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# The importance of family participation in homework: understanding the relationship between student homework behaviors and academic achievement by school level

**Süleyman Avcı**[1] · **Mustafa Özgenel**[2] · **Akif Avcu**[1]

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## Abstract

The purpose of this study was to examine in detail the relationship between perceived parental involvement in homework (content-oriented and autonomy-oriented forms of involvement) and students' homework behavior (homework time, homework time management, and amount of homework completed). The study also looked at how the relationships between these variables change between middle school and high school. The study was conducted on 528 middle and high school students in grades 5–12. The relationships between the variables used in the study were structured using a theoretical model and tested using the structural equation model method. The results of the study show that parental involvement in homework has a positive relationship with students' homework behaviour. In particular, time management skills have the strongest relationship with parental involvement among the three homework behaviors. However, while there was no direct relationship between parental involvement and overall academic achievement, parental involvement in homework showed a positive relationship with academic achievement through homework completion and time management. At the secondary school level, there is a positive relationship between students' homework time, homework completion and time management skills and academic achievement. Students' homework completion stood out as the variable with the strongest relationship with academic achievement. These findings suggest that parental involvement in the homework process, especially at the secondary school level, can help students to manage their homework more effectively and be more successful academically.

**Keywords** Parental homework involvement · Homework behavior · Academic achievement

Extended author information available on the last page of the article

## 1 Introduction

Parental involvement in homework has been identified as a significant factor influencing student achievement and homework habits (Cooper, 2015; Fernández-Alonso et al., 2022; Trautwein et al., 2006a, b; Xu et al., 2024). Parental involvement includes autonomy support, control, structure, and emotional involvement (Aldosari, 2021; Lorenz & Wild, 2007). Autonomy support is an effective strategy for promoting responsibility among students, which subsequently enhances their academic performance (Pomerantz et al., 2007). On the other hand, excessive parental control negatively affects students' self-confidence and ability to think freely (Patall et al., 2008).

While research on parental involvement and academic achievement is abundant, studies on the mediating role of homework behaviour are limited, although motivation and self-regulated learning are known mediators (Dumont et al., 2012; Karbach et al., 2013; Silinskas & Kikas, 2019). Although homework behaviour affects academic achievement (Cooper, 1989b,a; Cooper et al., 2006; Fan et al., 2017; Ozyildirim, 2022), its mediating role has been little studied (Núñez et al., 2015a, b). A better understanding of the role of homework can be achieved through research in this area. Research has largely focused on European, American and Chinese samples, and X-sample results may help to generalise these findings. In particular, comparative studies of American and Chinese societies have shown that the interaction between types of parental involvement and academic achievement differs (Cai, 2003; Cheung & Pomerantz, 2011; Hong et al., 2011; Kim & Fong, 2014). Cai (2003) found that Chinese parents spent more time on mathematics homework and controlled homework more strictly than US parents. Cheung and Pomerantz (2011) found that controlling parenting style was positively related to academic achievement in China. On the other hand, research from the Western world suggests that controlling involvement negatively affects achievement (Fan & Williams, 2010; Gonida & Cortina, 2014; Grijalva-Quiñonez et al., 2020; Luo et al., 2016; Valdés-Cuervo et al., 2022). In a meta-analysis-based study, Fernández-Alonso et al. (2022) identified that the relationship between parental involvement and academic achievement varies according to cultural context.

China and the U.S. have contrasting views on parental involvement due to cultural differences. Although Turkiye has a collectivist culture, its level is much lower than that of China (Kagitcibasi, 1997; Uskul et al., 2010). Therefore, researchers expected that parental homework behaviors and children's perceptions in Turkish society would be different from those in Western societies. Thus, it is evident that parental homework involvement needs to be addressed in a cultural context. In order to fill the gap in the literature, this study aims to examine in depth the relationship between perceived parental homework involvement, students' homework behavior, and students' academic achievement.

Besides cultural differences, parental involvement also varies according to students' age and school level (Hoover-Dempsey & Sandler, 1997). Direct parental involvement is high in elementary school but decreases in middle and high school, where autonomy support increase (Boonk et al., 2018; Cooper et al., 2000). While involvement is generally ineffective in elementary school, supportive involvement in particular positively affects achievement in upper grades (Núñez et al., 2015a).

Therefore, the aim was also to determine the possible changes in the relationship between the three variables according to school level.

## 2 Literature review

### 2.1 Parental homework involvement types

Positive academic outcomes are achieved through the interaction of parents, students, teachers, and homework types, as supported by several studies (Cooper et al., 2006; Deslandes & Rousseau, 2008; Patall et al., 2008; Xu & Wu, 2013). Two basic models describe how homework influences success (Cooper, 2015; Trautwein et al., 2006a, b). In both models, parental involvement is a key factor influencing homework behavior and success. Parental involvement in homework is categorized based on parental expression and student perception. For example, Lorenz and Wild (2007) examined parental involvement in terms of autonomy support, control, structure, and emotional involvement. Pomerantz et al. (2007, 2012) described parental involvement as a combination of autonomy support, control, and beliefs about children's potential.

Self-determination theory (SDT) is frequently used to categorize parental involvement by focusing on autonomy-supportive and controlling parenting (Deci & Ryan, 2002; Dumont et al., 2014; Moroni et al., 2015; Trautwein et al., 2006a, b). Unlike others, Xu et al. (2017) measured parental involvement in two dimensions: autonomy-oriented and content-oriented. This study is based on the classification proposed by Xu et al. (2017). Parental autonomy support involves providing and respecting children's choices and encouraging their initiative. Content-oriented support refers to helping with homework when needed. This classification is the most frequently used in research (Núñez et al., 2015a, b, 2021, 2023; Xu et al., 2017). The principal objective of attaining comparable data was the driving force behind the selection of this classification. X, with its distinctive social structure, exhibits a combination of individualistic and collectivistic cultural traits. The research is based on the design of studies conducted in both Eastern (Xu et al., 2017) and Western (Núñez et al., 2023) societies in line with Xu's approach, as outlined in the original study. The findings of this study will facilitate the comparison of results between different societies.

### 2.2 The relationship between parental homework involvement and academic achievement

Supporting homework is one of the most common ways parents contribute to their children's education (Epstein & Van Voorhis, 2012; Cooper, 1989a, b). Parents participate in homework when they believe their participation will make a difference (Hoover-Dempsey et al., 2001). The relationship between parental involvement in homework and academic outcomes shows mixed results. While several studies (e.g., Castro et al., 2015; Cooper et al., 2000; Desimone, 1999; Hill & Tyson, 2009; Xu, 2004) highlight a positive link between parental involvement and students' homework behavior, others report negative (Domina, 2005; Lee & Bowen, 2006; Moroni et al., 2015; Rogers et al., 2009; Singh et al.,1995) or no effects (Driessen et al., 2005;

Levin et al., 1997). This variability suggests that the type and extent of involvement may influence these outcomes. Setting expectations and appreciating positive behaviors leads to positive outcomes, while constant control has a negative effect (Patall et al., 2008).

While experimental and longitudinal studies show a positive relationship, cross-sectional studies offer less clarity (Núñez et al., 2015a, b). The relationship between parental involvement in homework and academic achievement may be mutually deterministic depending on the situation. Parents who are involved in their children's homework to help them succeed are more likely to participate, as are students who achieve well (Crosnoe, 2001; Mau, 1997; Patall et al., 2008). Research has detailed the relationship between perceived parental involvement and academic achievement. For example, according to the meta-analysis by Xu et al. (2024), autonomy support is positively related to students' academic achievement, but other types of involvement such as content support and control did not show the same effect. It was also concluded that parental involvement was not generally associated with achievement at either secondary or high school level. This finding also showed that there were no significant differences between the Asian, European and American samples. Fernández-Alonso et al. (2022) emphasised that the level of parental involvement in homework is negatively related to academic achievement and that this negative effect is more pronounced in Europe. This ultimately led to increased academic achievement. The meta-analysis study by Jiang et al. (2023) found that positive parental involvement had a positive effect on academic achievement, whereas controlling involvement had a negative effect on achievement. The study also concluded that autonomy support had the strongest interaction among the types of parental involvement. Recent research reports that parental content support may still have a positive impact on math achievement, despite the potential for creating a sense of inadequacy in children (Xu et al., 2018; Xu & Corno, 2022). Research consistently highlights the positive role of parental autonomy support in enhancing students' sense of autonomy and competence, which helps them persist in their learning process (Moorman & Pomerantz, 2008; Epstein & Van Voorhis, 2001). Additionally, students who actively involve their parents in homework show higher motivation for academic success (Epstein & Van Voorhis, 2001; Jeynes, 2005), indicating that a supportive yet non-controlling approach is key to fostering both autonomy and achievement.

The literature on homework shows that the relationship between parental involvement in homework, student homework behavior and academic achievement varies by grade level. At the primary level, direct parental involvement in homework is highest and tends to decrease with grade. In contrast, autonomy support increases in parallel with increasing grade level (Cooper et al., 2000). The effect of homework participation on academic achievement also varies over time. Parental involvement is beneficial for primary and secondary school students, but not for middle school students, according to Hancock (2001). In contrast, Núñez et al. (2015a, b) found a positive relationship between parental homework support and academic achievement in middle and high school students, while this relationship was insignificant at the elementary school level.

### 2.3 The relationship between Student Homework behaviors and Academic Achievement

Students' homework behavior is a broad term that encompasses students' attitudes, approaches, and practices towards homework. Variables that need to be considered include homework time (Trautwein, 2006a, b), homework compliance, homework time management and homework effort (Xu & Corno, 1998; Xu, 2008a). This study included homework time, homework completion, and homework time management. These three variables were selected because they were used in Núñez et al. (2015a, b), allowing for comparable data and fitting the Structural Equation Modeling analysis, which requires limiting variables while examining the mediating role of homework behaviors. Furthermore, in many studies, the objective was to gather comparative data by assessing the amount of time devoted to homework and the management of homework, collectively rather than as separate factors influencing academic achievement.

The relationship between homework time and academic achievement is mixed, with more time spent on homework generally associated with better achievement, according to research such as Cooper et al. (2006). It has been shown that exceeding a certain threshold of homework time does not contribute significantly to academic achievement, but on the contrary, the benefit obtained diminishes (Trautwein et al., 2002; Trautwein, 2007). De Jong et al. (2000) suggest that low-achieving students may be particularly negatively affected by heavy homework loads. Valle et al. (2016) found a negative relationship between time spent on homework and academic achievement, albeit at a low level.

Homework behavior changes significantly with age; younger students spend more time on homework despite receiving less (Gill & Schlossman, 2003; Cooper, 1989a, b). However, the relationship between time spent on homework and academic achievement is particularly pronounced in the upper grades (Cooper, 1989a, b; Cooper et al., 2006). High school students benefit the most in terms of time spent on homework (Núñez et al., 2015a, b). Among the factors affecting academic achievement, it has been observed that students' level of homework completion plays an important role. A study conducted by Núñez et al. (2015a, b) found that homework completion has a positive relationship with academic achievement. This relationship was found to be stronger for high school students compared to middle school students. Another study conducted by Valle et al. (2016) showed that homework completion is an important determinant of academic achievement in middle school students. Furthermore, Xu (2022) identified a positive correlation between homework completion and academic achievement, thereby substantiating the overall impact of homework and its management on academic success.

The volitional control theory developed by Corno (2004) emphasizes the psychological mechanisms that govern the volition to focus on tasks when faced with uninteresting tasks or potential distractions. Xu and Corno (2003) identified five key features of homework management (organizing the environment, managing time, focusing attention, monitoring motivation, and controlling emotions), which Xu (2008b) later used to develop a homework management scale. Xu (2013) showed that these five dimensions are related to parental support. Yang and Tu (2020), in

their study of middle school students, empirically demonstrated that high achievers use homework management strategies more frequently than low achievers. Time management, which stands out among the five strategies, has a stronger relationship with academic achievement (Xu, 2022). Time management, defined as the efficient use of time, rather than the amount of time spent on homework, is strongly linked to academic success (Núñez et al., 2015a, b; Trautwein & Köller, 2003). As students advance in education, the use of self-regulated learning strategies tends to decrease. Hong et al. (2009) reported that high school students used metacognitive strategies less frequently than middle school students. Xu et al. (2014) reported a negative relationship between time management and grade level. However, there are other studies in the literature that show that the findings on this relationship are not consistent (Xu, 2006, 2010a; Xu & Corno, 2003, 2006; Yang & Tu, 2020).

### 2.4 The relationship between parental homework involvement and homework behaviors

Parental involvement in homework occurs in varying types and frequencies across from primary school to high school (Cooper et al., 2000; Hancock, 2001; Núñez et al., 2015a). Parents are more likely to assist with homework at the primary level, while they tend to offer general support at the middle and high school levels (Gonida & Cortina, 2014). The type of parental involvement in homework has a different impact on academic outcomes at different educational levels. Middle and high school students prefer indirect parental involvement and dislike parental control (Boonk et al., 2018). Autonomy-supported participation has been shown to positively influence homework completion (Boonk et al., 2018; Doctoroff & Arnold, 2017; Feng et al., 2019; Gonida & Cortina, 2014; Moroni et al., 2015; Núñez et al., 2015a, b; Voorhis, 2011). Gonida and Cortina (2014) definitively found that, regardless of grade level (elementary and middle school), autonomy support was the most beneficial type of parental involvement for homework, whereas interference was the most harmful. Culture plays a key role in shaping both parental involvement behaviors and acceptable student behaviors (Cai, 2003; Hong et al., 2011; Kim & Fong, 2014). Xu et al. (2014) found that Chinese parents were more involved in homework than US parents, and this involvement was positively reflected in homework behaviour.

Research shows that the effect of parental involvement on homework varies depending on the type and amount of involvement. Núñez et al. (2017) found that parental involvement was positively associated with homework completion, homework time, and time management. Of these relationships, the strongest interaction was with homework time, followed by time management and homework completion. Xu (2024b) found that both content support and autonomy support were positively related to homework completion, but autonomy support had a stronger effect on this relationship. Xu (2024a) concluded that parental autonomy support has a positive relationship with students' homework time management.

### 2.5 The present study

The purpose of this study is to examine in depth the relationship between perceived parental homework involvement, student homework behavior, and student academic achievement. In addition, changes in this relationship at the middle and high school levels were examined. Parental support for homework has a multidimensional structure (Pomerantz et al., 2007, 2012). In this study, two dimensions of parental support for homework were considered: content-oriented and autonomy-oriented. Content-oriented support refers to parents helping their children with homework, while autonomy-oriented support refers to parents listening to their children's ideas about homework and trusting their children's ability to do homework (Kurt & Tas, 2019; Xu et al., 2017). This study is in line with Xu et al. (2017), who divided the autonomy enabling approach into two sub-dimensions, namely autonomy and content. As these two dimensions represent the positive aspect of parental involvement, they were included in the research model as a single dimension. Avci and Ozgenel (2024) also found a high positive correlation (0.705) between the sub-dimensions. This study analyses three important behavioral indicators related to students' homework. These indicators are time spent on homework, homework time management, and amount of homework completed (Xu, 2008b). This study presents a theoretical research model that addresses the research questions and tests the research hypotheses within the framework of the model proposed by Núñez et al. (2015a, b) (Fig. 1). The study group consisted of middle and high school students.

The questions that motivated us in the present study are: (a) can parental involvement in homework, as perceived by students, predict students' homework-related behaviors, (b) are students' homework habits a determinant of their academic performance, (c) can parental involvement in homework, as perceived by students, affect students' academic performance, (d) do students' homework-related behaviors play a mediating role in the relationship between students' perceived parental involvement and academic performance?

The following hypotheses were tested with the theoretical model:

**H1** There is a significant positive relationship between parental involvement in homework (content-oriented support and autonomy-oriented support) and children's homework time, homework time management, and the amount of homework completed (Dumont et al., 2012; Feng et al., 2019; Vasquez et al., 2016).

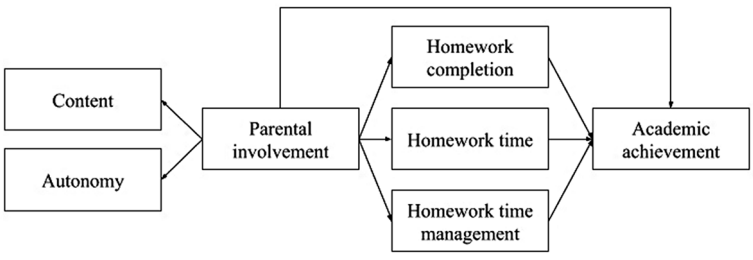


**Fig. 1** Hypothesized model

**H2a** There is a positive relationship between parental involvement in homework (content-oriented support and autonomy-oriented support) and academic achievement directly and indirectly through homework behaviors (Dumont et al., 2012; Wang & Eccles, 2012; Wang et al., 2007; Woolley & Bowen, 2007).

**H2b** Homework behaviors do mediate the relationship between parental homework involvement and academic achievement (Wang & Eccles, 2012; Woolley & Bowen, 2007).

**H3a** There is a significant positive relationship between the amount of time children spend on homework, homework time management, and the amount of homework completed and academic achievement (Cooper et al., 2006; Fan et al., 2017; Ozyildirim, 2022).

**H3b** The relationship between homework time management and homework completion and academic achievement is stronger than homework time (Núñez et al., 2015a, b; Valle et al., 2019; Xu, 2010b).

**H4** The direction and magnitude of the relationship between perceived parental involvement in homework, student homework behavior, and student academic achievement are different for middle and high school students (Cooper et al., 2006; Fernández Alonso et al., 2017; Núñez et al., 2015a, b).

## 3 Method

### 3.1 Participants and procedure

The data for this study were collected from a total of 528 middle and high school students (228 middle school, 300 high school) in the Pendik and Kartal districts of Istanbul province. In the Turkish education system, middle and high school education consists of a total of eight academic years of four years each. Middle school education covers grades 5 to 8 and high school education covers grades 9 to 12. This study was designed to include students from all grades in both levels of education. Two schools from each level were selected for implementation. 52.4 per cent of the students were female (265) and 47.6 per cent (241) were male. Twenty-two students explicitly stated that they did not want to specify their gender. The mean age of the students was 14.44 years (SD: 1.97).

Permission for implementation was first obtained from the Ministry of National Education and then from school administrators. In the schools to be implemented, permission was first obtained from the parents. Questionnaires were administered during class time to students whose parents had given permission and who volunteered to participate in the study. Data were collected from 16 classes at both middle and high school levels. The average class size was 28 in the middle school and 36 in the high school.

## 3.2 Instruments

### 3.2.1 Perceived parental homework involvement

In this study, two perceived parental homework behaviors, content-oriented support, and autonomy-oriented support, were measured. Data were collected using the Perceived Parental Homework Participation Scale developed by Xu et al. (2017) and adapted into Turkish by Avci and Ozgenel (2024). Content-focused support involves parents helping their children with homework, and children consulting their parents about issues they do not understand. Autonomy-focused support includes parents listening to children's ideas about homework and expressing confidence in children's ability to do homework. Scale items are answered on a 4-point Likert scale (1 = strongly disagree, 4 = strongly agree). The goodness of fit values obtained in the study by Avci and Ozgenel (2024) are quite high: $x^2/df = 2.577 < 3$, $CFI = 0.973 > 0.950$, $GFI = 0.949 > 0.900$, $TLI = 0.964 > 950$ and $RMSEA = 0.063 < 0.08$. Cronbach's alpha internal reliability coefficients for content and autonomy were *0.858* and *0.809* respectively.

### 3.2.2 Time management

In this study, the time management subscale of the Homework Management Scale developed by Xu (2008b) and adapted into Turkish by Avci and Ozgenel (2024) was used for time management. Time management refers to students' efficient use of time during the homework process. Time management consists of 4 items and is a five-point Likert scale ranging from 1 to 5 (never to always) (Xu, 2008b). In the Turkish adaptation study conducted by Avci and Ozgenel (2024), the goodness of fit values obtained for the whole scale are quite high: ($x^2/df = 2.084 < 3$, $CFI = 0.950 > 0.950$, $GFI = 0.922 > 0.900$, $TLI = 0.942 > 900$, *and* $RMSEA = 0.049 < 0.05$). The Cronbach's alpha internal reliability coefficient obtained in the adaptation study was *0.786*.

### 3.2.3 Homework completion

The Homework Completion Scale assesses students' homework completion behavior. A two-item scale is used to determine the level of homework completion as reported in the literature (Xu, 2011; Xu & Wu, 2013). The items are: (1) ''How much of your assigned homework do you usually complete?'' and (2) ''How often do you come to class without your homework?'' The response scale for the first item ranges from 1 (none) to 5 (all), while for the second item it ranges from 1 (never) to 5 (routinely). The Cronbach's alpha internal reliability coefficient for the original scale is reported to be 0.71 (Xu, 2011).

### 3.2.4 Homework time

To determine the time students, spend on homework, they are asked how much time they spend on mathematics homework on weekdays and weekends: 'How much time do you usually spend on your mathematics homework on weekdays/weekends? The

answer options for this question are 1 (0–15 minutes), 2 (15–30 minutes), 3 (30–60 minutes), 4 (60–90 minutes), 5 (90–120 minutes), and 6 (more than 120 minutes) (Suárez et al., 2019; Valle et al., 2019).

#### 3.2.5 Academic achievement

The mathematics course grades from the first semester report cards were used to measure students' academic performance. In Turkiye, a semester report card grade is derived from the combination of two examination results and the teacher's assessment of the student's academic work, with equal weight given to the examination results and the teacher's assessment. This study used semester report cards instead of a standardized measurement tool because the data were collected from eighth-grade students. This study used domain-specific measurement tools, with the mathematics course being the preferred option. Therefore, the course notes from the mathematics course were also taken into account.

### 3.3 Analysis

In the initial phase of the study, the multiple imputation method was employed using SPSS software to address the issue of missing data, which constituted 1.3% of the total data set. This technique entails the estimation of missing values based on observed data, coupled with the introduction of random error to ensure the maintenance of data variability (Sterne et al., 2009). Before analyzing the relationship between academic achievement, homework time, homework completion, time management and parental involvement using the structural equation model (SEM), this study first examines the relationship between the variables using Pearson's correlation analysis. In order to determine the robust standard error and confidence interval of the parameter estimate, the bootstrap technique is used to examine the importance of the mediating role of homework time, homework completion and time management in family factors and academic success. Results are interpreted as significant if the confidence interval does not include zero, as recommended by Erceg and Mirosevich (2008). Before testing the hypothesized models, the main assumptions of the SEM analysis (normality, linearity and homoscedasticity) were examined. The normality and linearity of the data set were examined using a scatterplot. It was found that the research variables had an elliptical distribution in the scatterplot. Based on this data, it was concluded that the data set had a normal distribution and linearity characteristics. Variance-covariance matrices were used to test for homoscedasticity. In the tests conducted, the result of the Box M test was not significant ($p > 0.025$), indicating that homoscedasticity was satisfied (Tabachnick et al., 2013). The analyses were performed using the lavaan package (Rosseel, 2012) in the R environment (Team, 2013). The fit levels of the tested models were evaluated based on the recommended cut-off levels of Jöreskog and Sörbom (1993).

The means, standard deviations and intercorrelations of the variables are presented in Table 1. As can be seen from the table, academic performance, homework time, homework completion, parental homework involvement and time management are

**Table 1** Means, standard deviations, and correlations with confidence intervals

| | Variable | | M | SD | 1 | 2 | 3 | 4 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. | Age | Total | 14.44 | 1.97 | | | | | | |
| | | Middle | 11.62 | 1.30 | | | | | | |
| | | High | 15.83 | 1.05 | | | | | | |
| 2. | HW completion | Total | 4.07 | 1.04 | −0.19** | | | | | |
| | | Middle | 4.20 | 1.01 | −0.09 | | | | | |
| | | High | 3.97 | 1.05 | −0.24** | | | | | |
| 3. | HW time | Total | 6.56 | 2.74 | 0.22** | 0.25** | | | | |
| | | Middle | 5.76 | 2.26 | 0.04 | 0.28** | | | | |
| | | High | 7.17 | 2.91 | 0.02 | 0.29** | | | | |
| 4. | Time man. | Total | 14.29 | 3.72 | −0.00 | 0.37** | 0.21** | | | |
| | | Middle | 14.29 | 3.88 | −0.07 | 0.35** | 0.16* | | | |
| | | High | 14.29 | 3.61 | 0.06 | 0.39** | 0.26** | | | |
| 5. | Content | Total | 10.29 | 3.88 | −0.18** | 0.18** | 0.04 | 0.19** | | |
| | | Middle | 10.83 | 3.81 | −0.15* | 0.14* | 0.10 | 0.20** | | |
| | | High | 10.89 | 3.88 | −0.13* | 0.19** | 0.06 | 0.19** | | |
| 6. | Autonomy | Total | 8.88 | 3.32 | −0.09* | 0.24** | 0.10* | 0.33** | 0.66** | |
| | | Middle | 11.13 | 3.41 | −0.04 | 0.21** | 0.15* | 0.36** | 0.65** | |
| | | High | 10.68 | 3.25 | −0.09 | 0.25** | 0.10 | 0.29** | 0.66** | |
| 7. | Math ach. | Total | 78.11 | 18.99 | 0.22** | 0.21** | 0.13** | 0.23** | −0.03 | 0.05 |
| | | Middle | 71.99 | 21.49 | −0.08 | 0.36** | −0.03 | 0.36** | 0.05 | 0.13 |
| | | High | 82.76 | 15.31 | 0.07 | 0.15** | 0.13* | 0.10 | −0.05 | 0.02 |

HW: Homework, Ach: Achievement, Man: Management, Ind: Indirect, M: Mean, SD: Standard Deviation *:$p<0.05$., **: $p<0.01$

mostly significantly correlated, while there are non-significant correlations between mathematics scores and the content and autonomy sub-dimensions of parental homework involvement types.

### 3.4 Ethical

The procedures followed in the study were in accordance with the ethical standards of the Helsinki Declaration, and necessary permissions were obtained for the research.

## 4 Findings

### 4.1 Hypothesized models

First, the hypothesized model was implemented for all middle and high school students. According to the results, the model is not significantly different from a baseline model ($Chi^2(3) = 6.81$, $p = 0.078$) and the values suggest a satisfactory fit ($GFI = 1.00 > 0.95$; $AGFI = 0.97 > 0.90$; $NFI = 0.99 > 0.90$; $CFI = 0.99 > 0.90$; $RMSEA = 0.05 < 0.08$; $SRMR = 0.02 < 0.08$). Each increase in parental homework involvement scores was associated with time management and homework completion scores. In addition, homework completion and time management were positively

**Table 2** Standardized regression weights for middle school ($n=228$), and high school ($n=300$) student samples

| Parameter | Coefficient | 95% CI | | $p$ | Label |
|---|---|---|---|---|---|
| Parental HW Involv. =~ Content | 0.661 | 0.563 | 0.759 | <0.001 | |
| Parental HW Involv. =~ Autonomy | 0.996 | 0.867 | 1.124 | <0.001 | |
| Homework time ~ Parental HW Involv. | 0.096 | 0.011 | 0.182 | 0.029 | p2 |
| Homework completion ~ Parental HW Involv. | 0.240 | 0.153 | 0.326 | <0.001 | p3 |
| Time management ~ Parental HW Involv. | 0.326 | 0.239 | 0.413 | <0.001 | p4 |
| Math ach. ~ Parental HW Involvement | −0.043 | −0.131 | 0.045 | 0.341 | p1 |
| Math ach. ~ Homework time | 0.058 | −0.028 | 0.143 | 0.186 | p5 |
| Math ach. ~ Homework completion | 0.141 | 0.051 | 0.231 | 0.002 | p6 |
| Math ach. ~ Time management | 0.175 | 0.084 | 0.266 | <0.001 | p7 |
| Homework time ~~ Homework completion | 0.234 | 0.154 | 0.315 | <0.001 | |
| Homework time ~~ Time management | 0.194 | 0.112 | 0.276 | <0.001 | |
| Homework completion ~~ Time management | 0.321 | 0.243 | 0.399 | <0.001 | |
| Ind1: = p2*p5 | 0.006 | −0.004 | 0.015 | 0.258 | Ind1 |
| Ind2: = p3*p6 | 0.034 | 0.009 | 0.059 | 0.009 | Ind2 |
| Ind3: = p4*p7 | 0.057 | 0.023 | 0.091 | 0.001 | Ind3 |
| Total: = p1 + p2*p5 + p3*p6 + p4*p7 | 0.054 | −0.032 | 0.139 | 0.222 | Total |
| Indirect:= p2*p5 + p3*p6 + p4*p7 | 0.096 | 0.057 | | <0.001 | Indirect |

CI: Confidence Intervals, HW: Homework, Ach: Achievement, Involv.: Involvement, Ind: Indirect

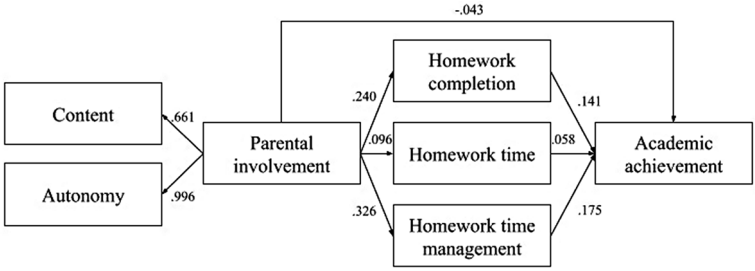


**Fig. 2** Tested model

associated with mathematics scores where there was no association for homework time and parental homework involvement. Types of homework involvement have an indirect effect on academic achievement via homework completion and time management, while the indirect effect of types of homework involvement via homework time is not statistically significant (Table 2) (Fig. 2).

The mediation analysis was repeated with a multiple group approach between middle and high school students. Accordingly, four different models were compared. A detailed description of these models can be found in Yuan and Chan (2016). The results of the analysis are shown in Table 3. The results indicate that the invariance of the models was achieved at the metric level. This result suggests that the associations between the variables are not comparable, which requires invariance in the scalar models. Accordingly, these analyses were repeated separately for each group.

**Table 3** *Chi* square difference test statistics for the models

| | Df | AIC | BIC | $\chi^2$ | $\chi^2\Delta$ | RMSEA | Df Δ | *p* |
|---|---|---|---|---|---|---|---|---|
| Configural | 13 | 16,688 | 16,863 | 36.06 | | | | |
| Metric | 14 | 16,687 | 16,857 | 36.69 | 0.63 | 0 | 1 | 0.429 |
| Scalar | 19 | 16,783 | 16,932 | 143.03 | 106.34 | 0.28 | 5 | < 0.001** |
| Strict | 25 | 16,811 | 16,934 | 182.63 | 39.60 | 0.15 | 6 | < 0.002** |

Df: Degree of freedom, AIC: Akaike Information Criterion, BIC: Bayesian Information Criterion RMSEA: Root Mean Square Error of Approximation

**Table 4** Standardized regression weights for middle school ($n$ = 228) student samples

| Parameter | Coefficient | 95% CI | | *p* | Label |
|---|---|---|---|---|---|
| Parental HW Involv. =~ Content | 0.614 | 0.463 | 0.765 | < 0.001 | |
| Parental HW Involv. =~ Autonomy | 1.055 | 0.835 | 1.275 | < 0.001 | |
| Homework time ~ Parental HW Involv. | 0.142 | 0.018 | 0.267 | 0.024 | p2 |
| Homework completion ~ Parental HW Involv. | 0.193 | 0.067 | 0.319 | 0.002 | p3 |
| Time management ~ Parental HW Involv. | 0.345 | 0.211 | 0.479 | < 0.001 | p4 |
| Math ach. ~ Parental HW Involvement | −0.008 | −0.124 | 0.107 | 0.890 | p1 |
| Math ach. ~ Homework time | −0.159 | −0.278 | −0.039 | 0.010 | p5 |
| Math ach. ~ Homework completion | 0.309 | 0.186 | 0.431 | < 0.001 | p6 |
| Math ach. ~ Time management | 0.278 | 0.154 | 0.403 | < 0.001 | p7 |
| Homework time ~~ Homework completion | 0.264 | 0.143 | 0.384 | < 0.001 | |
| Homework time ~~ Time management | 0.121 | −0.008 | 0.249 | 0.072 | |
| Homework completion ~~ Time management | 0.310 | 0.192 | 0.429 | < 0.001 | |
| Ind1: = p2*p5 | −0.023 | −0.049 | 0.004 | 0.090 | Ind1 |
| Ind2: = p3*p6 | 0.060 | 0.014 | 0.106 | 0.010 | Ind2 |
| Ind3: = p4*p7 | 0.096 | 0.038 | 0.154 | < 0.001 | Ind3 |
| Total: = p1 + p2*p5 + p3*p6 + p4*p7 | 0.125 | 0.001 | 0.249 | 0.047 | Total |
| Indirect: = p2*p5 + p3*p6 + p4*p7 | 0.133 | 0.058 | 0.20 | < 0.001 | Indirect |

CI: Confidence Intervals, HW: Homework, Ach: Achievement, Involv.: Involvement, Ind: Indirect

The model is not significantly different from a baseline model, suggesting a satisfactory fit ($Chi^2(3) = 0.63$, $p$ = 0.889), and the values suggest a satisfactory fit ($GFI = 0.00 > 0.95$; $AGFI = 0.99 > 0.90$; $NFI = 0.00 > 0.90$), ($CFI = 0.00 > 0.90$; $RMSEA = 0.00 < 0.05$; $SRMR = .20e\text{-}03 < 0.08$). Again, the indirect effect of parental homework involvement types on homework time was not statistically significant (Table 4).

The model is not significantly different from a baseline model ($Chi^2(3) = 2.87$, $p$ = 0.413) and the values suggest a satisfactory fit ($GFI = 0.00 > 0.95$; $AGFI = 0.98 > 0.90$; $NFI = 0.99 > 0.90$; $CFI = 0.00 > 0.90$; $RMSEA = 0.00 < 0.05$; $SRMR = 0.01 < 0.08$). For high school students, none of the indirect effects were statistically significant (Table 5).

### 4.2 Parental homework involvement and students' homework behaviors

Parental involvement in homework is positively related to homework behavior (homework time, homework completion and time management). Increased parental

**Table 5** Standardized regression weights for high school ($n=300$) student samples

| Parameter | Coefficient | 95% CI | | $p$ | Label |
|---|---|---|---|---|---|
| Parental HW Involv. =~ Content | 0.687 | 0.556 | 0.818 | <0.001 | |
| Parental HW Involv. =~ Autonomy | 0.966 | 0.802 | 1.130 | <0.001 | |
| Homework time ~ Parental HW Involv. | 0.101 | −0.016 | 0.218 | 0.090 | p2 |
| Homework completion ~ Parental HW Involv. | 0.265 | 0.149 | 0.381 | <0.001 | p3 |
| Time management ~ Parental HW Involv. | 0.303 | 0.187 | 0.419 | <0.001 | p4 |
| Math ach. ~ Parental HW Involvement | −0.039 | −0.162 | 0.084 | 0.535 | p1 |
| Math ach. ~ Homework time | 0.093 | −0.024 | 0.211 | 0.122 | p5 |
| Math ach. ~ Homework completion | 0.120 | −0.005 | 0.245 | 0.061 | p6 |
| Math ach. ~ Time management | 0.038 | −0.088 | 0.164 | 0.557 | p7 |
| Homework time ~~ Homework completion | 0.279 | 0.174 | 0.384 | <0.001 | |
| Homework time ~~ Time management | 0.245 | 0.139 | 0.352 | <0.001 | |
| Homework completion ~~ Time management | 0.342 | 0.240 | 0.443 | <0.001 | |
| Ind1: = p2*p5 | 0.009 | −0.007 | 0.026 | 0.254 | Ind1 |
| Ind2: = p3*p6 | 0.032 | −0.004 | 0.068 | 0.085 | Ind2 |
| Ind3: = p4*p7 | 0.011 | −0.027 | 0.050 | 0.560 | Ind3 |
| Total: = p1 + p2*p5 + p3*p6 + p4*p7 | 0.014 | −0.103 | 0.131 | 0.818 | Total |
| Indirect: = p2*p5 + p3*p6 + p4*p7 | 0.053 | 0.006 | 0.099 | 0.026 | Indirect |

CI: Confidence Intervals, HW: Homework, Ach: Achievement, Involv.: Involvement, Ind: Indirect

involvement is associated with improved homework time, homework completion and time management. The strength of this relationship differs at the secondary and tertiary levels. At the middle school level, there is a positive relationship between parental involvement and homework time ($b=0.142$), homework completion ($b=0.193$), and time management ($b=0.345$). At the secondary school level, there is a positive relationship between parental involvement and homework completion ($b=0.265$) and time management ($b=0.303$), but not with time spent on homework ($b=0.101$). Overall, the strongest relationship with parental involvement at all levels was found for time management. Time spent on homework was higher among middle school students, while homework completion and time spent on homework were similar among all students and high school students.

### 4.3 Student homework behaviors and academic achievement

According to the model tested on all students, there is a positive relationship between homework completion ($b=0.141$) and time management ($b=0.175$) and academic achievement, while there is no relationship between homework time and academic achievement ($b=0.058$). For middle school students, there is a significant relationship between homework time ($b=-0.159$), homework completion ($b=0.309$) and time management ($b=0.278$) and academic achievement. At the high school level, there is no relationship between the three homework behaviours and academic achievement. The strongest explanatory variable for all students is time management ($b=0.175$), followed by homework completion ($b=0.141$) and homework time ($b=0.058$). The strongest variable at secondary school level is completed homework ($b=0.309$). Homework time, homework completion and time management are three variables that are positively correlated with each other. The relationship between

homework completion and time management ($b = 0.310$) is higher than homework time ($b = 0.264$).

### 4.4 Parental homework involvement and academic achievement

The results of the analysis show that there is no direct relationship ($b$=-0.043) between parental homework involvement and academic achievement for all students. This result is repeated for students in middle school ($b$=-0.008) and high school ($b$=-0.039). However, there is an indirect effect of parental homework involvement through homework completion ($b = 0.034$) and time management ($b = 0.057$) for all students. The indirect effect result is replicated for middle school students, while there is no indirect effect for high school students. There are differences in the mediating effects of homework completion and time management. The mediating effect of time management on the relationship between parental homework participation and academic achievement is higher than that of homework completion.

## 5 Discussion

The results of this study highlight the relationship between parental involvement in homework and homework behavior and academic achievement. The study included two types of involvement (content and autonomy) representing the positive aspects of parental involvement. In this study, due to the high positive correlation between autonomy and content parental involvement approaches, parental involvement was included as a latent variable in the analyses and discussions were conducted on the latent variable. Homework behavior included homework completion, homework time and time management. The theoretical model tested revealed the mediating role of homework behaviors in the relationship between parental involvement and academic achievement. Furthermore, the relationship identified by this model was examined in middle and high school students and the effect of school level was evaluated.

### 5.1 Parental homework involvement and academic results

The results of this study support the hypothesis that there is a positive relationship between parental involvement in homework and homework behavior (time spent on homework, time management of homework, and amount of homework completed). Accordingly, the homework behavior of students who perceive their parents to be supportive of homework is more positive. The relationship between homework time management and amount of homework completed and parental support is positive in both middle and high school. The relationship between time spent on homework and parental support is positive for middle school students, but not for high school students.

There is a wide range of parental involvement in homework (Boonk et al., 2018; Danioni et al., 2017; Gonzalez-DeHass et al., 2005). Although there is a general tendency for parental involvement to decline during the transition to secondary school (Epstein & Lee, 1995; Hoover-Dempsey & Sandler, 1997), it

continues to evolve in its form (Boonk et al., 2018). At the primary school level, direct forms of participation predominate, while at the secondary school level, supportive participation becomes more important (Gonida & Cortina, 2014). The results of the study show that parental involvement in homework continues in middle and high school. The study examined two dimensions of parental involvement: autonomy support and content support. While autonomy-supportive involvement has a positive effect on achievement, controlling involvement has a negative effect (Bempechat & Shernoff, 2012; Patall et al., 2008). Furthermore, many studies show that supportive parental involvement has a positive effect on children's homework completion (Cooper et al., 2000; Dumont et al., 2012; Feng et al., 2019; Katz et al., 2011; Pomerantz et al., 2007; Vasquez et al., 2016). Although Turkish society has a collectivist structure, the results obtained are consistent with the Western literature, which has an individualistic social structure. This finding may be due to the changing social structure and the fact that the sample group was selected from a metropolitan area, such as Istanbul. In Turkiye, the rise in social status through education and competitive exams increases parental intervention with children. Although this is the tendency of parents, children benefit more from non-oppressive and supportive involvement.

The results of the study partially support the hypothesis that there is a positive relationship between parental homework involvement and academic achievement, both directly and through homework behavior. Similarly, the hypothesis that homework behaviors mediate the relationship between parental homework involvement and academic achievement was partially supported. According to the findings, there is no direct relationship between parental homework involvement and academic achievement. However, for all students, parental homework involvement has an indirect effect on academic achievement through homework completion and time management. School level seems to be a determining factor in this relationship. While involvement in homework has an indirect effect on academic achievement through homework completion and time management for middle school students, this indirect effect is not observed for high school students. There are also differences between homework completion and time management, with time management having a more significant mediating effect. The extensive literature on the impact of parental involvement on academic achievement generally shows positive and favourable results (Boonk et al., 2018; Cooper et al., 2000; Katz et al., 2011; Pomerantz et al., 2007; Xu et al., 2018). However, Xu et al. (2024) identified a positive correlation between academic achievement and autonomy support in their meta-analysis, while no significant relationship was observed between content support and control and academic achievement. Conversely, Fernández-Alonso et al. (2022) reached the conclusion in their meta-analysis based on the amount of parental involvement that this variable demonstrated a negative relationship with academic achievement. Research has shown that supportive parental involvement indirectly influences academic achievement through mediating variables such as student motivation and self-regulation (Dumont et al., 2012; Karbach et al., 2013; Silinskas & Kikas, 2019). In addition, self-regulation strategies, such as time management, are found to be critical to student achievement (Fan & Williams, 2010; Gonida & Cortina, 2014; Grijalva-

Quiñonez et al., 2020; Luo et al., 2016). Many studies in the literature confirm that the effect of parental involvement on academic achievement is higher in relation to psychological resources (motivation, self-efficacy, self-regulated learning, positive homework-related emotions, etc.) than academic achievement (Dinkelmann & Buff, 2016; Fan & Williams, 2010; Luo et al., 2016; Núñez et al., 2015a, b; Pomerantz et al., 2005). The lack of a mediating role of homework behaviors in the effect of parental involvement in homework on academic achievement in high school students can be explained by the decrease in both parental involvement (Cooper et al., 2000) and homework completion (Gill & Schlossman, 2003; Xu, 2004) in parallel with increasing educational level. The discrepancy in the mediating effect of homework behaviours observed at the middle school and high school levels can be attributed to the declining significance and value attributed to homework in this age group (Patall et al., 2008; Epstein & Van Voorhis, 2012). At the high school level, the transition from daily short-term homework to long-term assignments such as projects, coupled with a reduction in the overall number of homework tasks (Cooper et al., 2006), may diminish the mediating influence of parental involvement.

### 5.2 Student homework behaviors and academic achievement

The results of this study partially supported the hypothesis that there is a positive relationship between students' homework behaviors (time spent on homework, time management of homework, and amount of homework completed) and academic achievement. According to the literature, the relationship between the three homework behaviors examined and academic achievement can be quite variable. In particular, there is no clear direction in the relationship between time spent on homework and academic achievement.

Meta-analyses show that the effect of homework time on academic achievement is positive but very small (Cooper, 1989b, 1989a; Cooper et al., 2006; Fan et al., 2017; Ozyildirim, 2022). However, there are also many studies that show no relationship or a negative relationship between the two variables (Chang et al., 2014; Kitsantas et al., 2011; Núñez et al., 2015a, b; Trautwein, 2007; Trautwein et al., 2006a, b, 2009; Xu, 2011). These findings highlight the complexity and diversity of the effects of homework time on academic achievement. This study found that the relationship between homework time and academic achievement differed according to school level. Although the relationship was insignificant for all students and at the high school level, its direction was positive. However, there was a negative relationship between time spent on homework and academic achievement at secondary school level. These findings are quite consistent with the literature on homework. There may be many reasons for the lack of relationship between the two variables. Factors such as academic failure and the difficulty of the homework may be among the reasons why students spend too much time on homework. For example, a student may spend more time on homework because of the difficulty of the task or put more effort into the task because of fear of failure. Conversely, a successful student may grasp the subject quickly and complete the assignment quickly (Fan et al., 2017; Trautwein, 2007; Trautwein et

al., 2002). In this case, a state of mutual balance will result in a neutral relationship between the two variables. The discrepancy between balanced results in high school and a subsequent negative relationship in middle school may be attributed to the incomplete development of students' self-regulation skills during this period. As students progress through their academic careers, they demonstrate an enhanced capacity to utilise self-regulation strategies, including planning, time management, goal setting and maintaining focus. Consequently, the development of self-regulation skills is less pronounced at the secondary school level in comparison to the high school level (Zimmerman & Schunk, 2011). In particular, deficiencies in time management skills may result in students devoting more time to homework than is optimal (Núñez et al., 2015a, b). In this context, it is possible that secondary school students do not demonstrate an increase in academic achievement despite investing a significant amount of time in their studies, due to an inability to effectively manage their time. Furthermore, the observation that self-regulation skills are less developed in low-achieving students (Zimmerman, 2002) may also be a contributing factor to the emergence of this result. It is also clear that an excessive amount of homework is a significant factor in the negative relationship between homework time and academic achievement. In this case, due to low motivation, students spend a lot of time, but they may not be rewarded for the time they spend (Cooper, 2007; Cooper et al., 1998; Trautwein, 2007).

In homework, efficient use of time is more effective than time spent on homework (Núñez et al., 2015a, b). Time management is a self-regulatory skill that refers to the effective use of time in the homework process (Claessens et al., 2007). Research has shown that effective management of homework time is more important for academic success (Xu, 2020, 2022; Yang & Xu, 2015). In this study, the finding of a positive and significant relationship between time management and academic achievement is consistent with the literature. In addition, the fact that the coefficient values of time management are higher for time spent on homework supports that time management is a more effective variable for academic achievement. However, the relationship between the two variables varies according to school level. While there is a positive and significant relationship at the middle school level, the relationship is positive but not significant at the high school level. According to the self-regulation literature, in the context of homework, skills are acquired but not used in primary school, skills are actively used in middle school, and skills are not consciously used in high school despite having skills (Hong et al., 2009). The results of this study show that homework time management is less effective in high school, which is consistent with the literature. The lack of conscious use of time management in high school may be due to the declining value placed on education.

The literature suggesting that the quality of time spent on homework is more influential than the quantity of time spent on homework (Núñez et al., 2015a, b) is supported by the findings of this study regarding the direction and extent of the relationships between homework time, homework completion and time management. The coefficient value between homework completion and time management is much higher for the time spent on homework. This finding indicates that students with effective time management skills complete more homework. These findings are similar at the middle and high school levels. Several studies can be cited as evidence

of the positive effect of time management on homework completion (Bembenutty, 2009; Núñez et al., 2015a, b; Valle et al., 2019; Xu, 2022; Yang & Xu, 2015). For example, Valle et al. (2019) found that students who used time efficiently were more successful in terms of homework completion than those who spent more time. The findings of this study are consistent with and supportive of the literature. These findings also provide evidence from a different culture on the effectiveness of using self-regulation theory in homework settings.

Research shows that homework completion has the strongest relationship with academic achievement. Homework completion is recognized as a more effective strategy for improving students' academic performance than time spent on homework. In a study conducted by Xu and Corno (2022) and Xu (2011), homework completion was found to be more dominant than the relationship between homework management and academic achievement for students in grades 8 and 11. Similarly, Xu and Corno (2022) found that homework completion explained academic achievement more effectively than time spent on homework for students in grade 8. This study demonstrated that the relationship between homework completion and homework time management with academic achievement is more significant than the time spent on homework for all students and at the middle school level. It can be stated definitively that homework time management is more effective than homework completion for all students. These findings confirm the literature (Núñez et al., 2015a, b; Valle et al., 2019; Xu, 2010b) that the quality of time spent on homework is more important than the amount of time spent on homework. It is therefore crucial to assign homework to students according to their level and interests. This is because quality assignments motivate students to complete them (Dettmers et al., 2010; Trautwein & Lüdtke, 2009) and to use self-regulation skills (time management) (Xu et al., 2017). Furthermore, measures must be taken to prevent all problems that prevent homework completion.

## 6 Conclusion, limitations and future directions

The present study aimed to examine the pattern of relationships between perceived parental homework involvement, homework behavior and academic achievement in middle and high school students. The results indicate that positive parental involvement is directly related to homework behavior and indirectly related to academic achievement. According to self-regulation theory, there are two main dimensions of parental involvement: autonomy-providing/supportive and controlling (Deci & Ryan, 2002). However, only one dimension was assessed in this study. This study did not include the controlling dimension because it was based on the construct and measurement tool defined by Xu et al. (2017). Future research should also consider the controlling dimension, which has a negative impact on students' academic outcomes (Dumont et al., 2012; Hill & Tyson, 2009; Moroni et al., 2015; Silinskas & Kikas, 2019). It is recommended to include homework effort in the research. This choice was guided by the model put forward by Núñez et al. (2015a, b) in the design of the study. These variables are

known to affect academic achievement, so future research must examine homework effort and homework frequency. On the other hand, homework effort, which is included in homework behavior, was not assessed in this study. However, it is known that this variable also has an effect on academic performance. Therefore, it is important to investigate this variable in future studies. In this study, academic achievement is based on the current mathematics exam grades of students at different school levels, as reported by teachers. It should be noted that the academic achievement grades were not obtained from a standardized test, as the data were collected from different schools. In future research, it may be appropriate to use standardized tests to determine students' academic achievement, but also to include multiple assessment systems.

In this study, data were collected cross-sectionally over the same time period. Although cross-sectional designs give us a perspective/insight into understanding the relationships between variables, they provide limited information about causal relationships. Longitudinal studies are needed to understand how the relationship between students perceived parental homework involvement, homework behaviour and academic achievement changes over time, and experimental studies are needed to understand the causal relationship between variables. Longitudinal and experimental studies provide an in-depth understanding of the relationship between variables and provide solutions accordingly.

This study focuses on parents' homework engagement strategies and students' homework behavior in Turkiye, and the results should be considered as a reflection of Turkish culture in particular. The influence of cultural and geographical factors on parents' and students' homework behaviours cannot be ignored (Fan et al., 2017). Students' attitudes towards education may be influenced by a variety of factors, including local cultural values, structural features of the education system, and parental expectations. In this context, conducting similar studies in different cultures will help us to understand cultural influences on homework attitudes in a general framework.

The course or subject area on which the research focuses may influence students' attitudes towards homework and their performance. In this study, data was collected from mathematics, but there may be significant differences between mathematics, science, language, and literature assignments (Kitsantas et al., 2011; Mu, 2014). In addition, there may be differences between the value that parents and students place on this subject. Particularly in Turkiye, the fact that mathematics is the most important subject in national examinations may lead to the perception that this subject is more important. Therefore, research that compares students' attitudes and performance on homework in different subject areas may provide a more comprehensive picture of how students' homework-related behaviors and attitudes may change.

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## Declarations

**Ethical approval** The authors obtained approval from the Ethics Committee of Istanbul Sabahattin Zaim University.

**Consent for participation** Participation in the study was voluntary, and both parents and students were in agreement in writing.

**Conflict of interest** The authors declare that there is no conflict of interest.

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**Süleyman Avcı** Dr. Süleyman Avcı is a faculty member at Marmara University, Atatürk Faculty of Education, Department of Educational Sciences. His research interests focus on enhancing educational processes and teaching strategies, developing effective educational programs, and improving evaluation techniques in education. His work is dedicated to supporting the professional growth of educators and researching innovative teaching approaches to improve student learning.

**Mustafa Özgenel** Dr. Mustafa Özgenel is a faculty member at Istanbul Sabahattin Zaim University, Faculty of Education, Department of Educational Sciences. His research focuses on leadership qualities in educational settings, factors that predict and enhance school effectiveness, and the impact of teacher performance on educational outcomes. Dr. Özgenel is interested in developing and improving educational curricula and engages in studies related to assessment and evaluation in educational contexts. His work aims to understand and enhance the factors that contribute to effective schooling and educational leadership.

**Akif Avcu** Dr. Akif Avcu is a faculty member at Marmara University, Atatürk Faculty of Education, Department of Educational Sciences. His research focuses on educational measurement and evaluation, psychological aspects of learning, and the application of statistical methods in educational research. Dr. Avcu is dedicated to improving assessment techniques, understanding the psychological factors that influence student learning, and developing evidence-based approaches to enhance educational outcomes. His work aims to contribute to the advancement of educational psychology and statistical practices in education.

## Authors and Affiliations

**Süleyman Avcı[1] · Mustafa Özgenel[2] · Akif Avcu[1]**

✉ Süleyman Avcı
suleyman.avci@marmara.edu.tr

Mustafa Özgenel
mustafa.ozgenel@izu.edu.tr

Akif Avcu
avcuakif@gmail.com

[1] Department of Educational Sciences, Atatürk Faculty of Education, Marmara University, Istanbul, Türkiye, Turkey

[2] Department of Educational Sciences, Faculty of Education, Istanbul Sabahattin Zaim University, Istanbul, Türkiye, Turkey