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MODELING THE RELATIONSHIPS BETWEEN TRANSFORMATIONAL LEADERSHIP, TEACHER ACADEMIC OPTIMISM, AND TEACHER ENGAGEMENT: EVIDENCE FROM THE SERBIAN SCHOOL CONTEXT

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ABSTRACT

Although the construct of teacher engagement is acknowledged as important for positive student and teacher outcomes, evidence about its determinants is still scarce. The main aim of this study was to investigate the relationships between transformational leadership, dimensions of teacher academic optimism (i.e., self-efficacy, teacher trust in parents and students, and academic emphasis), and teacher engagement. Data obtained from 420 primary and lower secondary school Serbian teachers were analyzed by utilizing structural equation modeling with latent variables. The results revealed that transformational leadership has positive effects on all dimensions of teacher academic optimism. Transformational leadership was directly associated with teacher engagement, although this relationship was not strong. Also, transformational leadership was linked to teacher engagement indirectly, via teachers' trust in parents and students and academic emphasis. The present study suggests that transformational leadership plays an important role in enhancing teacher engagement.

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Therefore, by strengthening transformational leadership in the school, the engagement of teachers is likely to be improved.

Key words:
transformational leadership, teacher academic optimism, teacher engagement, primary and lower secondary school, structural equation modeling.

INTRODUCTION

In recent decades, educational systems around the world have been reformed and are increasingly focused on improving effectiveness and equity. Analyzing the factors influencing educational reforms, the researchers concluded that teacher motivation and engagement have a key role in efforts aimed at school improvement (Alazmi & Al-Mahdy, 2022; Honig, 2004). Moreover, the COVID-19 pandemic has shown that teachers are a key and irreplaceable factor on which education rests and that in the long run education is not sustainable as a self-directed activity (Hargreaves, 2021).

Affective-motivational characteristics are a crucial segment of teachers' professional competencies (Blömeke & Kaiser, 2017). Since teacher academic optimism (Beard, Hoy, & Woolfolk Hoy, 2010) and work engagement (Granziera & Perera, 2019) are recognized as influential motivational beliefs of teachers, it is important to investigate their determinants. This paper investigates a model of the relationships between school leadership, teacher academic optimism, and teacher engagement. This study seeks to overcome several limitations of previous research in this area. First, little is known about the relationship between transformational school leadership and teacher engagement. Second, teacher engagement is often measured using instruments that do not take into consideration the specifics of the teacher's role. We emphasize that teachers differ from employees in other sectors and that teacher engagement is a specific construct (Yerdelen, Durksen, & Klassen, 2018). Third, academic optimism has often been treated as a global construct which precludes understanding the antecedents and effects of its individual dimensions. Finally, in previous research, the mentioned constructs have been investigated as manifest, and their relationships have not been modeled by taking measurement error into account. In the current study, we decided to use latent variable modeling in order to more accurately assess the relationships between the examined constructs.

CONCEPTUAL FRAMEWORK

Serbian School Context

In the last two decades, the Serbian school system has been marked by intensive reform processes. Some of the most important changes introduced into the education system concern the mandatory professional training of teachers, the introduction of inclusion in schools, and mandatory pre-school education for a year before starting primary school. These initiatives have not always led to expected results, because they were mainly directed in a top-down fashion, without the active involvement of teachers as key agents of educational reforms (Hebib & Ovesni, 2019). Research has shown that teachers are dissatisfied with the level of income and the volume of administration that accompanies their job, which further erodes their dedication to teaching (Simić, Mladenović, & Stojković, 2015). Young people tend to not opt for a teaching profession and many places at teacher-training colleges remain vacant (Maghnouj *et al.*, 2020). Additionally, research indicates that teachers who work in inclusive classes are under increased professional stress (Vuletić *et al.*, 2018).

The education system in Serbia can be characterized as centralized, since the curriculum and educational standards are prescribed by the Ministry of Education, Science and Technological Development. One manifestation of the centralization of the Serbian education system is the appointment of school principals by the education minister (The Law on the Fundamentals of the Education System, article 123). Although the position of school principal has not yet been professionalized, the current educational policy indicates the recognition of the role of school leadership in Serbia. *Standards of competencies for principals of educational institutions* (Official Gazette RS, No. 38/2013) were adopted in 2013. Based on this document, *the Rulebook on the training program and taking the license exam for the principals of educational institutions* was adopted in 2018 (Official Gazette RS, No. 63/2018). This rulebook prescribes mandatory training for principals selected to the position. The length of the training depends on the previous experience of the candidate, their previous education, and the achieved results of the candidate's school on external examination.

The role and functions of school leadership depend on the characteristics of the context (Hallinger, 2018; Leithwood, Sun, & Schumacker, 2020). For example, socio-cultural values influence how school principals allocate work time to different leadership activities (Hallinger, 2018). In Serbia, according to *the Rulebooks on criteria and standards for the financing of an institution that performs the activity of primary/secondary education* (Official gazette RS, No. 115/2020 and 93/2022), every primary school with at least 32 classes and every secondary school with at least

24 classes are eligible to have an assistant principal, who is usually in charge of the school's pedagogical activities. This implies that principals are typically not involved in the activities of monitoring and supervising teaching. On the other hand, Serbian principals see their tasks primarily in the domain of creating a healthy and stimulating environment for learning (Teodorović *et al.*, 2020). The findings of international research (Liu, Bellibaş, & Printy, 2018) indicate that principals and teachers in Serbia believe that the practice of distributed leadership is developed in Serbian schools. These findings agree with the current educational policy environment, which prioritizes the formation of different school teams that are responsible for various aspects of school functioning (Law on the Basics of the Education System, article 130).

Conceptualization of Teacher Engagement

Work engagement can be defined as "a motivation concept that refers to the voluntary allocation of personal resources directed at the range of tasks demanded by a particular vocational role" (Klassen, Yerdelen & Durksen, 2013, 2013: 34). It is a relatively stable dimension that includes both trait-like and state-like components (Wang, Zhang, & Zhang, 2022). Increasing evidence indicates that teacher engagement is related to desirable teacher outcomes. For example, contemporary research suggests that teacher engagement is related to job satisfaction (Granziera & Perera, 2019) and self-efficacy (Burić, Zuffianò, & López-Pérez, 2022; Dicke *et al.*, 2015; Li, Liu, Chen, & Yao, 2022). In addition to that, some researchers recently reported that this construct is also relevant for student outcomes. For example, empirical evidence indicates that teacher engagement predicts the quality of teacher-student relationships (Soininen, Pakarinen, & Lerkkanen, 2023). One Chinese study revealed that work engagement mediates the relationship between a teacher's emotional intelligence and student achievement (Wang, 2022). However, scholars have conceptualized and measured teacher engagement in different ways during the examination of its antecedents and outcomes.

In contemporary literature, there are two main models of teacher engagement. According to one model, teacher engagement is similar to the work engagement of any other employee in an organization. This model assumes that there is no significant distinction between the work engagement of members of different professions (e.g. teachers and school counselors), and work engagement is described by dimensions that are universal for all professions, such as willingness to work (dedication), ability to work (vigor) and absorption (Bakker, Albrecht, & Leiter, 2011; Skaalvik & Skaalvik, 2016). Schaufeli *et al.* (2002) developed the most influential universal work engagement model. From this model was derived the Utrecht Work Engagement Scale (UWES), an instrument that has been widely used in teacher research. However,

the profession of a teacher is specific and includes various tasks, such as instruction, nurturing and providing social and emotional support, cooperation with colleagues, and classroom management (Borup, Graham, & Drysdale, 2014). Starting from this thesis, Klassen, Yerdelen, and Durksen (2013) proposed a model of teacher work engagement that includes the specifics of teaching work.

The model proposed by Klassen, Yerdelen and Durksen (2013) looks at teacher engagement from three dimensions: cognitive-physical, emotional, and social. The cognitive-physical dimension refers to the degree to which teachers use their cognitive and physical resources in work-related tasks. The emotional dimension refers to positive feelings that the teacher has towards work and performing work-related tasks, such as enjoyment and excitement. The social dimension of teacher engagement is based on the specificity of the teacher's job of establishing relationships with students, colleagues, and students' parents. This job specificity of establishing relationships with other people is not found so often in other professions (Klassen, Yerdelen & Durksen, 2013; Perera, Vosicka, Granziera, & McIlveen, 2018; Wang, Zhang & Zhang, 2022). It is precisely the social dimension of work engagement that separates the engagement of teachers from the work engagement of many other professions. This model is integrative because it incorporates the knowledge obtained by studies of work engagement with the knowledge obtained by research on teacher-student relatedness (Perera *et al.*, 2018).

Transformational School Leadership

Transformational leadership is one of the most well-known concepts in the field of leadership. The most influential transformational leadership model was developed by Bass (Bass & Riggio, 2006), according to which transformational leaders demonstrate integrity (idealized influence), motivate followers (inspirational motivation), take into account the needs and abilities of followers (individual consideration) and encourage followers to be creative in a professional context (intellectual stimulation). In the last three decades, this model has been frequently researched in various fields, including education.

Leithwood and his colleagues (Leithwood & Jantzi, 2005; Leithwood & Sun, 2012) possibly have the greatest merit for introducing the concept of transformational leadership to the field of educational leadership. Although transformational leadership in educational settings has primarily been investigated in Western contexts, the last 20 years have seen the internationalization of research on this model of educational leadership (Berkovich, 2018). Nevertheless, educational scholars have defined this construct in different ways and used different approaches that partially overlap. In this study, we utilize the conception developed by Geijsel, Sleegers, Stoel and Krüger (2009) according to which the three basic dimensions of transformational leadership

are vision building, providing individual consideration, and intellectual stimulation (Geijsel *et al*., 2009; Moolenaar, Daly, & Sleegers, 2010). Vision building concerns the degree to which the leader formulates a shared vision of the school's future and connects it to the day-to-day functioning of the school. Individual consideration includes recognition and appreciation of differences between teachers. Providing intellectual stimulation represents the creation of conditions for the continuous professional learning of teachers (Moolenaar & Sleegers, 2015; Thoonen *et al*., 2011). It is important to note that this conceptualization of transformational leadership does not include the dimensions of idealized influence and inspirational motivation, which are recognized as problematic in contemporary literature. Specifically, these two components are included in the concept of charismatic leadership, and their exclusion prevents the overlapping of transformational leadership and charismatic leadership constructs (Stock *et al*., 2022).

Regardless of the existence of different conceptions of transformational leadership, previous research has accumulated knowledge about its positive effects in educational settings. For example, Li and Karanxha (2022) analyzed studies of the effects of transformational leadership on student achievement in the period 2006-2019. These authors revealed that eight of the 14 analyzed studies had found that this model of educational leadership was significantly, directly or indirectly, related to student achievement. Recent research indicates the existence of interaction between transformational leadership and instructional leadership in schools (Bellibaş, Kılınç, & Polatcan, 2021; Kwan, 2020). For example, Bellibaş, Kılınç and Polatcan (2021) provided evidence that the strength of the effects of instructional leadership on teachers' practice depends on the presence of transformational leadership.

In contemporary literature, there is a well-established opinion that the effects of educational leadership on student outcomes are mediated by variables that are more directly related to teaching and learning (Leithwood *et al*., 2020). The central role of school leaders is to influence the various components of teacher competence, which then affect student outcomes. Furthermore, Leithwood *et al*. (2010) argue that identifying the mechanisms through which school leadership operates can provide helpful guidelines for practice improvement. In this paper, the focus is on transformational leadership and its relationships with the motivational and emotional competencies of teachers.

Teacher Academic Optimism

Teacher academic optimism is a construct that consists of a teacher's sense of efficacy, trust in parents and students, and teacher academic emphasis (Beard, Hoy, & Woolfolk Hoy, 2010). Teacher self-efficacy can be defined as teachers' assessment of their own abilities to achieve desired results related to student engagement and

learning (Tschannen-Moran, Woolfolk Hoy, & Hoy, 1998). A trusting relationship includes feelings of benevolence, reliability, competence, honesty and openness (Goddard, Tschannen-Moran, & Hoy, 2001). A trust-based learning environment encourages students to be active and to show initiative (Beard, Hoy & Woolfolk Hoy, 2010). Teacher academic emphasis refers to the degree to which teachers find ways to engage students in appropriate academic tasks (Beard, Hoy & Woolfolk Hoy, 2010). This component of academic optimism can be interpreted as an attribute of the school or an individual characteristic of the teacher. Regardless of the operationalization of academic emphasis, it is an important predictor of student achievement (Hoy, Tarter, & Hoy, 2006).

Transformational Leadership and Teacher Academic Optimism

Previous research has provided compelling evidence that school leadership is an important factor in fostering teacher academic optimism. In one Turkish study (Börü & Bellibaş, 2021) on a sample of 225 teachers from 20 schools, the effects of different school leadership styles on teachers' academic optimism were examined. It was found that distributed leadership, instructional leadership, and transformational leadership of school principals, considered individually, contributed to teachers' academic optimism. However, when all three styles were simultaneously included in the regression equation, only distributed leadership had a statistically significant effect. In Thailand's context, it was demonstrated that principal authentic leadership is positively related to teacher academic optimism (Kulophas *et al*., 2018). Nevertheless, it is important to consider the relationships between transformational leadership and individual components of teacher academic optimism.

The effects of transformational leadership on teacher self-efficacy, which is one of the three basic components of teacher academic optimism, have been widely studied. Most previous research (Li & Liu, 2020; Polatcan, Arslan, & Balci, 2021) found a direct positive relationship between these variables. Much less is known about the relationships between transformational leadership and other components of teacher academic optimism. However, Leithwood, Patten, and Jantzi (2010) showed that distributed leadership, which was assessed as groups of leadership activities exercised by different school staff members, significantly contributed to teachers' trust in others and academic press, which refers to teachers' high standards for student engagement in learning. Thien and Chan (2022) reported that in the

Malaysian educational context, distributed leadership has a positive impact on teachers' trust in parents and students.

Although they do not mention transformational leadership explicitly, Tschannen-Moran and Gareis (2015) point out that school principals create a climate of trust through caring for all members of the school community, respecting the personal needs of teachers, respecting the ideas and suggestions of others, and involving teachers in decision-making. We believe that these are leadership practices that are covered by the dimensions of transformational leadership. Moreover, there is a positive correlation between teachers' trust in principals, colleagues, and in parents and students (Tschannen-Moran, 2014), which indicates that school principals, by their behavior, shape teachers' trust in different actors of school life (Tschannen-Moran & Gareis, 2015).

Researchers have documented a positive relationship between instructional leadership and the academic press in schools (Mitchell, Kensler, & Tschannen-Moran, 2015). However, there is a need to investigate the effects of other models of school leadership on academic emphasis. In this study, we argue that transformational leadership can positively influence this aspect of teachers' academic optimism. Transformational leaders can build and communicate a school vision that is focused on students' learning. One of the core elements of academic emphasis is high teacher expectations and student engagement (Beard, Hoy, & Woolfolk Hoy, 2010; Mitchell, Kensler, & Tschannen-Moran 2015). Through intellectual stimulation, transformational leaders can make teachers aware of the importance of setting high academic expectations. Drawing on the knowledge accumulated by previous research, we set the following hypothesis:

Hypothesis 1: Transformational leadership is positively related to teachers' academic optimism.

Teachers' Academic Optimism and Engagement

The relationship between academic optimism and teacher engagement can be explained from different theoretical perspectives. According to Job Demand-Resources theory (Bakker & Demerouti, 2017), teachers' self-efficacy is an important resource that influences teacher motivation and behavior. Teachers who believe in their own professional skills will set higher goals for themselves and work harder to achieve them, even when faced with obstacles (Tschannen-Moran, Woolfolk Hoy, & Hoy, 1998). Researchers (Dicke *et al.*, 2015; Granziera & Perera, 2019; Yerdelen *et al.*, 2018) have provided evidence that self-efficacy is a positive predictor of teacher engagement. Moreover, engagement is interpreted as the opposite side of professional burnout, and self-efficacy is negatively related to teacher burnout (Skaalvik & Skaalvik, 2010). However, social cognitive theory

(Bandura, 1997) presupposes that there can be reciprocal interaction between these constructs. This assumption has been supported by recent longitudinal evidence (Burić, Zuffianò, & López-Pérez, 2022) that shows that teacher work engagement predicts beliefs about self-efficacy.

The trust that teachers, parents, and students have in each other is a crucial element of successful cooperation and effective education. Teachers have to trust parents and students in order to cooperate with each other and to achieve common goals (Bilgic & Gumuseli, 2012). Research conducted by Gülbahar (2017) showed that there is a significant relationship which is positive at a moderate level between teachers' trust in parents and students and teacher engagement. Teachers' trust in parents and students increases their engagement in performing work-related tasks (Gülbahar, 2017). Goddard *et al*. (2001) argue that "when teachers believe their students are competent and reliable, they create learning environments that facilitate student academic success." (p. 14). To our knowledge, the relationship between teachers' academic emphasis and work engagement has not yet been directly examined. Nevertheless, there is evidence that teacher mastery goal orientation, which refers to enhancing student active learning, is significantly related to professional motivation (Skaalvik & Skaalvik, 2013). In addition to that, some researchers (Han, Yin, & Wang, 2016) reported that teacher engagement mediates the relationship between a teacher mastery goal approach and commitment to students. Based on the presented theoretical understandings and the results of prior research, we put forward the following hypothesis:

Hypothesis 2: Teacher academic optimism is positively related to teacher engagement.

Transformational Leadership and Teacher Engagement

The direct effect of transformational leadership on teacher engagement is expected based on social identity theory (Hogg, van Knippenberg, & Rast, 2012). Berkovich and Bogler (2021) argue that transformational leaders encourage teacher identification with the school, through connecting their self-concept with common priorities and goals. This thesis is supported by research (Valckx, Vanderlinde, & Devos, 2020) which showed that transformational leadership in school contributes to the sense of shared responsibility among teachers. Transformational leaders can strengthen the engagement of teachers primarily through apostrophizing a shared vision and intellectual stimulation.

However, it has not yet been empirically established whether transformational leadership is directly linked to teacher engagement. Few studies have investigated the effects of transformational leadership on constructs similar to teacher engagement. For example, Leithwood and Sun (2012) in their meta-analysis came to the insight

that transformational leadership is strongly related to teacher job satisfaction and commitment. However, this meta-analysis did not examine teacher engagement as a criterion variable. Niessen *et al.* (2017) reported that transformational leadership is not directly related to thriving teachers, which represents the subjective experience of energy and learning. A study that directly dealt with the relationship between these two constructs was conducted in the Netherlands (Breevaart & Bakker, 2018). This study showed that teachers tend to be more engaged when they are faced with challenging demands and transformational leadership is simultaneously highly present. However, it should be kept in mind that in this research the central variables, transformational leadership and teacher engagement, were measured using the Multifactor Leadership Questionnaire (MLQ) and UWES, respectively. Using instruments that do not respect the specifics of the teacher's role is problematic and can lead to the accumulation of knowledge that is decontextualized. Based on the available literature, we set up a hypothesis:

Hypothesis 3: Transformational leadership is positively related to teacher engagement.

The Mediating Role of Teacher Academic Optimism in the Relationship Between Transformational Leadership and Teacher Engagement

In this study, we expected that teachers' academic optimism mediates the relationship between transformational leadership and teacher engagement. Justification for this hypothesis was provided by previous research. For example, Kulophas *et al.* (2018) examined primary school teachers in Thailand, and the central predictor variable was the school principal's authentic leadership. It was found that this leadership model had a direct effect on teacher engagement. Furthermore, authentic leadership was indirectly related to teacher engagement through academic optimism. Alazmi and Al-Mahdy (2022) surveyed 333 teachers employed in primary schools in Kuwait. It was shown that authentic leadership in school has a direct positive effect on teacher engagement, as well as an indirect effect through teachers' occupational self-efficacy. It is important to note that previous research has treated academic optimism as a global construct. Therefore, the question of interplay between transformational leadership, individual components of academic optimism and teacher engagement is open. Furthermore, it has not been investigated whether teacher academic optimism has a mediating role in the relationship between transformational leadership and teacher engagement. In order to overcome this gap in the literature, we put forward the following hypothesis:

Hypothesis 4: Teacher academic optimism mediates the relationship between transformational leadership and teacher engagement.

METHOD

Sample and Procedure

Participants were 420 teachers from 21 elementary schools[1] throughout Serbia. The sample was convenient since schools included in research are those with which researchers had earlier collaborated in other activities. Schools included in the research are predominantly from urban areas (18 schools).

From the total sample, 237 teachers are class teachers, and 182 subject teachers in elementary schools, with an average age of 47.62 years (SD = 8.50) and an average length of service of 21.24 years (SD = 9.52). All sociodemographic characteristics are shown in Table 1.

Table 1: Socio-demographic characteristics of sample

		Count	Percentage
Gender	Male	54	12.86
	Female	366	87.14
Age	Up to 40	76	18.14
	41-50 years	174	41.53
	Above 50 years	169	4.33
Length of service	Up to 15 years	120	28.57
	16-30 years	223	53.10
	Above 30	77	18.33
Type of the school	Class teachers	237	56.56
	Primary school subject teachers	182	43.44

The data were collected using both an online and a standard paper-and-pencil survey. When it comes to online data gathering, an electronic survey was created in the Google forms application. A link to this online questionnaire was shared via

[1] Serbian elementary schools consist of two levels: four grades of primary school (ISCED 1) and four grades of lower secondary school (ISCED 2).

personal email addresses and teacher forums. All teachers from the recruited schools were asked to fill out the survey, but participation in the study was completely voluntary, and the anonymity of participants was guaranteed.

Measures

Predictor. Transformational leadership was measured with an instrument developed by Geijsel *et al*. (2009). This scale originally contains 15 items that measure three dimensions of transformational leadership in school: vision building, providing individual consideration, and intellectual stimulation. In the present investigation, teachers filled out a version of the scale with 16 items, which was used in the study of Oude Groote Beverborg, Sleegers, & van Veen (2015)and has already been applied in the Serbian context (Ninković, Knežević Florić, & Đorđić, 2022). The vision building (e.g. "Refers explicitly to the school's objectives during the decision-making process') and individual consideration (e.g. "Listens carefully to the ideas of members of the team") dimensions were measured with five items each, and intellectual stimulation was measured with six items (e.g. "Encourages teachers to experiment with new teaching methods"). Considering the characteristics of the school system in Serbia, the participants were informed that the items in this instrument refer to the leadership of the principal and vice-principal. The teachers gave their answers using a 5-point Likert scale (1– completely disagree to 5 – completely agree).

Mediator. Teachers' sense of academic optimism was measured by the scale validated by Beard, Hoy & Woolfolk Hoy (2010). The instrument includes 11 items that are divided into three subscales: teacher self-efficacy (3 items; e.g. "How much can you do to get students to believe they can do well in school work?"), trust in parents and students (4 items; e.g. "I trust the parents of my students"), and academic emphasis (4 items; e.g. "I give my students challenging work"). The teachers gave their answers to the items in the self-efficacy scale using a 9-point Likert scale (1 – none at all to 9 – to a great deal). The remaining items in this instrument were answered by teachers using a 5-point Likert scale (1 – completely disagree to 5 – completely agree).

Outcome. Teacher engagement was assessed with the Engaged Teachers Scale (ETS) developed by Klassen, Yerdelen and Durksen (2013). The instrument with four items each measures four interconnected dimensions of teacher engagement:

cognitive engagement (e.g., "Try my hardest to perform well while teaching"), emotional engagement (e.g., "I love teaching"), social engagement: students (e.g. "In class, I am empathetic towards my students"), social engagement: colleagues (e.g., "At school, I am committed to helping my colleagues"). The teachers gave their answers using a 7-point Likert scale (1 – never to 7 – always).

Apart from the transformational leadership scale, the other measures were used for the first time in the Serbian school context. These instruments were translated with a back-translation procedure (Brislin, 1970, 1986). In the first step, the instruments were translated from English to Serbian by a translator and researcher who is fluent in English. In the second step, an independent translator back-translated the Serbian versions of instruments into English. Finally, in the third step, the original and back-translated versions of the instrument in English were compared and it was concluded that there was no substantial difference between these two versions. The metric characteristics of all instruments are presented in the Results section.

Control variables. We controlled for the effect of teacher gender, since previous research (Topchyan & Woehler, 2021) showed that female teachers show higher levels of work engagement. The effects of other demographic variables such as teachers' years of experience or grade level were not examined since the previous studies had not indicated their relevance.

Data Analysis

Data analysis was performed in several stages. First, descriptive statistics and manifest correlations among variables were calculated using the psych package (version 2.2.5) in R (Revelle, 2022). The construct validity of the employed instruments was examined using confirmatory factor analysis (CFA). The main purpose of CFA is to evaluate the extent to which the hypothesized latent variable model fits the data. The set hypotheses were evaluated using full structural equation modeling (full SEM). Compared to path analysis with manifest variables, full SEM has significant advantages, such as more reliable measurement of constructs and modeling of their relationships (Bollen, 1989; Bollen *et al*., 2022). The reliability of composite scores was assessed by calculating omega coefficients in the semTool package (version 0.5.6) in the R software environment (Jorgensen *et al*., 2022).

When evaluating the examined models, we relied on several fit indices: comparative fit index (CFI), Tucker-Lewis Index (TLI), root-mean square error of approximation (RMSEA), and standardized root mean square residual (SRMR). For CFI and TLI, values ≥ .90 indicate acceptable fit, and values ≥ .95 indicate excellent fit (Hu & Bentler, 1999). For RMSEA, values > .10 indicate a poor fit, values > .05 and ≤ .10 indicate an acceptable fit, and values ≤ .05 indicate a good fit (Lai & Green, 2016; MacCallum, Browne, & Sugawara, 1996). For the SRMR, values ≤ .08 indicate

an acceptable fit (Hu & Bentler, 1999). We also reported the chi-square test statistic, but we gave preference to the previously mentioned indices in assessing model fit. When examining the hypothesized models, we interpreted the fit indices holistically and in the light of contemporary methodological recommendations.

CFA and full SEM were conducted in the lavaan package (version 0.6.12) in R (Rosseel, 2012). We used the robust maximum likelihood estimator (MLR), in order to account for non-normality of the data. This parameter estimation method is characterized by the calculation of the Yuan-Bentler chi square test statistic (Y-B χ^2) and robust Huber-White standard errors (Savalei & Rosseel, 2022). The significance of indirect effects was tested by calculating confidence intervals using the Monte Carlo method (Hayes & Scharkow, 2013; Preacher & Selig, 2012) with 20,000 resamples. This method of testing indirect effects is recommended in contemporary literature, and its distinctive advantage is less computational complexity during calculation (Preacher & Selig, 2012). The Monte Carlo method was implemented in the semTool package (version 0.5.6) in R (Jorgensen *et al*., 2022).

RESULTS

Results of Preliminary Analysis

First, we tested the transformational leadership model with three interrelated factors, but the latent correlations between the transformational leadership dimensions were very high. For this reason, we examined the transformational leadership model with three first-order factors (vision building, individual consideration, and intellectual stimulation) and one second-order factor (transformational leadership). This model had the following fit indices: Y-B $\chi^2 = 347.433$, $df = 101$, $p < .001$, CFI = .945, TLI = .934, RMSEA = .095, 90% CI [.084, .105], and SRMR = .030. Due to the high value of RMSEA, based on careful examination of modification indices, we decided to allow correlations between two pairs of residuals. This model had slightly better fit indices: Y-B $\chi^2 = 313.504$, $df = 99$, $p < .001$, CFI = .957, TLI = .947, RMSEA = .085, 90% CI [.074, .095], and SRMR = .027. The reliability of this scale was very high ($\omega_{L2} = .988$).

CFA of the three-factor model of the scale of teacher academic optimism demonstrated decent fit indices: Y-B $\chi^2 = 119.197$, $df = 41$, $p < .001$, CFI = .944, TLI = .925, RMSEA = .073, 90% CI [.058, .088], and SRMR = .043. Nevertheless, the latent correlations among dimensions of teacher academic optimism were of moderate

strength (r_s were in the range of .337 to .400). For that reason, we decided to use this model with three first-order factors. All three subscales had adequate reliability (for self-efficacy ω = .792, for teachers' trust in parents and students ω = .850, and for academic emphasis ω = .708).

We first tested the teacher engagement model with four first-order factors. CFA of this model showed acceptable fit indices: Y-B χ^2 = 345.147, *df* = 98, $p <$ .001, CFI = .924, TLI = .906, RMSEA = .095, 90% CI [.084, .105], and SRMR = .047. However, very high positive correlations were obtained between certain dimensions of teacher engagement. The latent correlation between emotional engagement and cognitive engagement was .911, and between cognitive engagement and social engagement: students it was .895. Due to high correlations between individual factors, we tested a model with one second-order factor of teacher engagement and four first-order factors (cognitive engagement, emotional engagement, social engagement: students, and social engagement: colleagues), which is also suggested in the literature (Klassen, Yerdelen & Durksen, 2013; Perera *et al*., 2018). This model had very similar fit indices: Y-B χ^2 = 342.462, *df* = 100, $p <$ .001, CFI = .924, TLI = .909, RMSEA = .093, 90% CI [.082, .104], and SRMR = .047. Due to the relatively high RMSEA value, we allowed the correlation of one pair of residuals within the dimension social engagement: students and one pair of residuals within the dimension social engagement: colleagues. This model had the following fit indices: Y-B χ^2 = 302.807, *df* = 98, $p <$ .001, CFI = .936, TLI = .921, RMSEA = .087, 90% CI [.076, .098], and SRMR = .043. Bearing in mind that RMSEA can be inflated by the number of observed variables, sample size, and nonnormality of data (Maydeu-Olivares, Shi, & Rosseel, 2018), we decided to retain this model of teacher engagement. The reliability of this scale was high (ω_{L2} = .950).

Hypotheses testing. The descriptive statistics in Table 2 indicate that teachers scored high on all four dimensions of work engagement. As can be seen in Table 2, very high correlations between the dimensions of transformational leadership were found. Correlations of transformational leadership with components of teacher academic optimism were relatively low, while correlations of transformational leadership with dimensions of teacher engagement were mostly moderate. The

correlations between factors of academic optimism and teacher engagement were moderate to strong, except in the case of the correlation between teacher self-efficacy and social engagement with colleagues, which was small ($r = .12$, $p < .001$).

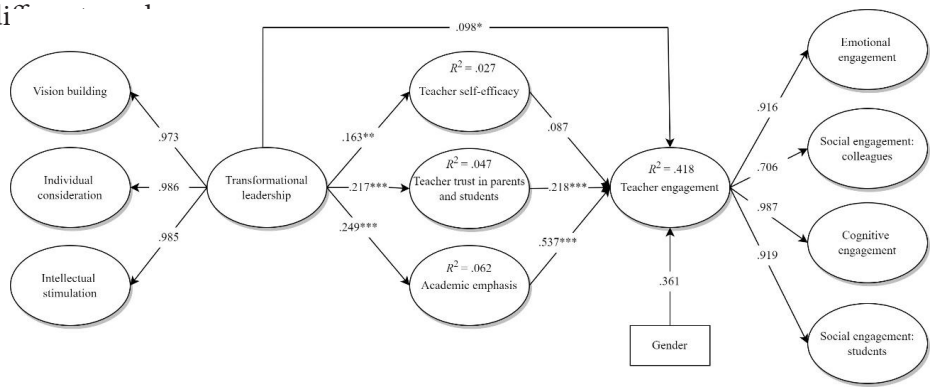
Table 2: Descriptive statistics and manifest correlations among examined variables

	1	2	3	4	5	6	7	8	9	10
1. VB	–	.87	.90	.13	.19	.26	.25	.31	.25	.21
2. IC		–	.90	.15	.27	.27	.29	.32	.27	.23
3. IS			–	.14	.20	.24	.23	.27	.20	.15
4. TSE				–	.36	.33	.29	.12	.27	.29
5. TPS					–	.54	.36	.23	.33	.41
6. AE						–	.47	.39	.54	.50
7. EE							–	.61	.82	.72
8. SEC								–	.66	.59
9. CE									–	.79
10. SES										–
M	3.80	3.86	3.94	7.17	3.92	4.21	6.16	5.99	6.34	6.29
SD	0.93	0.91	0.92	1.24	0.59	0.48	0.91	0.83	0.80	0.81
Min	1.00	1.00	1.00	2.33	2.00	1.50	1.50	2.50	1.00	2.75
Max	5.00	5.00	5.00	9.00	5.00	5.00	7.00	7.00	7.00	7.00

Note. VB – vision building, IC – individual consideration, IS – intellectual stimulation, TSE – teacher self-efficacy, TPS – trust in parents and students, AE – academic emphasis, EE – emotional engagement, SEC – social engagement: colleagues, CE – cognitive engagement, SES – social engagement: students
All correlations are significant at $p < .001$.

In order to test the hypotheses, mediation analysis with latent variables was carried out (Figure 1). The hypothesized model fitted the data satisfactorily well: Y-B χ^2 = 1750.386, $df = 884$, $p < .001$, CFI = .924, TLI = .919, RMSEA = .053, 90% CI [.049, .057], and SRMR = .073. Figure 1 displays the estimated structural relationships among latent constructs. Transformational leadership was positively associated with teacher self-efficacy ($\beta = .163$, $SE = 0.060$, $p = .006$), teacher trust in parents and students ($\beta = .217$, $SE = 0.054$, $p < .001$), and academic emphasis ($\beta = .249$, $SE = 0.060$, $p < .001$). In Figure 1, it can be seen that transformational leadership explained the small percentages (from 2.7% to 6.2%) of variance in components of

teacher academic optimism. We found that teachers' trust in parents and students has a positive effect on teacher engagement (β = .218, *SE* = 0.067, *p* < .001), as does academic emphasis (β = .537, *SE* = 0.131, *p* < .001). Contrary to expectations, the effect of teacher self-efficacy on teacher engagement was not statistically significant (β = .087, *SE* = 0.077, *p* = .145) after controlling for transformational leadership and the other two dimensions of academic optimism. Transformational leadership was also directly related to teacher engagement (β = .098, *SE* = 0.061, *p* = .036), although the strength of this relation was not strong. The effect of teacher gender was not statistically significant (*B* = 0.361, *SE* = 0.216, *p* = .094), which indicates that there are no significant differences in the level of work engagement between teachers of di



Note. For ease of interpretation, the unstandardized effect for the teacher gender variable is shown. * *p* < .05; ** *p* < .01; *** *p* < .001.

In order to obtain robust estimates of the indirect effects of transformational leadership on teacher engagement, through the dimensions of academic optimism, the Monte Carlo method with 20,000 resamples was applied. The obtained results are shown in Table 3.

Table 3: Monte Carlo analysis of indirect effects of transformational leadership on teacher engagement via dimensions of teacher academic optimism

Mediator	Std. coefficient	*p* value	95% Confidence interval	
Self-efficacy	.014	.194	-.005	.040
Trust in parents and students	.047	.004	.020	.083
Academic emphasis	.134	.000	.073	.204

As can be seen in Table 3, the indirect effect of transformational leadership via teacher self-efficacy on teacher engagement was not statistically significant. On the other hand, the indirect effect of transformational leadership through teacher trust in parents and students was statistically significant. The mediation effect through academic emphasis was also statistically significant. This result implies that transformational leadership in schools contributes to teachers' academic emphasis, which leads to higher levels of teacher engagement. The total indirect effect ($\beta = .195$, $SE = 0.061$, $p < .001$) consisting of three specific indirect effects was also statistically significant. Finally, the total effect of transformational leadership was statistically significant ($\beta = .294$, $SE = 0.070$, $p < .001$). The total explained variance of teacher engagement was 41.8%.

DISCUSSION

The primary purpose of this study was to model the association between transformational leadership, teachers' academic optimism, and teachers' engagement in the Serbian school context. The obtained results provided support for the examined model of the relationship between these constructs. In the continuation of this section, the major findings of the current study will be discussed.

It was found that there is a positive effect of transformational leadership on teacher self-efficacy, which is in line with previous studies (Polatcan, Arslan, & Balci, 2021) conducted in other national contexts. However, it should be borne in mind that we found quite a small effect size. It seems that other models of school leadership, such as teacher leadership (Li & Liu, 2020) and instructional leadership (Liu, Bellibaş, & Gümüş, 2021) have a greater effect on teacher self-efficacy. This is reasonable to expect, given that teacher self-efficacy represents a self-assessment of personal abilities to influence student learning.

One of the findings was that transformational leadership was positively related to teachers' trust in parents and students. To the best of our knowledge, there are no other quantitative studies explicitly focused on the effect of transformational

leadership on this dimension of teacher trust. Thien and Chan (2022) reported a slightly larger effect of distributed leadership on this component of teacher academic optimism. Given that we modeled transformational leadership as a hierarchical construct, we were not able to identify which of the dimensions of transformational leadership predicts teachers' trust in parents and students. However, Sun and Leithwood (2015) found in their meta-analysis that leadership behaviors oriented toward creating school development directions were weakly related to teachers' trust in others. These findings point to the conclusion that individual consideration and intellectual stimulation contribute more to teachers' trust in parents and students.

One of the key findings of this study is that transformational leadership positively predicted academic emphasis. All three dimensions of transformational leadership (i.e., vision building, individual consideration, and intellectual stimulation) can have an important role in creating a school climate that emphasizes the academic achievement of students. Transformational leaders can integrate high academic expectations into the school's vision and then stimulate teachers to strive for their implementation. This interpretation is supported by a recent meta-analysis (Liebowitz & Porter, 2019) which showed that school principal behaviors that are important for improving student achievement do not fall within the domain of instructional leadership in the narrow sense. Finally, empirical evidence suggests that transformational leadership has the potential to influence students' academic achievement (Li & Karanxha, 2022).

Contrary to expectations, we did not find a significant relationship between teacher self-efficacy and teacher engagement. This finding can be interpreted in several ways. First, in some previous studies, in which a positive relationship between these constructs was found, teacher engagement was operationalized and measured differently and the sample consisted of candidates for the teaching profession (Dicke, Stebner, Linninger, Kunter, & Leutner, 2018). Second, previous research (Granziera & Perera, 2019; Yerdelen *et al*., 2018) found small effects of self-efficacy on teacher engagement. More recent research (Burić, Zuffianò, & López-Pérez, 2022), in which sophisticated statistical methods were applied, showed that teacher engagement longitudinally predicts self-efficacy although that effect is not large. Finally, some studies (Li *et al*., 2022) indicate that the relationship between teacher engagement and self-efficacy is mediated by teacher involvement in professional development activities.

Teachers' trust in parents and students was a statistically significant predictor of teacher engagement. In the context of the applied instrument, trust in students refers to general trust, encouragement of students, belief in their abilities and expectation of high achievements, while the dimension of trust in parents refers to general trust in parents and counting on parental support. Also, this finding is in accordance with the study conducted by Gülbahar (2017).

The next important result of current research concerns the relationship between academic emphasis and teacher engagement. The obtained results showed that teachers with higher levels of academic emphasis tend to be more engaged in their work. Some scholars (Skaalvik & Skaalvik, 2013) have shown that teachers' mastery goal orientation predicts work-related motivation, one dimension of which is engagement. Our results can be interpreted as showing that setting high but suitable academic expectations for students leads to higher levels of work engagement in teachers. Therefore, in accordance with expectations, it was found that academic emphasis is positively related to teacher engagement.

The obtained results supported the hypothesis that transformational leadership has a direct effect on teacher engagement. This finding is consistent with Job Demand Resources theory (Bakker & Demerouti, 2017), which assumes that transformational leadership is one of the contextual resources that can positively influence teacher engagement. Compared to previous studies of the relationship between authentic leadership of school principals and teacher academic optimism (Alazmi & Al-Mahdy, 2022), we found a smaller effect of transformational leadership. The results on the direct effects of transformational leadership on the affective-motivational characteristics of teachers are not conclusive. For example, Niessen *et al*. (2017) found that transformational leadership has no direct effect on teachers' thriving, measured three months later. It is possible that the relationship between transformational leadership and work engagement depends on other variables, such as teacher' emotional exhaustion (Niessen *et al*., 2017), grade level (elementary vs. high school), and teachers' job autonomy.

An important finding of this study is that transformational leadership achieves its effect on teacher engagement partially via two components of teacher academic optimism. Specifically, our analysis showed that the specific indirect effect of transformational leadership on teacher engagement via the academic emphasis component of teacher academic optimism was stronger than through teacher trust in parents and students. Contrary to expectations, the mediation effect of teacher self-efficacy was not statistically significant. These findings provide a more detailed picture of the interplay between the examined constructs. In this way, our study expands existing knowledge about the mechanisms through which school leaders can enhance teacher engagement.

CONCLUSIONS

The main contribution of this study concerns the provision of insights into mediated pathways from transformational leadership to teacher engagement via teachers' academic optimism. The obtained results revealed that transformational

leadership has the potential to primarily indirectly influence the engagement of teachers. Therefore, it is important that school leader preparation and professional development programs include the transformational leadership model. Also, it would be beneficial if the assessment of transformational leadership behaviour, in addition to the evaluation of other competencies, is an integral part of the selection of school principals and other school leaders.

This study provides practical guidance for school leaders in improving teacher engagement. The obtained results indicate to school leaders that they should focus on academic emphasis and building teachers' trust in parents and students. Although we did not find evidence that transformational leadership via teacher self-efficacy affects teacher engagement, this certainly does not mean that school principals should ignore teacher self-efficacy. Teacher self-efficacy is an important predictor of teaching quality (Burić & Kim, 2020) and one of the motivational characteristics of teachers that school leaders can affect.

Limitations and Further Research Recommendations

First, a longitudinal examination of the relationship between transformational leadership, academic optimism, and teacher engagement would provide a better understanding of the direction and strength of the associations between these constructs. Second, it is possible that teachers gave socially desirable answers and that their evaluations did not objectively reflect the behaviour of principals and vice-principals in their schools. Therefore, it would be beneficial for future studies to include examining school leaders' perceptions and correlating school leaders' self-assessments with teacher ratings. We also endorse the recommendation of Stock *et al.* (2022) that it is preferable to use objective measures of the behaviour of leaders more often, such as the length of time spent in an activity or the frequency of different forms of behaviour. Another recommendation for future research is the application of multilevel modeling techniques, which would enable the separation of the effects of transformational leadership on teacher engagement at the organizational (school), team, and individual levels.

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