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SELF-EFFICACY, AFFECTIVE WELL-BEING, AND INTENT-TO-LEAVE BY SCIENCE AND MATHEMATICS TEACHERS: A STRUCTURAL EQUATION MODEL

**Mehmet Karakus,
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Muhammet Usak,
Jude Ocean**

Introduction

The psychological resources of teachers are increasingly important as the nature of teaching changes with increasing pressure from policymakers, politicians, and communities. Teachers are now held responsible for students' affective and psycho-social progress as well as their academic success (Pillay et al., 2005; Kurniawan et al., 2019; Suprpto et al., 2017; Ersozlu et al., 2020; Ledger et al., 2019); career in teaching is recognized as one of the most demanding and distressing professions (Johnson et al., 2005; Kyriacou, 2001). Affect is central to the teacher identity and the work of teachers because they establish closer relationships with students for longer periods of time than other professionals do with their clients (Klassen et al., 2012; Lutovac & Kaasila, 2018; Simsek, & Yazar, 2019).

The deep level of emotional connection between teachers and students means that teachers' emotional states have a profound effect on not only their own well-being, but also on the attitudes and behaviors of their students and the emotional climate of the classroom (Becker et al., 2014; Reyes et al., 2012). Teachers genuinely express their own feelings in the classroom, along with surface and deep acting. Emotional regulation of these types helps teachers meet their professional goals, and might, therefore, influence their wellbeing (Yin, 2016). For early-career teachers, personal attributes related to responsiveness to requests of students and teaching environment, resilience at school, self-reflection, resourcefulness, and developing good relationships are considered essential parts of the emotional work required by their profession as they adjust to teaching (Buchanan, 2009).

Teachers' affective well-being has further implications, which occur at the school-level, related to their resolutions to discontinue their employment (McInerney et al., 2015). Teacher's affective wellbeing impacts turnover and retention of teachers in Hong Kong, where affective commitment (i.e., emotional attachment of teachers to their profession), was favored over normative (i.e., feelings of obligation and duty) and continuance (i.e., fear of



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Abstract. *The current research aims to explore the impact of Science and Mathematics teachers' self-efficacy on their intentions to leave through the mediating effects of their affective wellbeing (stress, burnout, and depression). Data were collected from 329 teachers of Science and Mathematics who were selected randomly with a clustered sampling method from 232 secondary schools in South and East Anatolia, Turkey. The structural equation model that yielded the best fit indicated that as teachers' self-efficacy levels increase, their stress, burnout, depression, and intent-to-leave levels decrease. Teachers with high self-efficacy are less likely to develop intention-to-leave because of their positive affective well-being indicators. Results suggest that maths and science teachers who have optimistic beliefs in their capabilities can more easily cope with the stressors at work and have better affective well-being, and consequently, a lower level of intention-to-leave. The results provide educational leaders with insights as to how better to retain qualified Science and Mathematics teachers.*

Keywords: *intent-to-leave, self-efficacy, science and mathematics teachers, wellbeing*

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losing salary, status, etc.) (McInerney et al., 2015). This is in agreement with findings in European/English-speaking countries: according to Meyer et al. (2002), these three types of commitment are negatively related to thoughts about resigning from the occupation as well. However, affective commitment maintains a high correlation with outcomes that are related to employee such as anxiety, family-to-work conflict, and outcomes that are related to organization such as participation, performance, and willingness to serve the organization even not included in job description.

Teachers' affect thus influences teachers' own wellbeing and their retention in the profession, rendering teacher attrition costly to both the individual teacher and to the community (Buchanan, 2009; Schuck et al., 2012). In the US, the turnover level in teaching is as high as 30% (and 50% in some areas of excessive poverty, according to Ingersoll (2001) and reaches 40% in Australia and some other OECD countries within five years of starting the profession (Buchanan, 2013).

Institutional factors (at the federal, state, and school levels) also affect retention. A large-scale and broad survey that is conducted by the National Center for Education Statistics of US among schools and teachers with nation-wide representation revealed that high turnover rates result from small income levels, lack of enough support received by institutional management, insufficient control mechanisms, restricted access to institutional decision-making processes (Ingersoll, 2001).

Although teacher turnover is costly to states and schools (Haynes, 2014), it is challenging for educators to establish long-term relationships with the school communities they serve (Darling-Hammond, 2010). Stressful working conditions are among the critical antecedents of teachers' intentions-to-leave (Weiss, 1999), and a high rate of teacher turnover generates a lack of qualified teachers in many countries (Hong, 2012). This is a major problem for Turkey and other countries, especially in disadvantaged schools in which teachers feel more pressure from stressful working conditions coupled with a lack of support (Darling-Hammond, 2010; Özoğlu, 2015). The working conditions, time pressure, high workload, material deficiencies, lack of resources, and students' negative and uncertain attitudes are the main challenges that STEM teachers face in Turkey and other countries (Asunda & Walker, 2018; Ejiwale, 2013; Said, et al., 2018; Shadle et al., 2017). In Turkey, teacher salaries are low, and there is a downward trend in the popularity of the teaching profession compared to the other OECD countries (OECD, 2018). There are also resource gaps which reduce the ability of institutions to furnish students with the required instructional opportunities (Özoğlu, 2015). Consequently, disadvantaged schools face higher intensity of teacher turnover and often need to employ inexperienced or out of field teachers, (including Science and Mathematics teachers), to fill the vacancies (Özoğlu, 2015).

Thus, the personal and public costs of teacher turnover are high. Consequently, more research that contributes to understanding the antecedents of teachers' affective well-being and potential psychological resources that aid them in remaining in the profession is essential. (Hall-Kenyon et al., 2014). One such theoretical model is that of teacher 'self-efficacy' (Bandura, 1997).

Self-Efficacy, Affective Well-Being, and Intent-to-Leave

Self-efficacy is a belief about personal characteristics that embody individuals' thoughts, perceptions, attitudes, behaviors, and performance (Bandura, 1997). The term self-efficacy describes a belief possessed by individuals about the extent to which they can cope with the challenges and control the actions that influence their lives (Bandura, 1997). Self-efficacy is an organizational facilitator that empowers teachers to develop constructive perspectives and valuable schemes to deal with negative ones (Betoret & Artiga, 2010, Erdem, 2015), which may shield teachers against the harmful effects of job stress, such as burnout (Schwarzer & Hallum, 2008). Self-efficacy perceptions are not implicitly appraising. These perceptions are constructed aside from the reflections on the potentials of others (Gist, 2018). On the contrary, primarily, self-efficacy beliefs are constructed from an individual's unique experiences and their interpretations related to the observers' field of study (Rittmayer & Beier, 2009; Tatar & Buldur, 2013; Shauka et al., 2020).

Science educators committed substantial time and efforts to develop professional tools in the field of science teaching for evaluating self-efficacy. These tools include Science Teaching Efficacy Belief Instrument (STEBI) by Riggs (1988), and Riggs and Enochs (1990), and Teaching Science as Inquiry (TSI), which was developed by Smolleck et al. (2006) based on National Science Education Standards (Mintzes et al., 2013). According to the research results, individuals with a solid science knowledge and a tendency to participate in reformist teaching actions exhibits maximum degrees of self-efficacy (Mintzes et al., 2013). Usually, performing better and staying longer in STEM



instruction is directly proportional with the individuals' STEM self-efficacy (Rittmayer and Baier, 2010). However, to date, no studies have investigated the links between affective wellbeing and self-efficacy – and the effects of that link on intent-to leave – in STEM teachers. This study thus makes this new contribution to the literature.

Self-efficacy and well-being. Recent studies demonstrate that belief of teachers about their degrees of self-efficacy are significantly correlated to their sense of well-being (Collie et al., 2016). Teachers of high degrees of self-efficacy may create a high-quality classroom environment in which the teacher and students have more positive outcomes (Dofková, 2019; Guo et al., 2012). Given the close relation between teachers' affective well-being and their self-efficacy levels (Collie et al., 2016; Çalıřkan, 2017; Huang & Yin, 2018; Yuruk, 2011; Koksal, 2018), the relations between self-efficacy and an individual teacher's perceptions, attitudes, and feelings have led to a new line of inquiry about the variables related to teachers' affective well-being (Klassen & Chiu, 2011).

Affective well-being. Affective well-being is comprised of the strength and regularity of good and bad feelings and state of mind (Luhmann et al., 2012). Warr (1990) conceptualized affective well-being as comprising four dimensions: enthusiasm, contentment, anxiety, and depression. Van Horn et al. (2004) suggested three oppositional sides of affective well-being: enthusiasm-depression (e.g., burnout), pleasure-displeasure (e.g., job satisfaction), and, tiredness-vigor (e.g., well-being). In this study, work-related stress and burnout (following Van Horn et al., 2004), and depression (following Warr, 1990) were measured in Science and Mathematics teachers as aspects of their affective well-being.

Burnout result from prolonged job-related stress (Jennett et al., 2003), especially when educators accept that they are unable to deal with the workplace adversities (Maslach et al., 2001). Working under the pressure of the high demands of the teaching profession, teachers are more prone to burnout if they lack appropriate psychological resources to cope with it (Klusmann et al., 2008). Consequently, teachers who can successfully adapt to the stressful requirements experience fewer job burnouts (E.M. Skaalvik & Skaalvik, 2007; 2010).

Teachers feel stressed when there is a mismatch between job requirements and their abilities to deal with those requirements (Hakanen et al., 2006). According to Hobfoll et al.'s Conservation of Resources (COR) theory, individuals cannot deal with the destructive effects of negative experiences at work if the psychological resources which enable them to be more resilient are depleted (Hobfoll et al., 2000). These individuals, working at a highly demanding work environment, feel stress, anxiety, and burnout at the same time as they are trying to cope with their negative emotions. If their coping strategies become ineffective, and they feel that their resources have become significantly depleted, they may relinquish their tasks and experience depression (Hobfoll et al., 2000). There is experimental evidence that self-efficacy beliefs of the teachers and frequency of job burnout and depression are inversely proportional (Capone & Petrillo, 2018).

Several research studies have shown that teachers' self-efficacy has a positive effect on their affective well-being in terms of decreasing levels of stress, burnout, depression, and intent to leave and increasing commitment to their employment and job satisfaction (Aloe et al., 2014; Collie et al., 2012; Jeon et al., 2018; Klassen & Chiu, 2011). This indicates that teachers' self-efficacy beliefs count among the psychological resources that strengthen them against the negative effects of work-related stress, burnout, and depression.

H1: Self-efficacy impact stress, burnout, depression, and intent to leave directly and negatively.

H2: Self-efficacy negatively impact burnout through the mediatory influence of stress.

H3: Self-efficacy negatively impact depression through the mediatory influences of stress and burnout.

Intent-to-leave, which can predict employment-related 'teacher turnover,' is likely another important outcome of teachers' low levels of self-efficacy and affective well-being; when teachers cannot cope with the stressful situations they face in the classrooms and the systems in which they work, they are inclined to leave their schools or leave the teaching profession (Borman and Dowling, 2008; Gist, 2018). Teachers who do not have substantial psychological resources to cope with the challenges at work can suffer from a lack of satisfaction, motivation, and belonging, and then, feeling emotionally exhausted, they are more inclined to leave teaching (E.M. Skaalvik & Skaalvik, 2011). For Science, Technology, Engineering, and Mathematics (STEM) discipline, lack of adequate number of teachers is a serious problem. Unfortunately, STEM classes experience the highest idle time (Cowan et al., 2016). According to a meta-analysis by Borman and Dowling (2008), since science and mathematics are required for all graduates in US and in many countries, attrition in teachers is more common for teachers of these subjects (Wright et al., 2019).

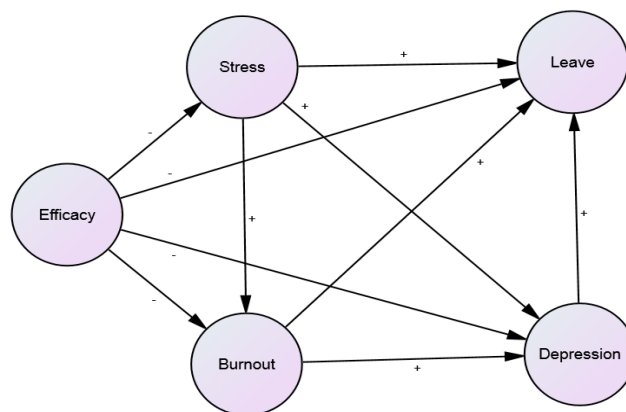


H4: Self-efficacy negatively impacts teachers' intent-to-leave through the mediatory influences of stress, burnout, and depression.

Science and Mathematics teachers are more susceptible to experience poor affective wellbeing because they have unique stressors at work such as the difficulty of the subjects they are expected to teach, students' amotivation, high levels of anxiety, and low levels of confidence to learn those difficult subjects, and the troubles in getting the required materials to teach science or mathematics (Beilock et al., 2010; Halim et al., 2006; Soyibo, 1994; Wang et al., 2020). It means that Science and Mathematics teachers need stronger levels of self-efficacy to cope with all those subject-specific difficulties and protect themselves from the adverse consequences of poor affective wellbeing such as intent-to-leave (Liu et al., 2018; Perera & John, 2020; Teig et al., 2019). Although self-efficacy and affective wellbeing are the matters of interest to attract and retain Science and Mathematics teachers, most of the studies in the literature about this topic were on the general teachers. To date, no single study has explored the impact of Science and Mathematics teachers' self-efficacy on their intent-to-leave through the mediating effects of their affective well-being indicators. Therefore, the current research aims to explore the effect of self-efficacy on intent-to-leave through the mediating effects of affective well-being indicators in terms of stress, burnout, and depression. Based on the aforementioned hypotheses, the proposed model shows that affective well-being indicators play a significant mediating role in the relation between teachers' self-efficacies and their intent-to-leave (Figure 1).

Figure 1

A model of self-efficacy on intent-to-leave through the mediatory influences of affective well-being indicators in terms of stress, burnout, and depression



Research Methodology

General Background

As methodology, we employed a survey-based correlational design in which self-reported scales of self-efficacy, stress, burnout, depression, and intention to leave were administered to the Science and Mathematics teachers. A structural equation modelling approach was adopted for the analysis based on the a priori hypotheses. This research was conducted in 2018 academic year, with the Science and Mathematics teachers working at the secondary schools in South and East Anatolia in Turkey.

Sample

The population of this study was comprised of Science and Mathematics teachers working at 876 secondary schools in twelve cities in the South and East region of Anatolia. All the Science and Mathematics teachers were surveyed at the selected schools 232 clustered, randomly-selected secondary schools. There were 376 Science and

Mathematics teachers working at the selected schools. The response rate was 87.5% with 329 teachers who agreed to answer the questions. The minimum sample size required for this number of population at a 95% confidence interval was reached with the current teacher sample.

The demographic information of the sample shows that there were 199 male teachers (60.5%) while 130 of them were females (39.5%). The majority of the teacher participants' experience range was between one to ten years (50.8%, $n=167$). A great number of the teachers' age range was between 31-40 years (41%, $n=135$).

Instruments and Procedures

Ethical permission for this study was taken from the research ethics board of the university of the first author. Data for the study were obtained from questionnaires, answered on 5-point Likert-type scales. Each point in the scale was: "5= I totally agree"; "4= I agree"; "3= I agree partially"; "2= I don't agree"; and "1= I don't agree at all". Information about these scales is given as follows.

The *Teacher Self-Efficacy Scale* was translated to Turkish by Yılmaz et al. (2004) and was originally developed by Schmitz and Schwarzer (2000). This scale measures teachers' self-efficacy beliefs on their competencies of dealing with the most compelling duties at school even under the pressure of various stressors and negative feelings. There were eight items in the scale and none of the items was deleted. The scale consisted of two factors with acceptable Cronbach's Alpha coefficients as follows; Coping business behavior: .73 and Innovator business behavior: .77. The overall Cronbach's Alpha coefficient of the scale was .785. The factor analysis ($KMO = .811$, Bartlett = .000, explained variance = 58.02 %) produced good fit indices ($\chi^2 = 22.797$, $df = 13$, $\chi^2/df = 1.754$, p -value = .044, Comparative Fit Index [CFI] = .983, Incremental Fit Index [IFI] = .983, Root Mean Square Error of Approximation [RMSEA] = .048, Tucker & Lewis Fit Index [TLI] = .973).

A four items scale was used to measure teacher stress, which was prepared by Karakus (2013). This scale measures teachers' general stress levels related to the teaching profession and working conditions at school. None of the items was deleted and the factor analysis ($KMO = .720$, Bartlett = .000, explained variance = 50.93 %) confirmed the unidimensionality of this scale with acceptable fit indices (Cronbach's Alpha = .802, $\chi^2 = .18$, $df = 1$, $\chi^2/df = .18$, p -value = .892, CFI = 1.00, IFI = 1.00, RMSEA = .000, TLI = 1.00).

The *short version of the Burnout Inventory* was translated to Turkish by Tumkaya et al. (2009) and originally developed by Pines (2005). This self-report burnout scale assesses teachers' mental, emotional, and physical exhaustion levels. There were seven items and none of the items was deleted. The factor analysis ($KMO = .891$, Bartlett = .000, explained variance = 52.02 %) confirmed the unidimensionality of this scale with good fit indices (Cronbach's Alpha = .859, $\chi^2 = 3.023$, $df = 4$, $\chi^2/df = .756$, p -value = .554, CFI = 1.00, IFI = 1.00, RMSEA = .000, TLI = 1.00).

Teachers' depression was measured by a scale developed by the *International Personality Item Pool* (Goldberg, 1999; Goldberg et al., 2006) and translated to Turkish by Karakus (2013). This scale measures the general symptoms of teachers' depression such as pessimism, hopelessness, sadness, and meaninglessness. Five items (of six) remained after factor analysis ($KMO = .881$, Bartlett = .000, explained variance = 75.86 %) and the unidimensionality of this scale was confirmed with acceptable fit indices (Cronbach's Alpha = .895, $\chi^2 = 1.340$, $df = 2$, $\chi^2/df = .000$, p -value = .670, CFI = 1.000, IFI = 1.000, RMSEA = .000, TLI = 1.000).

Teachers' intentions-to-leave school was measured by a three items scale prepared by Karakus et al. (2014). These questions assess the teachers' ideas about quitting their current school and their plans to look for a new school. None of the items was deleted and the factor analysis ($KMO = .821$, Bartlett = .000, explained variance = 58.58 %) confirmed the unidimensionality of this measurement tool with good fit indices (Cronbach's Alpha = .949, $\chi^2 = 1.677$, $df = 1$, $\chi^2/df = 1.677$, p -value = .195, CFI = 1.00, IFI = 1.000, RMSEA = .050, TLI = 1.00).

Data Analysis

Exploratory and confirmatory factor analyses and reliability analyses were done for each individual scale employed in the current research, using the Maximum Likelihood method. The measurement model was developed first, letting the covariances free between the latent variables, and then, the structural model was developed, by defining the causal relationships between the latent constructs based on the apriori hypotheses. The saturated structural model was trimmed by deleting the insignificant paths between the latent constructs to obtain the final structural model (Hox & Bechger, 1998).



Research Results

Descriptive Results and Correlations

Descriptive results and correlations between the variables included in this study are presented in Table 1.

Table 1
Descriptive Results and Correlations

Variables	\bar{X}	SD	SE	1	2	3	4	5
1.S.E.	3.802	.536	.029	1				
2.STR.	2.810	.930	.051	-.165**	1			
3.B.O.	2.565	.892	.049	-.234**	.557**	1		
4.DEF.	3.119	.929	.051	-.200**	.411**	.620**	1	
5.INT.	2.696	1.382	.076	-.109**	.363**	.263**	.261**	1

**p<.01, *p<.05,

Notes: S. E.: Self-efficacy, STR.: Stress, B.O.: Burnout, DEF.: Depression, INT.: Intent to leave, SD.: Standard deviation, SE.: Standard error.

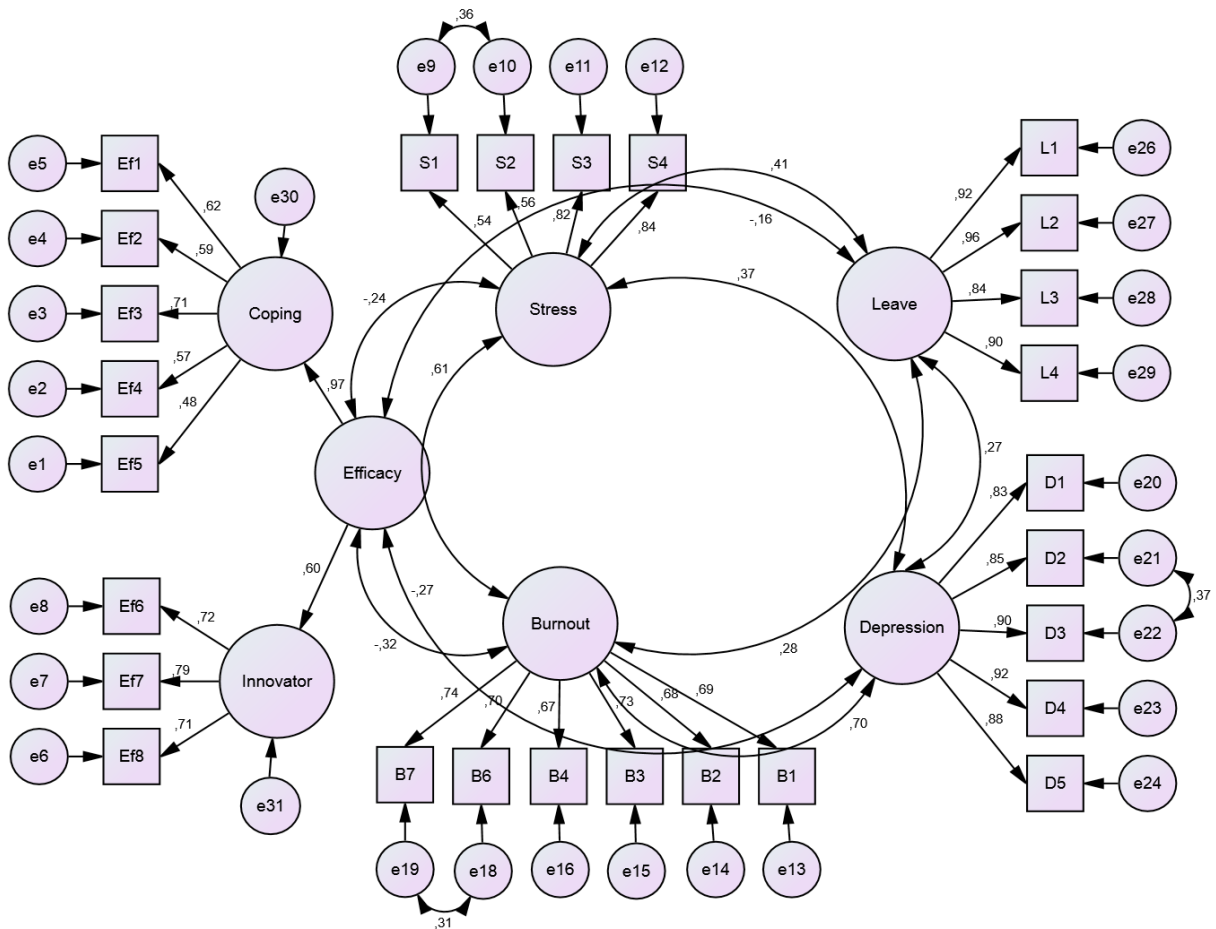
According to the mean scores in Table 1, teachers' levels of self-efficacy are relatively high (4). They also have moderate levels of depression, burnout, stress, and intent-to-leave (3).

Correlation matrix reveals that self-efficacy has negative relations with stress, burnout, depression, and intent to leave, and stress, burnout, depression, and intent to leave are all positively correlated with each other.

Confirmatory factor analysis was performed on all the scales used in this study. As suggested by the modification indices, three error covariances were defined in the measurement model along with the deletion of two items. D6 and B5 items were deleted, respectively. D6 was deleted because it had a low factor loading under 0.30. B5 was deleted because it had a high error variance and inflated the general chi-square value of the model. Between the items of B6 and B7, D2 and D3, and S1 and S2, error covariances were defined to solve the problem that occurred because of the high relations between their errors. After these modifications, the measurement model had adequate fit indices ($\chi^2 = 590.864$, $SD = 309$, $\chi^2/df = 1.912$, $IFI = .948$, $TLI = .940$, $CFI = .947$, $RMSEA = .053$). There are relatively high and meaningful correlations between the latent constructs in the measurement model (Figure 2).



Figure 2
The Measurement Model



Notes: All the coefficients were standardized. Efficacy: Self efficacy, Leave: Intent to leave. Fit indices: $\chi^2 = 590.864$, $df = 309$, $\chi^2/df = 1.912$, $CFI = .947$, $IFI = .948$, $RMSEA = .053$, $TLI = .940$.

The relations between the latent variables in the measurement model were significant and the directions of the correlations were in line with the apriori hypotheses illustrated in Figure 1. It enabled the researchers to delete the covariances and define the causal relations between the latent constructs in the next step in order to develop the structural model. The insignificant paths of Efficacy→Leave ($\beta = -.167$, $p = .447$), Burnout→Leave ($\beta = -.091$, $p = .417$), Efficacy→Depression ($\beta = -.062$, $p = .307$) and Stress→Depression ($\beta = -.091$, $p = .191$) were trimmed from the model (Table 2). $\Delta\chi^2$ values in Table 2 shows that none of the deleted paths caused a significant change in χ^2 values and the fit indices did not change significantly after those paths were trimmed. The final model still had adequate fit indices ($\chi^2 = 594.935$, $df = 313$, $\chi^2/df = 1.901$, $CFI = .947$, $IFI = .948$, $RMSEA = .052$, $TLI = .941$).

Table 2
The Fit Indices Before and After Trimming the Insignificant Paths

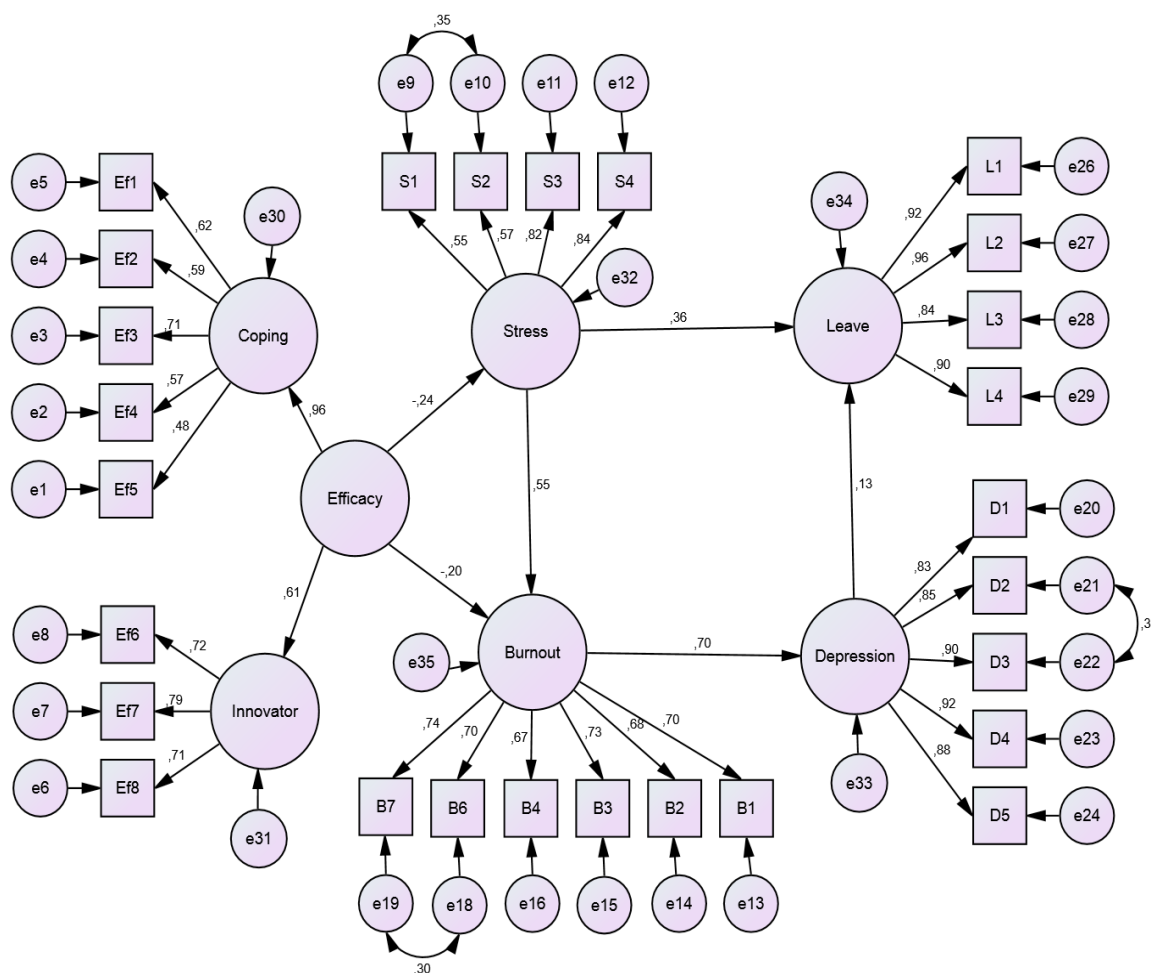
	χ^2	df	χ^2/df	$\Delta\chi^2$	IFI	TLI	CFI	RMSEA
Saturated model	594.935	313	1.901	-	.948	.941	.947	.052
Efficacy→Leave	591.443	310	1.908	0.007	.948	.941	.948	.053
Burnout→Leave	592.104	311	1.904	0.004	.948	.941	.948	.052



	χ^2	df	χ^2/df	$\Delta\chi^2$	IFI	TLI	CFI	RMSEA
Efficacy→Depression	593.215	312	1.901	0.003	.948	.941	.948	.052
Stress→Depression	594.935	313	1.901	-	.948	.941	.947	.052

Note: Efficacy: Self-efficacy, Leave: Intent to leave.

Figure 3
The Final Structural Model



Notes: All the coefficients were standardized. Efficacy: Self-efficacy, Leave: Intent to leave.
Fit indices: $\chi^2 = 594.935$, $df = 313$, $\chi^2/df = 1.901$, $CFI = .947$, $IFI = .948$, $RMSEA = .052$, $TLI = .941$

The final structural equation model reveals that teachers with higher levels of self-efficacy are less likely to experience negative affective states and therefore, they less frequently intend to leave their schools. More specifically, stress is a partial mediator in the relation between self-efficacy and burnout, stress and burnout are full mediators in the relation between self-efficacy and depression, and finally, stress, burnout, and depression are full mediators in the relation between self-efficacy and intent-to-leave (Figure 3).

Discussion

Although there are individual studies about the relations between individual variables (such as self-efficacy – stress, self-efficacy – burnout, self-efficacy – depression, and self-efficacy – intent-to-leave), we used a unique

perspective of psychological resources and developed a model with an original combination of the relevant antecedents of Science and Mathematics teachers' intentions-to-leave, which affects the actual turnover rate of the teaching force. The results of this study provide some insights to educational leaders and communities on how to increase teacher retention in Science and Mathematics education because attracting and retaining STEM teachers is a greater problem than in any other discipline (Cowan et al., 2016). Therefore, it is an urgent issue for Turkey and other countries to attract and retain qualified Science and Mathematics teachers (Bozkurt Altan & Ercan, 2016; Horvath et al., 2018; Tickle et al., 2011; Wang et al., 2018; LaForce et al., 2019; Wright et al., 2019; Gunawan, & Shieh, 2020; Madani, 2020). One solution would be to establish ways to reduce such teachers' intention-to-leave (Wang et al., 2018; Wright et al., 2019).

In Table 3, a brief summary of the four hypotheses of the study is presented, alongside the results.

Table 3

A Brief Summary of the Hypotheses and Results

H1: Self-efficacy impact stress, burnout, depression, and intent to leave directly and negatively.	H1 was partially confirmed. Teachers' self-efficacy impacted their stress and burnout directly and negatively while this influence was indirect and negative for their levels of depression and intent-to-leave.
H2: Self-efficacy negatively impact burnout through the mediatory influence of stress.	H2 was confirmed. Self-efficacy's impact on burnout was indirect and negative through the partial mediatory influence of stress.
H3: Self-efficacy negatively impact depression through the mediatory influences of stress and burnout.	H3 was confirmed. Self-efficacy's impact on depression was indirect and negative through the full mediatory influences of stress and burnout.
H4: Self-efficacy negatively impact teachers' intent-to-leave through the mediatory influences of stress, burnout, and depression.	H4 was confirmed. Self-efficacy's impact on intent-to-leave was indirect and negative through the full mediatory influences of stress, burnout, and depression.

All the hypotheses were confirmed by the structural equation model developed in this study (Table 3). This study found that teachers with high self-efficacy had lower levels of stress, burnout, depression, and intent-to-leave. These findings are consistent with the findings of previous studies showing that teachers' self-efficacy is correlated with their stress (Collie et al., 2012; Gilbert et al., 2014; Jeon et al., 2018; Klassen & Chiu, 2011; Klassen et al., 2013; Schwarzer & Hallum, 2008), burnout (Jeon et al., 2018; Schwarzer & Hallum, 2008; E.M. Skaalvik & Skaalvik, 2010; Wang et al., 2015), depression (Jeon et al., 2018; Kim & Kim, 2010), and intent-to-leave (Klassen & Chiu, 2011; Wang et al., 2015).

Similarly, Schwarzer and Hallum (2008) found that stress mediated the relation between self-efficacy and burnout and concluded that teachers' optimistic self-efficacy beliefs are among the protective factors against the development of work-related stress and burnout. Consistent with the current findings, Wang et al. (2015) found that teachers who had stronger beliefs in their self-efficacy and perceived the stressors at school to be personally controllable had not only lower burnout levels but also lower intentions-to-leave. The results of the current study also corroborate the findings of Jeon et al. (2018), who found that teachers' self-efficacy beliefs are significant predictors of their affective well-being indicators in terms of stress, burnout, and depression. Jeon et al. (2018) posited that self-efficacious teachers who believe that they have a considerable influence on teaching-learning processes would be more intrinsically motivated and satisfied with the working conditions, which would consequently enhance their affective well-being.

There are many affective stressors at school which jeopardize teachers' affective well-being (Klassen et al., 2012), and one response to this is to explore the ways to strengthen teachers' psychological resources to help them cope with the affective challenges at work more effectively (Hall-Kenyon et al., 2014). Working in demanding and dynamic school environments in which they need to adapt to changing administrators, new policies, and student needs, STEM teachers need adaptable skills that would enable them to be resilient and efficacious (Wright et al., 2019). In line with related research findings (Collie et al., 2016; Jeon et al., 2018; Wang et al., 2018), the results of the current study showed that Science and Mathematics teachers with high self-efficacy are less vulnerable to stressful working conditions, have better affective well-being indicators, and are less likely to develop intent-to-leave.

The findings of this study are in line with Hobfoll et al.'s COR theory, which argues that individuals who do not have psychological resources to cope with stress and burnout are more likely to give up and experience depression (Hobfoll et al., 2000). The results in this study show that lower levels of self-efficacy contribute to negative



experiences at work. Teachers who do not have substantial psychological resources such as a belief in their own self-efficacy more easily develop burnout and depression when experiencing work-related stress (Aloe et al., 2014; Capone & Petrillo, 2018; Jennett et al., 2003; Jeon et al., 2018; Schwarzer & Hallum, 2008; E.M. Skaalvik & Skaalvik, 2007; 2010; Zhong et al., 2009).

As Jeon et al.'s (2018) study showed, teachers with high levels of self-efficacy, who feel more capable of overcoming difficulties, might experience less anxiety in their work and might be more optimistic in employing coping strategies when they struggle with stressful issues at work than the ones who have lower levels of self-efficacy. As the results of the current study revealed, teachers with high levels of self-efficacy experienced less stress, burnout, and depression, and consequently, they less frequently intended to leave their school. They might be less vulnerable to the harmful effects of adverse circumstances at work, because of their high level of self-confidence in their capabilities.

When teachers do not believe that their self-competence is enough to meet the job demands, they feel distressed (Hakanen et al., 2006). The teachers with low levels of self-efficacy perceive themselves as less capable of dealing with challenging issues at school and perceive their job as emotionally exhausting (Jeon et al., 2018). The results of the current study imply that Science and Mathematics teachers with high levels of self-efficacy may be more capable of developing appropriate coping strategies to cope with stressful situations and more likely to seek various resources to alleviate their negative feelings at work.

Teacher educators can help Science and Mathematics teacher candidates to develop a robust professional identity to increase their levels of self-efficacy and to decrease their intent-to-leave (Horvath et al., 2018). Mentors of newly-qualified Science and Mathematics teachers can reinforce and sometimes redefine their professional identity to help them recognize their role in Science and Mathematics education to retain them in the profession (Hutchison, 2012). Educational leaders can also support teachers to develop professionally to increase their capacities to respond to disruptions and high demands in the workplace (Gist, 2018). Besides, educational leaders should give teachers the required mentoring and support and improve their working conditions, which will also decrease their intent-to-leave (Darling-Hammond, 2010).

Limitations

Firstly, the current study employs a cross-sectional and correlational design. It does not guarantee the causal relations between the independent and dependent variables. Although self-efficacy is the exogenous variable and the other variables (affective well-being indicators and intent-to-leave) are indigenous variables in this study, there might be bidirectional (or reciprocal) relations between those variables. For example, Huang and Yin (2018) tested the effect of affective well-being indicators on teachers' self-efficacy levels and found that pleasant affect was more closely related to teachers' self-efficacy than negative affect. However, in the current study, we found that teachers' self-efficacy contributes to their affective well-being. Longitudinal studies can be designed, and non-recursive structural equation models can be tested in future studies to understand the nature of the relations between those variables.

Secondly, we used only self-reports from teachers in the sample to collect data about teachers' self-efficacy, affective well-being, and intent-to-leave. Although the teachers are the best target group to collect data about their own self-efficacy beliefs, well-being indicators, and intentions, the shared variance between the variables examined in this study might have biased the results of this study. Although the scales we used in this study were valid and reliable ones, using only self-reported measures to collect data from the same respondents might have caused self-exaggerating or self-derogatory biases in this study. More objective and clinical methods can be used in future studies to understand the nature of teachers' beliefs, intentions, and well-being levels.

Finally, among many other possible antecedents of teacher turnover, the current research focused on only self-efficacy and affective wellbeing indicators of teachers as the antecedents of their intentions-to-leave school. The findings of this study sheds light on this issue from a psychological resource perspective. Other studies can develop different models focusing on social or organizational antecedents of teacher attrition and retention.

Conclusions and Implications

This exploratory study shed light on the outcomes and benefits of Science and Mathematics teachers' levels of self-efficacy in terms of their affective well-being and retention in educational employment. However, we measured



beliefs, intentions, and stated affects in the form of stress burnout and depression. Further studies are needed to understand the effect of self-efficacy on teachers' long-term outcomes, such as trait affects, performance, and actual turnover. The influence of specific dimensions of teacher self-efficacy, such as personal teaching efficacy, general teaching efficacy, and disciplinary efficacy can also be probed in future studies to understand the nature of the actual psychological resources teachers have to cope with their negative emotions. Future studies can also examine the most effective coping strategies teachers use to increase their affective well-being and retention rates. The current model, while it shows that self-efficacy is a psychological resource that enables teachers to cope with challenges, does not identify the actual mechanisms and strategies teachers use to improve their affective well-being and the other positive outcomes.

As one of the most important psychological resources, the self-efficacy of Science and Mathematics teachers should be nurtured by educational leaders to increase their affective well-being and retention. Science and Mathematics teachers should be provided with more learning opportunities to fill the gaps in their pedagogical content knowledge to increase their positive perceptions about their competency levels. There is empirical evidence that such in-service training activities enhance Turkish Science and Mathematics teachers' competencies in planning, implementation, and evaluation of the instructional process of Science and Mathematics education (Bozkurt Altan & Ercan, 2016). Educational leaders should also empower Science and Mathematics teachers to build more positive attributes to their competencies in teaching.

The results imply that teachers with high levels of self-efficacy feel more competent to handle stressful situations at work and consequently are less likely to experience burnout and depression. Accordingly, professional development programs can be organized for teachers to build confidence in their competencies to deal with challenging situations in their schools effectively. Rather than just focusing on how teachers can better meet the needs of their students, educational leaders should determine the potential stressors that Science and Mathematics teachers face at school, then include effective coping strategies in professional development programs to build higher levels of self-efficacy among teachers.

The results clarify the importance of workplace stressors on teachers' affective well-being and attrition. To alleviate the psychological challenges faced by Science and Mathematics teachers, school leaders should create positive climates at work and introduce policies to focus more on mitigating the psychological burdens of teachers. This includes providing them with opportunities for appropriate professional development.

This study is the first to analyze Science and Mathematics teachers' self-efficacy, affective well-being indicators, and intent-to-leave simultaneously. The results showed that Science and Mathematics teachers with high self-efficacy are more resilient to the adverse effects of stressful situations at work, and therefore, they less frequently experience burnout and depression. Because of their beliefs about their competence and their positive affective states, they are less likely to intend leaving the profession.

This study addresses one aspect of the current problem of teacher retention in Science and Mathematics education. It provides insights about teachers' beliefs in their competence and their affective well-being, and how this impacts their intentions-to-leave the profession. The current paper is an initial contribution, and further studies that explore the relations between Science and Mathematics teachers' self-efficacy, affective well-being, and retention rates will add more to the field.

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