

## Relationships between Social Support, Motivation, and Science Achievement: Structural Equation Modeling\*

Ilker Cirik

*Mimar Sinan Fine Arts University, Cumhuriyet Mah. Silahsor Cad. No: 89 Sisli,  
Istanbul, Turkey, 34380  
Telephone: +90 532 274 87 64, E-mail: ilker.cirik@msgsu.edu.tr*

**KEYWORDS** Social Support. Motivation. Science Achievement. Structural Equation Modeling

**ABSTRACT** This study investigated the relationships between the perceived social support, motivation and science achievement in a sample of 1375 (701 females, 674 males) middle school students. The study was conducted within a causal research design. Social support data were collected via the Child and Adolescent Social Support Scale (CASSS) and the data concerning motivation were collected via the Motivation Strategies for Learning Questionnaire (MSLQ). Students' science achievement levels were determined through calculating the scores they obtained in science courses. Data were analyzed through structural equation modeling (SEM). According to the structural models obtained, the effects of social support on science achievement and motivation, as well as the effects of social support and motivation on science achievement, were found to be positive and significant. The mediating effect of motivation between social support and science achievement was not significant  $p > .05$ . The findings revealed that the cooperation of the sources of support (parents, teachers, classmates, and close friends) was essential in increasing students' science achievement and motivation levels.

### INTRODUCTION

Researchers have been attempting to increase students' learning motivation and academic achievement levels for many years. As a result of these attempts, a common approach has been adopted that feedback, guidance, and support improved students' interest in learning (Deci and Ryan 2000) and ensured their active participation in the learning process (Lumsden 1994). In this respect, it can be stated that students should be supported from multiple sources (Chambers et al. 2006; Rushi 2007). Hence, literature shows that social support has positive effects on the quality of the learning process and academic achievement (Johnson and Johnson 1983; Song et al. 2014).

Dubow et al. (1991) reported that the social support perceived by the primary school students was a predictor of their achievement; Song et al. (2014) emphasized that social support perceived by the middle school students predicted their achievement; Legault et al. (2006) identified that there was a positive relationship between the social support perceived by students aged between 12 and 19 and their achievement; and Mattanah et al. (2012) proved that social support had positive effects on the performance of university students. Additionally, there have been findings stating that the sources of support might have different effects on achievement. Ratelle et

al. (2005) found that the parents support positively affected the achievement of high school students. Similarly, in a study on university students, Cutrona et al. (1994), and in a study on high school students, Kapikiran and Ozgungor (2009) concluded that parents support was a predictor of achievement, while peer support was not. Tabbah et al. (2012) reported that teacher and peer support had positive effects on the achievement of secondary school students. Furthermore, Rosenfeld et al. (2000) stated that teacher support affected the achievement of students enrolled in grades 6 to 12; however, it was essential to ensure that the teacher support should be accompanied by parent and peer support. In a similar study, Lopez et al. (2002) identified that cooperation among the sources of support is necessary in improving the performance of ninth grade students. In these findings, it is presumed to be beneficial to analyze the effects of social support on achievement as a whole. Additionally, motivation is observed to become prominent within the interaction between social support and achievement.

Motivation that includes self-efficacy, self-perceptions of ability, attributional style, and expectancies for success affect students' performances (Pintrich et al. 1987). Therefore, the performance levels of students increase when they perceive themselves as competent and value what they learn (Ahmed et al. 2010; Linnenbrink

and Pintrich 2003). Moreover, motivation should be perceived as a dynamic and multidimensional process (Zusho et al. 2003). In this respect, it is believed that students' interaction with their sources of support positively affect their motivation (Wigfield and Eccles 2002).

Vatankhaha and Tanbakooei (2014) revealed that support from parents, peers, and teachers significantly influenced 12-16 ages learners' motivation. In a study by Legault et al. (2006), which was conducted with students aged between 12 and 19, and a study by Wentzel (1998) with sixth grade students, found that the support students received from their parents, teachers, and peers had a positive relationship with their motivation levels. Another study by Shen et al. (2010) concluded that the decrease in teacher support resulted in the lack of motivation in the ninth grade students. Kapikiran and Oztungor (2009) identified that family support was a predictor of motivation level in high school students, while peer support was not. In light of these findings, the relationship between social support and motivation was determined; however, the effects of social support on motivation remained uncertain. Therefore, it is believed that the aforementioned effects should be a topic worthy of research. Furthermore, researchers were curious about why certain students achieved better and acted more ambitiously in learning and based on this position, there have been studies on the relationship between motivation and achievement.

Mega et al. (2014) stated that undergraduate students' motivation affected their achievement levels. Lee and Brophy (1996) found that sixth grade students with high levels of motivation were more willing and successful in the learning process. Similarly, their conducted with students from grades 3 to 8 and in the study by Tella (2007), which was conducted with middle school students, revealed that the students' achievement levels were directly proportional. In another study by Wolters (1999), secondary school students, who were able to regulate their levels of motivation could achieve better. Khatib (2010) and Zusho et al. (2003) reported that the university students' achievement levels were predicted by their motivation levels. Campbell (2007) and Wang (2008) identified a positive relationship between the university students' achievements and their motivation levels. Glynn et al. (2007) determined that the university students' motivation levels had direct effects on their achievements. In short,

many studies have been conducted on the relationship of social support, motivation, and achievement. On the other hand, it was noted that the studies on the effects of social support and motivation together on achievement were quite rare. This finding is supportive of the necessity for this research. Additionally, there are studies indicating that motivation mediate the effects of social support on achievement.

Ahmed et al. (2010) found that the support received by seventh grade students affected achievement both directly and through motivation. Likewise, Wentzel (1998) reported that motivation had a mediating role in the effect of the sixth grade students' perceived support on their achievements. There are gaps in the literature about the mediating role of motivation between social support and achievement' association. This research is believed to have contributions to fill in the existing gap.

### Objectives

Examining the studies presented in terms of educational levels, it was identified that there were few studies about the effects of social support and motivation on middle school students' achievement levels. However, many students experience developments and changes within their transition towards adolescence (Lord et al. 1994), which negatively affect their motivation and performance levels. Therefore, it is believed that adolescents should be supported by their teachers, parents, and peers (Harter 1999; Roeser et al. 1998). This study was conducted in light of this assumption with the aim of analyzing the relationship between the social support perceived by middle school students and their levels of motivation, as well as their achievements in science (see Fig. 1). Science achievement was considered to be the dependent variable in the study. The Turkish Ministry of National Education (MNE) (2013) identified the vision of the Science Curriculum as: "to cultivate all students with literacy in science." The results of Program for International Student Assessment (Yildirim et al. 2013) and Trends in International Mathematics and Science Study (Martin et al. 2012) showed that the scores obtained by Turkish students in science were lower than those of the students from other countries. This led to the selection of science achievement as the dependent variable for the study. Furthermore, per-

ceived social support was considered as the independent variable. Motivation was considered as the dependent variable in the first model, while it was considered as both independent and mediating variable in the second model.

Based on the general aim, the hypotheses that were tested through this research were as follows: (1) the effect of the perceived social support on science achievement is positive and significant; (2) the effect of perceived social support on motivation is positive and significant; (3) the effect of perceived social support and motivation together on science achievement is positive and significant; and (4) motivation mediate the relationship between perceived social support and science achievement. The proposed model within the study is presented in Figure 1.

**METHOD**

**Research Design**

The study was conducted within a causal research design. The effects of independent variables on the dependent variables were analyzed through SEM.

**Study Group**

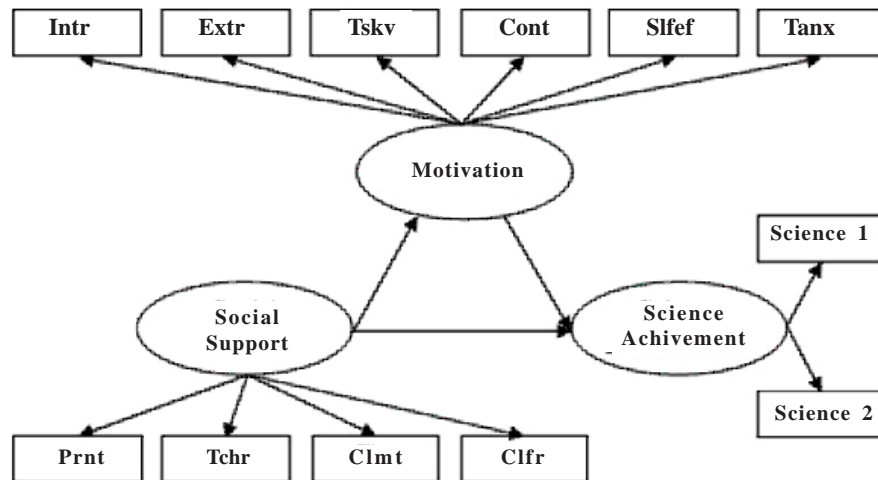
The study group consisted of students, who were enrolled at a middle school in Kucukcek-

mece, Istanbul during the 2013-2014 academic year. Due to the compulsory graded education, it was identified that the participating students had relocated from nine different schools. This finding indicated that the distribution of students was heterogeneous and the selected school was an average school among the existing schools. Therefore, a typical case sampling method was used and 1477 students participated in the study. One hundred two observations, which contained errors or outlying values, were removed from the data set. The data obtained from 1375 students, 701 (51%) being females and 674 being (49%) males, were evaluated. Among the students, 345 (25.1%) were enrolled in Grade 5, 338 (24.6%) were enrolled in Grade 6, 362 (26.3%) were enrolled in Grade 7, and 330 (24.0%) were enrolled in Grade 8.

**Research Instruments**

**CASSS**

Social support levels of students were assessed through the CASSS, which was developed by Malecki et al. (2004) and adapted into Turkish by Cirik et al. (2011). Each of the five factors (parents, teachers, classmates, close friend, people in school) consists of 12 positive items. The scale has a six-point scoring system ranging from never (1) to always (6). Factors of



**Fig. 1. Proposed model for social support, motivation, and science achievement**  
 Note. Intr=intrinsic goal orientation, Extr=extrinsic goal orientation, Tskv=task value, Cont=control beliefs about learning, Slfef=self-efficacy, Tanx=test anxiety, Prnt=parents, Tchr=teachers, Clmt=classmates, Clfr=close friend

the scale could be used together or separately according to the aim of the study (Malecki et al. 2004). In light of the literature (Shumaker and Brownell 1984), it was presumed that the support obtained from the first four factors were essential for adolescents; therefore, the “people in school” factor was removed from the scale. The factor loading values of the scale items were identified to vary between .60 and .84 for middle school students. The reliability coefficients of the factors were found to range between .93 and .96, while it was .97 for the whole scale.

The adaptation study of the scale was conducted with the participation of the middle school students ( $N=1517$ ). As a result of the Exploratory Factor Analysis (EFA), the items of the scale were observed to have factor loading values ranging between .48 and .83; and as a result of the Confirmatory Factor Analysis (CFA), the factor loading values were determined to range between .50 and .86. The internal consistency and alpha coefficient of the scale if item deleted were identified as .96, while the corrected item-total correlation was determined to range between .35 and .67.

### **MSLQ**

Motivation levels of students were assessed through the MSLQ, which was developed by Pintrich et al. (1993) and adapted into Turkish by Karadeniz et al. (2008). MSLQ consisted of two sections, being motivation (six factors) and learning strategies (nine factors). In this study, the motivation section of the scale (Intr=4, Extr=3, Tskv=5, Cont=3, Slf=5, Tanx=5; Total=25 items) was used. The scale has a seven-point scoring system ranging from not at all true of me (1) to very true of me (7).

As a result of the CFA, the fit indices of the scale were observed to be at a good fit  $\chi^2/df=3.49$ , GFI=.77, RMR=.07, CN=122. Reliability coefficients of the factors ranged between .62 and .93, while the correlations between the factors ranged between -.37 and .68. The adaptation study of the research was conducted with students aged between 12 and 18 ( $N=1862$ ). The CFA concluded that the factor loading values of the items ranged between .23 and .70; and the fit indices indicated a good fit  $\chi^2/df=3.20$ , RMR=.16, SRMR=.06, GFI=.92, AGFI=.90, RMSEA=.05, CFI=.86, NNFI=.84. Corrected item total correlations ranged between .15 and .58.

### **Science Achievement**

Students' science achievement was determined by calculating the averages of their scores obtained in the first and second semesters in the science courses.

### **Procedure**

Authorization was obtained from the Istanbul Provincial Directorate of National Education. Students participated in the study voluntarily. Prior to the application, the purpose and significance of the study were explained by the researcher along with the characteristics of the scales. The scales were completed in periods ranging from 35 to 45 minutes.

### **Data Analysis**

Data obtained were analyzed through SEM. SEM is a comprehensive and flexible approach in modeling the relationship between the observed and the latent variables (Hoyle and Smith 1994; Hu and Bentler 1998). Additionally, it is an efficient model since it allows evaluation and correction on a theoretical model (Anderson and Gerbing 1988) and controlling for measurement error as well as providing information on the degree of fit of the entire model (Frazier et al. 2004).

As suggested by Kline (2011), the standardized direct effect sizes were considered as <.10 small; .30 medium; >.50 large; and the significance level of the  $t$  value was considered to be  $t>1.96$ ,  $p<.05$ . The maximum likelihood estimation method was used and the fit indices, whose are presented in Table 1, were analyzed (Hooper et al. 2008; Schermelleh-Engel et al. 2003; Simsek 2007).

The fit of the data to a normal distribution was analyzed through Q-Q graphics and scatter matrix. Data were observed to have a normal distribution. The variance inflation factor (1.32, <10), tolerance values (.75, >.10), condition index (1.00, <30), and squared multiple correlation (.16, <.90) values were analyzed and it was determined that a multicollinearity did not exist among the variables (Kline 2011).

The first three hypotheses of the study involved the analysis of the direct effects of independent variables on the dependent variables. The fourth hypothesis required the mediating effect of motivation within the relationship be-

**Table 1: Approximate fit indexes**

<i>Fit measure</i>	<i>Good fit</i>	<i>Acceptable fit</i>
Chi-square/degree-of-freedom ( $\chi^2/df$ )	<2	< 3, < 5
Root Mean Square Error-of-Approximation (RMSEA)	$\leq .05$ , <.07	$\leq .08$ , $\leq .10$
Normed Fit Index (NFI)	>.95	$\geq .90$
Nonnormed Fit Index (NNFI)	>.95, $\geq .97$	$\geq .95$
Comparative Fit Index (CFI)	$\geq .97$	$\geq .95$
Standardized Root Mean Square Residual (SRMR)	$\leq .05$ , <.08	$\geq .10$
Goodness-of-Fit Index (GFI)	>.95	$\geq .90$
Adjusted Goodness-of-Fit Index (AGFI)	$\geq .90$ , >.95	$\geq .85$

tween social support and science achievement. During the mediation test, the following criteria were addressed: (1) the independent variable (social support) effects the dependent (science achievement) and mediating variable (motivation); the mediating variable effects the dependent variable positively; and (2) when the mediating variable is controlled, the effect of the dependent variable on the independent variable decreases significantly (partial mediation) or disappear totally (full mediation) (Baron and Kenny 1986; Frazier et al. 2004). For the analysis of the data, LISREL 8.80 and SPSS 17.0 software were used.

## RESULTS

In this study, social support, motivation, and science achievement were determined as the latent variables. CASSS factors constituted the observed variables of social support and MSLQ factors formed the observed variables of motivation. The average scores of students obtained

from their first and second semester science scores constituted the observed variables of science achievement. Pearson's correlation analysis of the variables of this study and the descriptive statistics are displayed in Table 2.

The correlation coefficient among the variables displayed in Table 2 indicated no significant relationship between the test anxiety factor of motivation and parents  $r = -.04$ ,  $p = .13$ ,  $p > .01$  and teachers  $r = -.05$ ,  $p = .03$ ,  $p > .01$  among the factors of social support. The relationship among the other factors was significant  $r = -.07$  and  $.42$ ,  $p = .00$ ,  $p < .01$ . Furthermore, significant relationships were found between social support factors and science achievement  $r = .13$  and  $r = .31$ ,  $p = .00$ ,  $p < .01$ , as well as the motivation factors and science achievement  $r = .10$  and  $r = .35$ ,  $p = .00$ ,  $p < .01$ . Additionally, the highest average for social support was the close friend factor 5.39 and the lowest average was the classmates factor 4.21. The highest average for motivation was the extrinsic goal orientation factor 6.24, while the lowest average belonged to the anxiety factor 2.96.

**Table 2: Summary of intercorrelations, means and standard deviations for study variables**

<i>Variable</i>	1	2	3	4	5	6	7	8	9	10	11	12
<i>Social Support</i>												
1. Parents	-	.43*	.37*	.34*	.36*	.18*	.33*	.19*	.36*	-.04	.30*	.29*
2. Teachers		-	.37*	.34*	.36*	.21*	.42*	.29*	.38*	-.05	.29*	.31*
3. Classmates			-	.43*	.26*	.13*	.27*	.18*	.24*	-.07*	.13*	.16*
4. Close friend				-	.30*	.20*	.34*	.26*	.26*	-.11*	.16*	.15*
<i>Motivation</i>												
5. Intr. goal orient.		-	.32*	.57*	.43*	.54*	-.26*	.26*	.27*			
6. Extr. goal orient.			-	.31*	.28*	.25*	-.21*	.13*	.11*			
7. Task value							-	.48*	.53*	-.21*	.27*	.26*
8. Cont. bel. ab. learn.					-	.37*	-.27*	.11*	.10*			
9. Self-efficacy								-	-.17*	.34*	.35*	
10. Test anxiety									-	.11*	.11*	
<i>Science Achievement</i>												
11. Science1										-	.88*	
12. Science2												-
<i>M</i>	5.19	5.24	4.21	5.39	6.06	6.24	6.16	6.08	5.85	2.96	69.22	73.45
<i>SD</i>	.72	.75	1.23	.78	.98	.97	.89	.94	1.10	1.26	18.24	17.17

( $N=1375$ ), \* $p < .01$



Science achievement averages were 69.22 for science1 and 73.45 for science 2.

**Results for the Measurement Model**

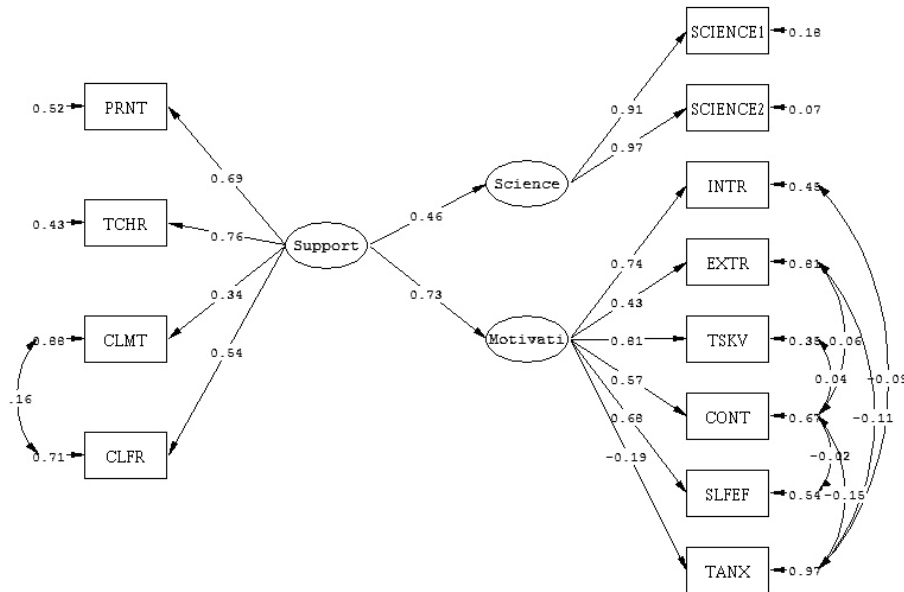
Within SEM, the measurement model and the structural model are tested independently (Hoyle and Smith 1994; Kline 2011). Therefore, in the first step, the measurement model was tested via CFA. As a result of the CFA, standardized path coefficients were determined to range between -.30 (tanx) and .94 (science 2), while the *t* value was significant  $t > 1.96, p < .05$ . On the other hand, fit indices indicated that the model data consistency was inadequate  $\chi^2 = 381.26, df = 51, p = .00, p > .05, \chi^2/df = 7.47$ . Examining the modification indices, it was observed that the covariance definitions that would be performed among the errors of clmt and clfr, tskv and cont, cont and slfef, extr and tanx, cont and tanx latent variables resulted in a significant decrease in the  $\chi^2$  value.

As a result of the literature analysis and expert opinions, corrections were made and the analysis was repeated. The analysis concluded that the standardized path coefficients ranged between -.27 (tanx) and .94 (science2), while the *t* value was significant  $t > 1.96, p < .05$ . Fit indices were calculated as  $\chi^2 = 261.74, df = 46, p = .00, p > .05, \chi^2/df = 5.69$ . Modification indices were analyzed

again and in addition to the corrections made in the first analysis, corrections were made in the model considering the errors in cont and extr, tanx and int latent variables were interrelated. The analysis concluded that the standardized path coefficients ranged between -.24 (tanx) and .94 (science2), while the *t* values were significant  $t > 1.96, p < .05$ . Fit indices were determined to be  $\chi^2 = 232.00, df = 44, p = .00, p > .05, \chi^2/df = 5.27$ . Depending on the size of the sampling, these values were determined to be indicators of an acceptable level of fitness. Other fit indices indicated a good level of consistency as follows: RMSEA=.05, NFI=.98, NNFI=.97, CFI=.98, SRMR=.04, GFI=.97, AGFI=.95. Therefore, the measurement model was verified. In the second step, estimation values and correction recommendations with respect to the measurement model were fixed within the structural model and the analyses were carried out.

**Results for Structural Model**

With respect to the structural model, firstly, the effects of social support on science achievement (hypothesis 1) and motivation (hypothesis 2) were analyzed. The model is presented in Figure 2.



**Fig. 2.** Path analysis for first two hypotheses of the study

According to Figure 2, standardized path coefficients and *t* values were observed to be between the social support and science achievement as .46,  $t=15.40$ ,  $p<.05$  and between social support and motivation as .73,  $t=23.61$ ,  $p<.05$ , respectively. These values indicated that the model fit the data adequately well. Examining the fit indices,  $\chi^2=316.29$ ,  $df=54$ ,  $p=.00$ ,  $p>.05$ ,  $\chi^2/df=5.85$ , values indicated that the model fit the data adequately acceptable. The RMSEA=.05, NFI=.97, NNFI=.96, CFI=.97, SRMR=.06, GFI=.96, AGFI=.95 values indicated a good level of fitness. Additionally, social support accounted for 21 percent of the variance for science achievement and 53 percent for motivation. According to the findings, the model was verified and it was determined that social support had positive and significant effects on science achievement and motivation.

Secondly, the effects of both social support and motivation together on science achievement (hypothesis 3) were analyzed in the model along with the mediating effect of motivation within the relationship between social support and science achievement (hypothesis 4). In order to determine the mediating effect, a new path from

the motivation to the science achievement was defined. The model is presented in Figure 3.

According to Figure 3, the standardized path coefficients and *t* values between social support and science achievement were determined as .34,  $t=6.43$ ,  $p<.05$ , while they were determined as .72,  $t=22.74$ ,  $p<.05$  between social support and motivation; and as .14,  $t=2.86$ ,  $p<.05$  between motivation and science achievement. This finding indicated that the model fit the data adequately acceptable. Reviewing the fit indices,  $\chi^2=314.30$ ,  $df=53$ ,  $p=.00$ ,  $p>.05$ ,  $\chi^2/df=5.93$ , values indicated an acceptable level of fitness, while the RMSEA=.06, NFI=.97, NNFI=.96, CFI=.97, SRMR=.06, GFI=.96, AGFI=.95 values indicated a good level of fitness. Furthermore, social support and motivation jointly explained 20 percent of the variance in science achievement.

According to the findings, the model was verified and the joint effects of social support and motivation on science achievement were positive and significant. On the other hand, according to the first model (see Fig. 2), the direct effect of social support on science achievement was .46, while according to the second model (see Fig. 3) the same effect within the mediating

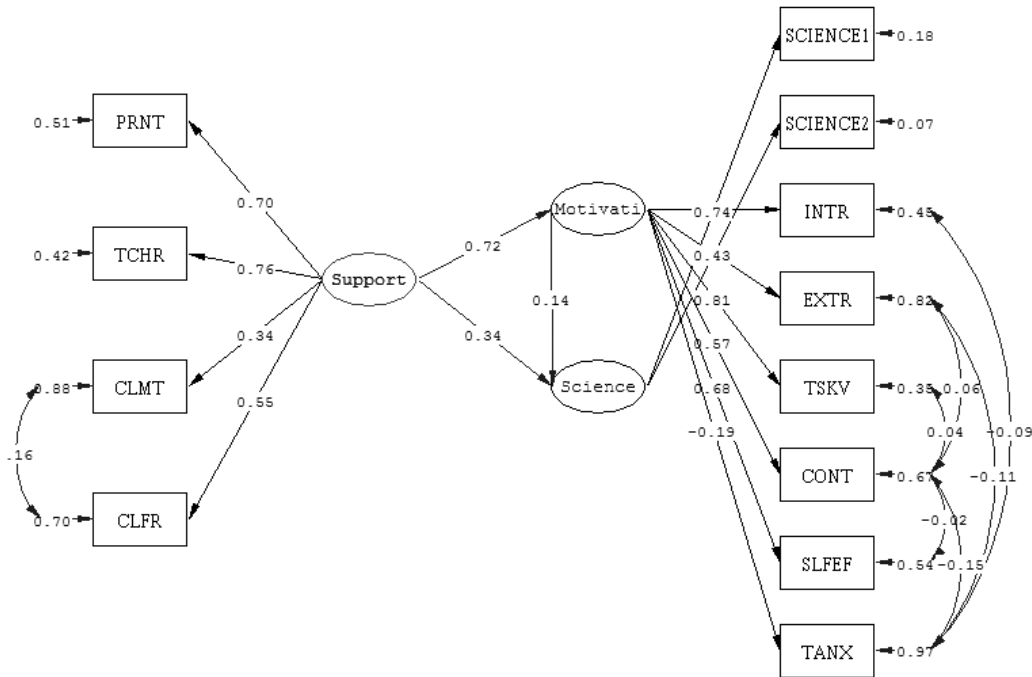


Fig. 3. Structural model for last two hypotheses of the study

role of motivation was observed to decrease to .34. This decrease indicated that motivation could have a partial effect on the mentioned relationship. In order to determine whether the decrease was significant, the  $\chi^2$  test was administered and it was concluded that the difference was not significant  $\chi^2=1.99, p=.16, p>.05$ .

### DISCUSSION

The current study aimed to analyze the relationships among the perceived social support, motivation, and science achievement levels of middle school students. Findings related to the first two hypotheses showed that the social support that students obtained from their parents, teachers, and peers had positive and significant effects on their science achievement and motivation. This finding indicated that the perceived social support by students improved their curiosity, encouraged meaningful learning, ensured that students perceived learning as significant and beneficial and guided students towards connecting their attributions to achievement to the levels of individual efforts, improved students' self-efficacy, decreased their test anxieties, and increased their levels of achievement. This finding is consistent with the results obtained in various studies in the literature (Dubow et al. 1991; Legault et al. 2006; Mattanah et al. 2012; Song et al. 2014; Ratelle et al. 2005; Tabbah et al. 2012; Vatankhaha and Tanbakooei 2014).

On the other hand, there are studies in the literature suggesting that there is no significant relationship between social support and achievement. Caskey (2009) and Hershberger and D'Augelli (1992) were not able to identify a significant relationship between students' achievement and social support levels. This may be due to the fact that students did not perceive social support as an essential factor for improvement of their performances (Caskey 2009). Hershberger and D'Augelli (1992) emphasized that an assessment of students' social support levels during the first years of school could have an effect on the findings of the study. Therefore, they stated that more efficient results could have been obtained in case the social support and achievement were assessed in closer time periods.

The findings of the third hypothesis of the study showed that the joint effect of social support and motivation on science achievement was positive and significant. In the literature, there

have been studies where the effects of social support and motivation on achievement were analyzed separately (Lee and Brophy 1996; Lepper et al. 2005; Mega et al. 2014; Wolters 1999; Tella 2007). The results of this study highlighted the significance of considering social support and motivation together in increasing the level of achievement.

According to the findings about the fourth hypothesis of the study, the mediating effect of motivation was not found to be significant within the relationship between social support and science achievement. This finding was not supportive of the other studies in the literature. Ahmed et al. (2010) reported that social support affected achievement both directly and through motivation. Similarly, Wentzel (1998) emphasized that social support improved motivation and increased the level of achievement accordingly. In this study, although the mediating effect of motivation was not found to be significant within the relationship between social support and science achievement, the directly proportional increase in relevant variables should be taken into consideration.

### CONCLUSION

The findings showed that the social support had positive effects on students' science achievement and motivation. The results of this study highlighted the significance of considering social support and motivation together in increasing the level of achievement. According to the findings, the mediating effect of motivation was not found to be significant within the relationship between social support and science achievement. These findings indicated that the perceived social support by students improved their curiosity, encouraged meaningful learning, and increased their levels of achievement. Consequently, social support and motivation should be handled together when designing the learning environment.

### RECOMMENDATIONS

Certain limitations should be considered with respect to the interpretation of the findings of this study. Since the data about social support and motivation were collected simultaneously, it became difficult to establish causal conclusions among variables. It is recommended that follow-



ing a chronological order would hinder this limitation. In the study, data were collected through self-report assessment tools. It is believed that collecting data through the mixed method would increase the validity, reliability, and the generalization levels of the findings. Since the study was a cross-sectional study, it should be considered that the data were collected within a certain time period and relevant variables may range over the course of time. Finally, the generalization of the findings to students who are enrolled at different schools, should receive attention, due to the fact that the students in the sampling of this study were enrolled in the same school.

Outside of its limitations, this study also has strengths. In analyzing the findings with respect to the literature, it was observed that the cooperation between the sources of support had an effect on science achievement. Secondly, it was acknowledged that previous studies focused on the relationship between social support and motivation; however, the effects of social support on motivation remained uncertain. In light of this understanding, the aforementioned effects were analyzed in this study, and it is believed that this has contributions to the literature. Thirdly, it was determined that the studies on the joint effects of social support and motivation on science achievement were quite few. Fourthly, a gap was identified in the literature with respect to the studies on the mediating effects of motivation within the relationship between social support and achievement. This study is believed to have contributions in filling in this gap identified in the literature. Furthermore, the inconsistencies between the findings of this study and findings of other studies evidence that there is a need for studies on the mediating role of motivation within the relationship between social support and achievement. According to the findings with respect to educators, it is suggested that they should provide support to students, which would in turn, increase the levels of their motivation and achievement. Secondly, educators should include interactive learning activities more frequently in learning environments so that the level of social support obtained by students from their peers would increase. Thirdly, educators could guide parents to create appropriate social support networks in the learning environments, which would promote the multi-dimensional development of their students.

## NOTE

- \* This study was presented at the 1<sup>st</sup> Eurasian Educational Research Congress, Istanbul, 2014.

## REFERENCES

- Ahmed W, Minnaert A, Werf G, Kuyper H 2010. Perceived social support and early adolescents' achievement: The mediational roles of motivational beliefs and emotions. *J Youth Adolescence*, 39: 36-46.
- Anderson JC, Gerbing DW 1988. Structural equation modeling in practice: A review and recommended two-step approach. *Psychological Bulletin*, 103: 411-423.
- Baron RM, Kenny DA 1986. The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, 51: 1173-1182.
- Campbell MM 2007. Motivational systems theory and the academic performance of college students. *Journal of College Teaching and Learning*, 4: 11-24.
- Caskey EE 2009. *Gender Differences in Antecedents to Academic and Personal Well-being in Urban Youth: What is the Role of Social Support?* PhD Thesis, Unpublished. Chicago: Loyola University.
- Chambers EA, Huyen M, Schreiber JB 2006. Achievement and at-risk middle school students' perspectives of academic support. *Journal of Research in Character Education*, 4: 33-46.
- Cirik I, Oktay A, Fer S 2011. Cocuk ve ergenler icin sosyal destek olceginin Turkceye uyarlanmasi. *e-Journal of New World Sciences*, 6: 940-957.
- Cutrona CE, Cole V, Colangelo N, Assouline SG, Russell DW 1994. Perceived parental social support and academic achievement: An attachment theory perspective. *Journal of Personality and Social Psychology*, 66: 369-378.
- Deci EL, Ryan RM 2000. The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, 11: 227-268.
- Dubow EF, Tisak J, Causey D, Hryshko A, Reid G 1991. A two-year longitudinal study of stressful life events, social support, and social problem-solving skills: Contributions to children's behavioral and academic adjustment. *Child Development*, 62: 583-599.
- Frazier PA, Tix AP, Barron KE 2004. Testing moderator and mediator effects in counseling psychology. *Research Journal of Counseling Psychology*, 51: 115-134.
- Glynn SM, Taasoobshirazi G, Brickman P 2007. Non-science majors learning science: A theoretical model of motivation. *Journal of Research in Science Teaching*, 44: 1088-1107.
- Harter S 1999. *The Construction of the Self: A Developmental Perspective*. NY: Guilford Press.
- Hershberger SL, D'Augelli AR 1992. The relationship of academic performance and social support to graduation among African-American and white university students: A path-analytic model. *Journal of Community Psychology*, 20: 188-199.
- Hooper D, Coughlan J, Mullen MR 2008. Structural equation modelling: Guidelines for determining model

- fit. *The Electronic Journal of Business Research Methods*, 61: 53-60.
- Hoyle RH, Smith GT 1994. Formulating clinical research hypotheses as structural equation models: A conceptual overview. *Journal of Consulting and Clinical Psychology*, 62: 429-440.
- Hu L, Bentler PM 1998. Fit indices in covariance structure modeling: Sensitivity to underparameterized model misspecification. *Psychological Methods*, 3: 424-453.
- Johnson DW, Johnson TR 1983. Social interdependence and perceived academic and personal support in the classroom. *The Journal of Social Psychology*, 120: 77-82.
- Kapikiran S, Ozgungor S 2009. Ergenlerin sosyal destek duzeylerinin akademik basari ve gudulenme duzeyi ile iliskileri. *Cocuk ve Genclik Ruh Sagligi Dergisi*, 16: 21-30.
- Karadeniz S, Buyukozturk S, Akgun OE, Kilic E, Demirel F 2008. The Turkish adaptation study of motivated strategies for learning questionnaire (MSLQ) for 12-18 year old children: Results of confirmatory factor analysis. *The Turkish Online Journal of Educational Technology*, 7: 108-117.
- Khatib SAA 2010. Meta-cognitive self-regulated learning and motivational beliefs as predictors of college students' performance. *International Journal for Research in Education*, 27: 57-72.
- Kline RB 2011. *Principles and Practice of Structural Equation Modeling*. NY: Guilford Press.
- Lee O, Brophy J 1996. Motivational patterns observed in sixth-grade science classrooms. *Journal of Research in Science Teaching*, 33: 303-318.
- Legault L, Green-Demers I, Pelletier L 2006. Why do high school students lack motivation in the classroom? Toward an understanding of academic amotivation and the role of social support. *Journal of Educational Psychology*, 98: 567-582.
- Lepper MR, Corpus JH, Iyengar SS 2005. Intrinsic and extrinsic motivational orientations in the classroom: Age differences and academic correlates. *Journal of Educational Psychology*, 97: 184-196.
- Linnenbrink EA, Pintrich PR 2003. The role of self-efficacy beliefs in student engagement and learning in the classroom. *Reading and Writing Quarterly*, 19: 119-137.
- Lopez EJ, Ehly S, Garcia-Vazquez E 2002. Acculturation, social support and academic achievement of Mexican and Mexican American high school students: An exploratory study. *Psychology in the Schools*, 39: 245-257.
- Lord SE, Eccles JS, McCarthy KA 1994. Surviving the junior high school transition family processes and self-perceptions as protective and risk factors. *Journal of Early Adolescence*, 14: 162-199.
- Lumsden LS 1994. *Student Motivation to Learn*. Retrieved from ERIC Database. (ED99C00011)
- Malecki CK, Demaray MK, Elliott, SN 2004. *A Working Manual on the Development of the Child and Adolescent Social Support Scale (2000)*. DeKalb: Northern Illinois University.
- Martin MO, Mullis IVS, Foy P, Stanco GM 2012. *TIMSS 2011 International Results in Science*. Retrieved from ERIC Database. (ED544560)
- Mattanah JF, Brooks LJ, Brand BL, Quimby JL, Ayers JF 2012. A social support intervention and academic achievement in college: Does perceived loneliness mediate the relationship? *Journal of College Counseling*, 15: 22-36.
- Mega C, Ronconi L, DeBeni R 2014. What makes a good student? How emotions, self-regulated learning, and motivation contribute to academic achievement. *Journal of Educational Psychology*, 106: 121-131.
- MNE 2013. *Ilkogretim Kurumlari Fen Bilimleri Dersi Ogretim Programi*. From <<http://ttkb.meb.gov.tr/www/guncellenen-ogretim-programlari/icerik/151>> (Retrieved on 20 December 2013).
- Pintrich PR, McKeachie WJ, Lin YG 1987. Teaching a course in learning to learn. *Teaching of Psychology*, 142: 81-86.
- Pintrich PR, Smith DAF, Garcia T, McKeachie WJ 1993. Reliability and predictive validity of the motivated strategies for learning questionnaire (MSLQ). *Educational and Psychological Measurement*, 53: 801-813.
- Ratelle CF, Larose S, Guay F, Senécal C 2005. Perceptions of parental involvement and support as predictors of college students' persistence in a science curriculum. *Journal of Family Psychology*, 19: 286-293.
- Roeser RW, Eccles JS, Sameroff AJ 1998. Academic and emotional functioning in early adolescence: Longitudinal relations, patterns, and prediction by experience in middle school. *Development and Psychopathology*, 10: 321-352.
- Rosenfeld LB, Richman JM, Bowen GL 2000. Social support networks and school outcomes: The centrality of the teacher. *Child and Adolescent Social Work Journal*, 17: 205-226.
- Rushi PJ 2007. Questioning the utility of self-efficacy measurements for Indians. *International Journal of Research and Method in Education*, 30: 193-206.
- Schermelleh-Engel K, Moosbrugger H, Muller H 2003. Evaluating the fit of structural equation models: Tests of significance and descriptive goodness-of-fit measures. *Methods of Psychological Research Online*, 8: 23-74.
- Shen B, Li W, Sun H, Rukavina PB 2010. The influence of inadequate teacher-to-student social support on amotivation of physical education students. *Journal of Teaching in Physical Education*, 29: 417-432.
- Shumaker SA, Brownell A 1984. Toward a theory of social support: Closing conceptual gaps. *Journal of Social Issues*, 40: 11-36.
- Simsek OF 2007. *Yapısal Eşitlik Modellemesine Giriş: Temel İlkeler ve Lisrel Uygulamaları*. Ankara: Ekinoks Yayınevi.
- Song J, Bong M, Lee K, Kim S 2014. Longitudinal investigation into the Role of Perceived Social Support in Adolescents' Academic Motivation and Achievement. *Journal of Educational Psychology*. From <<http://dx.doi.org/10.1037/edu0000016>> (Retrieved on 3 April 2014).
- Tabbah R, Miranda AH, Wheaton JE 2012. Self-concept in Arab American adolescents: Implications of social support and experiences in the schools. *Psychology in the Schools*, 49: 817-827.

- Tella A 2007. The impact of motivation on student's academic achievement and learning outcomes in mathematics among secondary school students in Nigeria. *Eurasia Journal of Mathematics, Science and Technology Education*, 3: 149-156.
- Wang F 2008. Motivation and English achievement: An exploratory and confirmatory factor analysis of a new measure for Chinese students of English learning. *North American Journal of Psychology*, 10: 633-646.
- Vatankhaha M, Tanbakoeib N 2014. The role of social support on intrinsic and extrinsic motivation among Iranian efl learners. *Procedia-Social and Behavioral Sciences*, 98: 1912-1918.
- Wentzel KR 1998. Social relationships and motivation in middle school: The role of parents, teachers, and peers. *Journal of Educational Psychology*, 90: 202-209.
- Wigfield A, Eccles JS 2002. Defining motivation and its development. In: A Wigfield, JS Eccles (Eds.): *Development of Achievement Motivation*. California: Academic Press, pp.1-11.
- Wolters CA 1999. The relation between high school students' motivational regulation and their use of learning strategies effort, and classroom performance. *Learning and Individual Differences*, 3: 281-299.
- Yildirim HH, Yildirim S, Yetisir MI, Ceylan E 2013. PISA 2012 Ulusal On Raporu. From <[http://yegitek.meb.gov.tr/meb\\_iys\\_dosyalar/2013\\_12/13053601\\_pisa2012\\_ulusal\\_n\\_raporu.pdf](http://yegitek.meb.gov.tr/meb_iys_dosyalar/2013_12/13053601_pisa2012_ulusal_n_raporu.pdf)> (Retrieved on 15 January 2014).
- Zusho A, Pintrich PR, Coppola B 2003. Skill and will: The role of motivation and cognition in the learning of college chemistry. *International Journal of Science Education*, 25: 1081-1094.