estimate	SE
Intercept (γ_{oo})	–0.265*	0.029	–0.270*	0.028	0.425*	0.100
Gender (γ_{1o})	–	–	0.058*	0.028	0.054	0.028
Status (γ_{2o})	–	–	–0.116*	0.044	–0.051	0.044
Experience (γ_{3o})	–	–	0.008	0.009	0.011	0.009
Education (γ_{4o})	–	–	–0.004	0.055	–0.015	0.054
Schooltype (γ_{o1})	–	–	–	–	–0.201*	0.032
Schoolsize (γ_{o2})	–	–	–	–	–0.001	0.002
Aveclsize (γ_{o3})	–	–	–	–	–0.014*	0.003
Manggoals (γ_{o4})	–	–	–	–	0.072*	0.033
Instrmang (γ_{o5})	–	–	–	–	–0.045	0.029
Supinstr (γ_{o6})	–	–	–	–	0.100*	0.040
Accrole (γ_{o7})	–	–	–	–	0.033	0.034
Burrulef (γ_{o8})	–	–	–	–	–0.069*	0.034

*<.05

obtained high scores in the indices of management of school goals and direct supervision of instruction, teachers practiced more exchange and coordination for teaching. However, when the school principals obtained higher scores in bureaucratic management, the teachers tended to carry out less exchange and cooperation activities for teaching.

The effects of school principals' leadership styles were similar for the index of professional collaboration (TCCOLLAB) in Model 3. The results indicated that the indices of management of school goals and direct supervision of instruction were both positively related to the variation in the TCCOLLAB among teachers and schools. The relationship between the index of bureaucratic management and the TCCOLLAB was negative. This result shows that when a principal takes more action to supervise directly teachers' instruction and learning outcomes and manage school goals, teachers tend to collaborate more with their colleagues in the school. However, when a principal engages in more bureaucratic management activities, teacher collaboration suffers significantly.

Discussions and Conclusions

Both researchers and policy makers have emphasized the importance of teacher collaboration in recent years. It has been found that effective teacher collaboration in schools has the potential to lead to better instruction and higher student learning. The contextual factors that may affect the level and quality of teacher collaboration in schools, however, have not been paid enough attention in the literature. Specifically, the principals' role in promoting more effective and productive collaboration in their schools is ambiguous. At this point, this study makes an important contribution to the literature by investigating the relationship between principals' different leadership traits and the level of teacher collaboration in their

schools. This study used Turkish data derived from the 2008 TALIS conducted by OECD.

The results of statistical analyses first indicated that there were significant differences between Turkish schools in terms of each dependent variable, exchange and co-ordination for teaching (TCEXCHAN) and professional collaboration (TCCOLLAB). More than 20% variability in both dependent variables was found to occur at the school level. To explain this high variability, several teacher and school level variables were included in multilevel analyses. Among teacher level variables, teacher gender and working status were found to be significant predictors of teacher collaboration. While females engage more in collaborative activities compared with their male colleagues, permanent teachers show less collaborative working attitudes compared with contract teachers. In the Turkish context, contract teachers are generally new graduates searching for permanent jobs. Therefore, it could be interpreted that these teachers might need more help in their practice and try to collaborate with other teachers to improve their teaching. In addition, because they are young and new in the profession, they may not yet have adopted a teaching style and could be more open for discussions and observations. However, the data do not give any insight to speculate possible reasons for female teachers' higher involvement in collaborative activities. Therefore, we believe there is need for future research, which may use a qualitative approach to comprehend underlying factors for this phenomenon.

In terms of the school-level context variables, it is found that the average class size and school type both significantly predict the level of teacher collaboration in Turkey. Teachers who work at private schools collaborate at a higher level, compared with those working in public schools. In Turkey, teachers generally hold permanent job contracts in public

schools and may feel more secure in terms of their employment; therefore, they may not feel the need to participate in more collaborative activities with their colleagues to improve their practice. In addition, teachers who work in private schools may have better working conditions and higher support to engage in professional collaboration. The negative impact of larger classrooms could also be explained in two different ways. First, teachers who teach in larger classrooms may have to use more traditional and teacher-centered instruction and therefore do not need to collaborate with other teachers to differentiate their methods and improve their teaching. In addition, schools with smaller classrooms sizes are generally located in more affluent and educated communities. In these communities, the pressure on teachers regarding improving their instruction and increasing student achievement would be higher. This pressure may force them to collaborate more with their colleagues.

Finally, the results of this study reveal that there are significant associations between different components of principal leadership and teacher collaboration in Turkish primary schools. In general, it is seen that implementation of instructional leadership approach by principals affects the teacher collaboration positively, while administrative leadership attitudes are correlated negatively with teacher collaboration. This result is consistent with previous research and with our expectations. According to the extant literature, in opposition to administrative leadership, instructional leadership requires principals to focus extensively on academic aspect of schools, such as academic goals, the quality of instruction, teacher development, and student performance (De Bevoise, 1984; Hallinger, 2005). Therefore, it is expected to find more professional collaborations among teachers who work with instructional leaders.

Managing school goals, which include working with teachers on goals and/or a school development plan, ensuring that teachers work according to the school's educational goals, promoting professional development activities in accordance with teaching goals of schools, and so on, was found to be associated positively with teacher collaboration. As illustrated by previous research, having common goals could urge teachers to work together and increase teacher collaboration. Therefore, principals could play an important role in teacher collaboration by promoting common goals and ensuring teacher are abiding by these goals.

Principals' involvement in activities regarding direct supervision of instruction, such as observing instruction in classrooms and giving teachers suggestions to improve their teaching, is also related positively to teacher collaboration. It can be argued that teachers may feel more pressure to collaborate with their colleagues with the aim of improving their teaching when their principals are watching their classroom activities closely and making specific suggestions about their mistakes and areas for improvement. This result aligns with McHenry's (2009) findings that suggest that the most important trait of leadership that fosters collaboration among teachers is giving feedbacks to teachers with regard to their instructional practice. Consistently, Hattie (2009) stresses that feedback is one the most powerful mechanisms that foster learning. His synthesis of meta-analyses shows that using sufficient amount of relevant feedback has considerable positive impact on the achievement of learners.

The only leadership component found to predict teacher collaboration negatively was bureaucratic rule following. In schools where principals devote too much time to bureaucratic tasks, such as ensuring everyone sticks to the rules, resolving problems with the timetable and/or lesson planning, and

checking for mistakes and errors in administrative procedures, teacher collaboration was significantly lower. The reason for this could be the lack of emphasis on instructional improvement on the principals' parts in these schools. In addition, these kinds of bureaucratic leadership activities may affect teacher morale negatively and decrease their eagerness for collaboration.

In summary, the results of this study make a clear and important link between different components of principal leadership and teacher collaboration in Turkish primary schools. Further research, however, is needed to explore this relationship more clearly. The mechanisms between principal leadership and teacher collaboration could be explored by using different types of quantitative research approaches (e.g., Structural Equation Modeling). Qualitative case studies could also be conducted to illustrate the role of principal leadership on teacher collaboration. It should also be recognized that the principal leadership indices used in this study were calculated based on the principals' own perceptions about their leadership. Therefore, similar studies can be conducted by using teachers' views about their principals' leadership styles. In addition, the results of this study cannot be generalized since they only reflect the situation in Turkish primary schools. TALIS data, therefore, could be used to conduct similar research in different countries around the world.

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Appendix

Table A1 lists the items in TALIS used to compute the indices of exchange and co-ordination for teaching (TCEXCHAN) and professional collaboration (TCCOLLAB).

Table A1. *How often do you do the following in this school?*

Index	**Item number in TALIS**	**Question**
Exchange and coordination for teaching	BTG30C	Discuss and decide on the selection of instructional media (e.g., textbooks, exercise books)
	BTG30D	Exchange teaching materials with colleagues
	BTG30E	Attend team conferences for the age group I teach
	BTG30F	Ensure common standards in evaluations for assessing student progress
	BTG30G	Engage in discussion of the learning developments for specific students
Professional collaboration	BTG30H	Teach jointly as a team in the same class
	BTG30I	Take part in professional learning activities (e.g., team supervision)
	BTG30J	Observe other teachers' classes and provide feedback
	BTG30K	Engage in the joint activities across different classes and age groups (e.g. projects)
	BTG30L	Discuss and coordinate homework practice across subjects.

Source: OECD (2010)