INVESTIGATING THE RELATIONSHIP BETWEEN SCIENCE TEACHERS' SELF- EFFICACY, WORK ENVIRONMENT AND THEIR JOB SATISFACTION BASED ON TIMSS 2011

(FEN ÖĞRETMENLERİNİN ÖZ-YETERLİLİKLERİ, ÇALIŞMA ORTAMLARI VE MESLEKİ DOYUMLARI ARASINDAKİ İLİŞKİNİN TIMSS 2011 VERİSİNE GÖRE İNCELENMESİ)

Nurcan KAHRAMAN[1]

ABSTRACT

According to Lent and Brown (2006) job satisfaction model, there are five components which are related to job satisfaction: (1) personality and affective traits, (2) goals and goal-directed activity, (3) self-efficacy, (4) work conditions, and (5) work related goal support. The present study aims to investigate the relationship between science teachers' job satisfaction and their self-efficacy to teach science, work conditions and their perceptions about goal support environment. TIMSS 2011 data of Turkey were used in the current study. 239 science teachers from Turkey participated in TIMSS in 2011. According to the multiple linear regression analysis results, science teachers' self-efficacy beliefs and their work conditions have significant contribution to explain their job satisfaction. Moreover, the predictor variables account for 15% of variance in Turkish science teachers' job satisfaction.

Keywords: Teachers, job satisfaction, self-efficacy, work environment

ÖZET

Lent ve Brown' un (2006) mesleki doyum modelinde mesleki doyum ile ilişkili 5 önemli eleman vardır: (1) kişilik ve duyuşsal özellikleri, (2) hedefe yönelik aktiviteler, (3) öz-yeterlilik, (4) çalışma koşulları ve (5) mesleki hedefe yönelik destek. Bu çalışma fen öğretmenlerinin öz-yeterlilikleri çalışma koşulları, iş ortamında aldıkları sosyal destek ve mesleki doyum arasındaki ilişkiyi araştırmayı amaçlamaktadır. Çalışmada TIMSS 2011 Türkiye verisi kullanılmıştır. 2011 yılında TIMSS çalışmasına Türkiye'den 239 fen öğretmeni katılmıştır. Çoklu lineer regresyon analizi sonuçlarına göre, fen öğretmenlerinin öz-yeterlilikleri ve çalışma ortamları mesleki doyumlarını açıklamada anlamlı bir etkiye sahiptir. Ayrıca, bağımsız değişkenler öğretmenlerin mesleki doyumları varyansının % 15'ini açıklamaktadır.

Anahtar Sözcükler: Öğretmenler, mesleki doyum, öz-yeterlilik, çalışma ortamı

---

[1] Yrd.Doç. Dr., Çanakkale Onsekiz Mart Üniversitesi Eğitim Fakültesi, nurcankahraman@comu.edu.tr

INTRODUCTION

Trends in International Mathematics and Science Study (TIMSS), sponsored by International Association for the Evaluation of the Education Achievement, investigate students' knowledge and skills in science and math every four years. The sample of the study is 4th and 8th grade students. The fifth administration of TIMSS was conducted in 2011. Nearly 60 countries participated in TIMSS 2011. TIMSS also handles the contextual factors that affect students' achievement. Teachers' characteristics are one of the contextual factors which TIMSS concerns about.

One of the teachers' characteristics is their job satisfaction which can also affect students' achievement and achievement related behaviors. According to educational researchers, a quality education is provided mostly by effective teachers (Ronfeldt, 2012). Being effective teacher, staying in the profession, generally depends on job satisfaction (Spear, Gould, & Lee, 2000). Job satisfaction which can be defined as people's pleasure level from daily work activities depend on different factors (Locke, 1976). Lent and Brown (2006) proposed a social cognitive career theory (SCCT) to understand job satisfaction in detail. This model includes six interrelated key elements: (a) work/educational satisfaction, (b) personality and affective traits, (c) goals and goal-directed activity, (d) self-efficacy, (e) work conditions and outcomes, and (f) goal-relevant environmental supports. By the way, it should be underlined that work/ educational satisfaction and job satisfaction terms are used interchangeably in the model since the researchers are interested in not only teachers' enjoyment of their role, but they are also interested in teachers' academic satisfaction. The Figure 1 presents proposed model of SCCT.
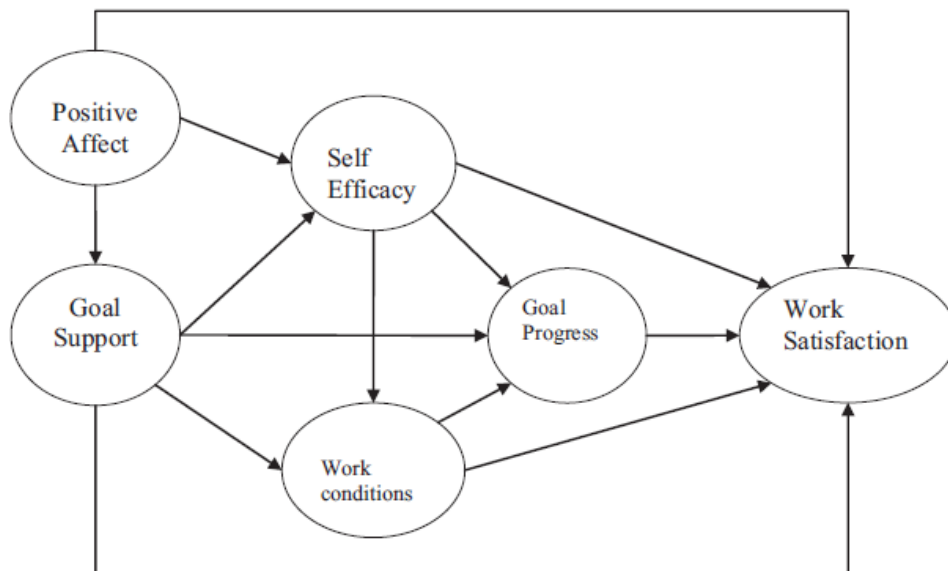
Figure 1 Lent and Brown's job satisfaction model

According to the Lent and Brown's (2006) model, one of the predictors of job satisfaction is personal traits. Judge, Heller, and Mount (2002) investigated the relationship

between personality traits and job satisfaction with a meta-analysis. They handled personality traits such as Neuroticism, Extraversion, Conscientiousness, and Agreeableness. According to the results, the researchers suggest that personality traits have considerable effect on job satisfaction. The third component of the model is goals and goal-directed activity. According to the model, having work-related goals and acting to achieve this goal can make people feel much satisfied in their jobs (Lent & Brown, 2006).

The other component of the Lent and Brown's (2006) job satisfaction model is self-efficacy. Self-efficacy can be defined as a person's beliefs about whether s/he can do the task or not (Bandura, 1982; Zimmerman, 2000; Pintrich & Schunk, 2002). Investigating self-efficacy beliefs from teachers' perspectives brings us teaching efficacy, because teaching is also a task that needs to be completed successfully for people. Therefore, teaching efficacy refers to teachers' beliefs about their capacity to organize necessary behaviours like designing activities needed to teach the subject (Tschannen-Moran & Woolfolk Hoy, 2001). Caprara, Barbaranelli, Steca and Malone (2006) examined effect of self-efficacy on teachers' job satisfaction with seventy-five junior high school teachers. The results suggested positive relation between self-efficacy and job satisfaction for teachers. In another study, Duffy and Lent (2009) investigated self-efficacy and teachers' job satisfaction with 366 teachers. According to the results, teachers' belies about their competence are positively related to job satisfaction. The long of short, the relevant literature suggests that, teachers who are satisfied with their jobs are those who are confident in their abilities to teach the subject, in other words who have high self-efficacy beliefs. Therefore, a positive relationship between teachers' self-efficacy and job satisfaction is expected for the present study.

Fourthly, work conditions are the other component of Lent and Brown's (2006) job satisfaction model. The researchers suggest that teachers' job satisfaction is affected by their work environment and they investigated work conditions in several categories like person-environment fit, expectancy- value beliefs and perceived organizational support. Moreover, they suggest that work conditions and outcomes are related to job satisfaction. In other words, teachers' perceptions about the degree of valued outcomes and conditions that is provided by their school can contribute their job satisfaction.

Last but not least, goal-relevant environmental supports, resources, and obstacles are also one of the components of the job satisfaction model. This aspect of model interested in teachers' perceptions about the degree of environmental support helps them improve their self-efficacy or achieve their work related goals (Lent & Brown, 2006). There is not much study which investigates the relationship between job satisfaction and goal support from teachers' co-workers, friends, family members or supervisors (Duffy & Lent, 2009).

Studies of social cognitive model and job satisfaction

Duffy and Lent (2009) tested the job satisfaction model with 366 teachers by using structural equation modeling with maximum likelihood (ML) estimation procedures. According to the results, teachers' positive affect, self- efficacy, and work conditions have direct effect on their job satisfaction. Besides that, the model accounted for 75% of variance of job satisfaction. In other words, teachers who have positive work environment are more

efficacious in their work and teachers who have high levels of trait positive affect tend to have much satisfaction in their jobs.

In another study, Lent et. al. (2011) tested the model with 235 Italian teachers. The researchers used path analysis to test the model. According to the results, the model accounted for 41% of the variance of job satisfaction. Moreover, job satisfaction was directly related to work conditions, efficacy support and positive affectivity. Although self-efficacy didn't have direct relation with job satisfaction, it was related to indirectly, via work conditions. In other words, teachers who have high self-efficacy beliefs tend to perceive more supportive conditions in their school, in turn, work conditions were related to job satisfaction.

In a recent study, Badri, Mohaidat, Ferrandino and Mourad (2013) tested SCCT model with 5022 teachers. They used structural equation model to investigate the relationship among the components of the model. According to the results, independent variables accounted for 82% of teachers' job satisfaction variance. Moreover, positive affect, goal progress and work conditions have significant direct effect on job satisfaction. Self- efficacy and goal support didn't show significant direct paths to job satisfaction; however, it was significantly related to work conditions. This result was similar to the model proposed by Lent et. al. (2011).

In the light of the mentioned literature, the present study aims to investigate the relationship between self- efficacy, goal and efficacy relevant environmental supports and obstacles, work conditions and job satisfaction in science teachers. Since previous results are mixed in terms of the relationship between environmental goal support and job satisfaction, this study aims to contribute literature to clarify the relationship. The other two key elements of SCCT, personality/affective traits and goals and goal-directed behavior, were not included the current study since there was no information about them in the TIMSS 2011 data.

METHOD

Sample

TIMSS uses a stratified two-stage cluster sample design. Firstly, schools were selected and then the classes were selected from the target students of each participating school (Joncas, 2007). The current study used TIMSS 2011 dataset of Turkey. There were 239 science teachers from Turkey participated in the study. The participants' ages are mostly under 50 (76%). Additionally, the average year of experience is 13 years.

Questionnaire

Self- Efficacy

TIMSS 2011 assesses teachers' self- efficacy with asking how they confident about teaching science. The stem sentence of the instrument was "In teaching science to this class, how confident do you feel to do the following?" and there were five items like "Answer

students' questions about science". It was four-point Likert scale ranging from "1 agree a lot" to "4 disagree a lot". The reliability coefficient of Cronbach alpha was .62. In order to measure teachers' self- efficacy beliefs, the items of the scales were reversed so that higher scores reflected more efficacious teachers.

According to the principal Components analysis results, the first component also counts for 40% of the variance and the factor loadings were presented in Table 1.

Table 1 Factor loadings of self-efficacy

Items	Loadings
Adapt my teaching to engage students' interest	.70
Explain science concepts or principles by doing science experiments	.70
Help students appreciate the value of learning science	.66
Answer students' questions about science	.63
Provide challenging tasks for capable students	.46

Work conditions

In this study, work conditions were handled as teachers' perceptions about school emphasize academic success. The stem sentence of the instrument was "How would you characterize each of the following within your school?" and there were five items. It was five point Likert scale ranging from "1 very high" to "5 very low". The reliability coefficient of Cronbah alpha was .77. In order to measure teachers' perceptions of emphasized success from the schools, the items of the scales were reversed.

According to the principal Components analysis results, the first component also counts for 53% of the variance and the factor loadings were presented in Table 2.

Table 2 Factor loadings of work conditions

Items	Loadings
Teachers' degree of success in implementing the school's	.79
Parental support for student achievement	.74
Students' desire to do well in school	.73
Teachers' understanding of the school's curricular goals	.72
Teachers' expectations for student achievement	.64

Work-related goal support

In this study, environmental support was handled as teachers' collaboration with other teachers improves teaching. The stem sentence of the instrument was "How often do you have the following types of interactions with other teachers?" and there were five items like "Discuss how to teach a particular topic". It was four-point Likert scale ranging from "1 daily" to "4 almost never". The reliability coefficient of Cronbach alpha was .82.

According to the principal Components analysis results, the first component also counts for 58% of the variance and the factor loadings were presented in Table 3.

Table 3 Factor loadings of goal support

Items	Loadings
Collaborate in planning and preparing instructional materials	.85
Discuss how to teach a particular topic	.84
Work together to try out new ideas	.80
Share what I have learned about my teaching experiences	.79
Visit another classroom to learn more about teaching	.45

Job satisfaction

TIMSS 2011 assesses teachers' job satisfaction with asking six items like "I am content with my profession as a teacher". It was four-point Likert scale ranging from "1 agree a lot" to "4 disagree a lot". The reliability coefficient of Cronbach alpha was .72. In order to measure teachers' job satisfaction, the items of the scales were reversed so that higher scores reflected more satisfied teachers.

According to the principal Components analysis results, the first component also counts for 46% of the variance and the factor loadings were presented in Table 4.

Table 4 Factor loadings of job satisfaction

Items	Loadings
I am frustrated as a teacher	.83
I am content with my profession as a teacher	.82
I do important work as a teacher	.67
I am satisfied with being a teacher at this school	.64
I plan to continue as a teacher for as long as I can	.53
I had more enthusiasm when I began teaching than I have now	.50

Analyses

TIMSS data related to both science teachers' contextual factors were reached from TIMSS 2011 international database (http://TIMSSandpirls.bc.edu/TIMSS2011/international-database.html). The International Database (IDB) Analyzer ver. 3.1 was used for analyses. IDB Analyzer was developed by the International Association for the Evaluation of Educational Achievement (IEA) to analyze large scale assessments like TIMSS and it considers sampling weights while analyzing the data (IDB Analyzer, 2013).

RESULTS

Descriptive Results

Mean and standard deviations were presented in table 5.

Table 5 Mean and standard deviations of the variables

	Minimum	Maximum	M	SD
Co-worker support	4. 85	14. 45	9.94	1. 99
Self-efficacy	5.62	12. 06	9. 52	1. 82
Work condition	4. 99	16. 21	9. 07	2. 01
Job satisfaction	4. 03	13. 80	10. 36	2. 03

TIMSS classifies data into three groups for support from co-workers; variable 7.5 point and lower represent somewhat collaboration, from 7.6 to 11. 4 represent collaboration and 11. 5 and upper points represent high collaboration between science teachers and their co-workers. As seen in table 5., mean of Turkish science teachers' collaboration is suitable for the second group in other words there are midium-level collobration among teachers.

For the second variable, self-efficacy, the cut point is 9. 3. In other words, according to TIMSS 9. 3 and lower represents somewhat efficicous, and upper points represent very efficious. As seen in table 1., Turkish science teachers have very high beliefs about to teach science.

TIMSS investigates teachers' perceptions about school emphasis on academic success, their work condition, in three groups: 9.5 point and lower represent medium emphasis, 9.6 to 13. 6 represent high emphasis and 13. 7 and upper points represent very very high empasis. The mean of Turkish science teachers' perceptions about their work environment is 9. 07 which means that they don't think that their school emphasizes on high success levels.

Lastly, job satisfaction also classifed in to three categories: lower points from 7.0 refers to less than satisfied, 7.1 to 10.4 refers to somewhat satisfied and upper points from 10.4 refers to satisfied in TIMSS data. Since, science teachers are somewhat satisfied with their jobs in Turkey.

Inferential Results

The multiple linear regression analysis was conducted to examine Lent and Brown's (2006) job satisfaction model for science teachers in Turkey. Self-efficacy, work conditions and goal support were handled as independent variables for the study. Results showed that the linear combination of predictor variables significantly accounted for 15% of variance in science teachers' job satisfaction in Turkey. More specifically, it was found that self- efficacy and work conditions each made a statistically significant contribution to the prediction of teachers' job satisfaction ($p < 0.05$), while co-workers' support failed to achieve significance ($p > 0.05$). The size and direction indicated that teachers who have confidence about teaching science, and who perceive successful oriented school environment tend to be more satisfied in their jobs. Beta coefficients and beta standard errors are presented in Table 6.

Table 6 Beta coefficients and beta standard errors for predictor variables

	β	β Standard Error
Co-worker support	.09	.07
Self-efficacy	.23*	.07
Work condition	.25*	.06

DISCUSSION

The present study aims to investigate the social cognitive career model, Lent and Brown's (2006) job satisfaction model, for Turkish science teachers. The model includes six components: job satisfaction, positive affect, self-efficacy, work conditions, goal support and goal-directed activities. The TIMSS 2011 data for Turkish sample were used to test the model. Two components of the model, positive affect and goal-directed activities, were not handled in the current study since there was no information about them in the TIMSS data. The present study investigated teachers' work conditions as their perceptions about the degree of school emphasize academic success. Moreover, goal support was investigated as teachers' collaboration with other teachers improves teaching. According to the results, teachers' self-efficacy beliefs about teaching science and their work conditions were significant predictors of teachers' job satisfaction. Besides, the support of co-workers didn't show significant effect on explaining teachers' job satisfaction. In other words, teachers who believe his/her capacity to organize teaching activities and who perceive a success- oriented school environment tend to be more satisfied in their jobs. Consisting with the present findings, Duffy and Lent (2009) tested the job satisfaction model and suggested direct relation between self-efficacy, work conditions and teachers' job satisfaction. According to the researchers' model, there was no direct relationship between teachers' job satisfaction and goal support components. It is considerable that the common result of the studies which investigated job satisfaction according to Lent and Brown's (2006) model is the direct relationship between work conditions and teachers' job satisfaction (e.g. Badri et. al., 2013; Duffy& Lent, 2009; Lent et. al., 2011). This suggests that teachers' perceptions about organizational support affect their job satisfaction. Moreover, it is same in different cultural contexts (Lent et. al., 2011).

Although Lent and Brown's (2006) job satisfaction model suggests that the environmental support for the person's goal is one of the predictor of job satisfaction, the findings of the current study couldn't confirm this suggestion. Previous studies' revealed mixed results about this relationship. While some of the researchers suggest direct relationship between goal support environment and teachers' job satisfaction (e.g. Lent et. al, 2011), others suggest no direct

relationship (e.g. Badri et. al., 2013; Duffy& Lent, 2009). On the other hand, the direct relationship between environmental support and work conditions is common finding of studies which test the model. This study did not aim to investigate relationship among all the components of the model. Therefore, future studies can consider testing the entire model so the indirect relationships can also be explained.

There are some limitations in this study. Firstly, it is a cross sectional study, so it does not explain cause and effect relation between variables. Secondly, one of the major limitations was that it was not possible to include all the components of the job satisfaction model since this study used data which was already collected. Hence, the further studies can investigate the model with all the components for Turkish science teachers. Additionally, this study investigated job satisfaction only for science teachers in Turkey. These relations can differentiate into other teachers and other cultures.

REFERENCES

Badri, M. A., Mohaidat, J., Ferrandino, V., & El Mourad, T. (2013). The social cognitive model of job satisfaction among teachers: Testing and validation.*International Journal of Educational Research*, *57*, 12-24.

Bandura, A. (1982). Self-efficacy mechanism in human agency. *American psychologist*, *37*(2), 122.

Caprara, G. V., Barbaranelli, C., Steca, P., & Malone, P. S. (2006). Teachers' self-efficacy beliefs as determinants of job satisfaction and students' academic achievement: A study at the school level. *Journal of school psychology*, *44*(6), 473-490.

Duffy, R. D., & Lent, R. W. (2009). Test of a social cognitive model of work satisfaction in teachers. *Journal of Vocational Behavior*, *75*(2), 212-223.

IDB Analyzer (Version 3) [Computer software and manual]. (2013). Hamburg, Germany: International Association for the Evaluation of Educational Achievement

Joncas, M. (2007). TIMSS 2007 sample design. *TIMSS,* 77-92.

Judge, T. A., Heller, D., & Mount, M. K. (2002). Five-factor model of personality and job satisfaction: a meta-analysis. *Journal of applied psychology*, *87*(3), 530.

Lent, R. W., & Brown, S. D. (2006). On conceptualizing and assessing social cognitive constructs in career research: A measurement guide. *Journal of Career Assessment*, *14*(1), 12-35.

Lent, R. W., Nota, L., Soresi, S., Ginevra, M. C., Duffy, R. D., & Brown, S. D. (2011). Predicting the job and life satisfaction of Italian teachers: Test of a social cognitive model. *Journal of Vocational Behavior*, *79*(1), 91-97.

Locke, J. (1976). The Correspondence of John Locke.

Pintrich, P. R. (2002). The role of metacognitive knowledge in learning, teaching, and assessing. *Theory into practice*, *41*(4), 219-225.

Ronfeldt, M. (2012). Where should student teachers learn to teach? Effects of field placement school characteristics on teacher retention and effectiveness.*Educational Evaluation and Policy Analysis*, *34*(1), 3-26.

Spear, M., Gould, K., & Lee, B. (2000). *Who Would be a Teacher?: A Review of Factors Motivating and Demotivating Prospective and Practising Teachers*. Slough: NFER.

Tschannen-Moran, M., & Hoy, A. W. (2001). Teacher efficacy: Capturing an elusive construct. *Teaching and teacher education*, *17*(7), 783-805.

Zimmerman, B. J. (2000). Attaining self-regulation: A social cognitive perspective.