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Development of Marmara Job Stress Scale for School Administrators: A Validity and Reliability Study*

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ABSTRACT

This study aims to develop a valid and reliable scale to determine the antecedents and consequences of job stress experienced by school administrators and how they cope with job stress. The study sample consists of a group of 234 school administrators who currently work at the districts of Silivri and Büyükçekmece in Istanbul. The Kaiser-Meyer-Olkin value was calculated as .937 and the Barlett test value as 9719.964. After the Exploratory Factor Analysis, a 54-item structure was emerged. The Cronbach alpha internal consistency coefficient was calculated as .967 in the antecedents of job stress sub-dimension, .951 in the consequences of job stress and .706 in the strategies for coping with job stress. As a result of the 27% lower and upper group analysis, it was determined that the items and factors were distinctive. The scale is in 5-point Likert type and there is no reverse item in the scale. While a total score is obtained from the sub-dimensions of the scale, a total score cannot be obtained from the overall scale. Finally, it was determined that the scale entitled Marmara Job Stress Scale is a valid and reliable scale that measures the antecedents and the consequences of job stress experienced by school administrators, and their strategies to cope with job stress.

Keywords:
School administrators, Job stress, scale development

1. Introduction

The situations that force an employee to deviate from his regular functions due to job-related factors are called job stress (Beehr & Newman, 1978). Stress consists of components such as personal expectations, pressure caused by change, and an individual's ability to fight this pressure (Baltaş, 2018), and the factors that create stress are called stressors (Güler & Çınar, 2010). Stress is a multifaceted and unavoidable phenomenon that can contribute positively to performance as well as the negative effects that may reduce an employee's performance (Mavili Aktaş, 2001). In addition to the physical, psychological, behavioral, and social effects of stress (Baltaş & Baltaş, 2018), it also causes organizational consequences such as low productivity and performance, work alienation, absenteeism, work accidents, and increased employee turnover (Tozkoparan, 2019).

There are many structures within school organizations that can cause stress spontaneously. For this reason, it is not possible to escape from stress in educational organizations where the input is human (Arıcan, 2011). In school organizations where stress takes place spontaneously, revealing the motivating type of stress and avoiding the harmful one makes a positive contribution to productivity (Aydın, 2016).

*This study was produced from the master thesis conducted by Serkan Yüksel under the supervision of Assoc. Prof. Mustafa Özgenel and presented as a paper at the IZU Graduate Student Congress.

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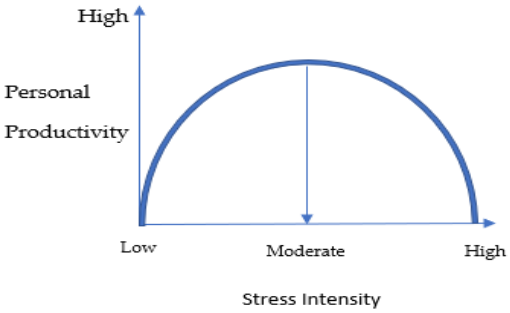

Figure 1. *Stress-Performance Relationship* (Aydın, 2016).

When the stress-performance relationship presented in Figure 1 is examined, it is seen that moderate stress contributes positively to productivity, but very low and very high levels of stress negatively affect personal productivity (Aydın, 2016). Therefore, it is thought that it is very important to determine the antecedents that cause stress.

Long-term job stress that cannot be controlled has individual effects such as heart diseases, high blood pressure, loss of general health, depression, family problems, and isolation from society (Baltaş & Baltaş, 2018). Organizationally, it is known that stress has negative consequences such as low productivity and performance, work alienation, absenteeism, work accidents, job dissatisfaction, and increased employee turnover (Tozkoparan, 2019). The high cost of compensating for the negative effects of stress (Tutar, 2016) increases the importance of determining the causes of stress and identifying and eliminating its negative consequences. In addition, when educational organizations are considered, this importance increases even more since the low performance in these organizations will directly or indirectly affect the whole society.

In our country, there have been studies on stress and the causes and consequences of stress both in enterprises and educational organizations and it is seen that various scales have been used in these studies. However, it is thought that developing a new measurement tool will contribute to the field, since it is thought that the causes and consequences of stress and even the strategies to cope with stress may change in line with the changing times and technological developments. For this reason, this study aims to develop a valid and reliable scale that determines the antecedents and consequences of stress experienced by school administrators and their strategies to cope with stress.

2. Method

2.1.Research Model

The purpose of this study is to develop a valid and reliable scale that helps to determine the antecedents and consequences of stress experienced by school administrators and their strategies to cope with stress. For this purpose, the survey method, one of the quantitative research methods, was used in the research. Survey research models are the models in which researchers collect data by surveying a sample group or the whole universe to explain the attitudes, views and behaviors of a universe (Creswell, 2020).

2.2. Study Group

The study group of the research consists of the school administrators working in pre-schools, primary schools, secondary schools, and high schools in the districts of Silivri and Büyükçekmece in Istanbul in the 2020/2021 academic year. The draft data collection tool was applied to 236 school administrators, and 2 forms were excluded from the analysis. Therefore, the sample group of the quantitative research consisted of 234 school administrators in the end. The demographic information of 234 school administrators, who constituted the sample of the research, is given in Table 1 below.

Table 1. *Demographic Characteristics of School Administrators*

Demographics		n	%
Gender	Female	48	20.5
	Male	186	79.5
Marital Status	Married	206	88
	Single	28	12
Age	30 and below	3	1.3
	31 - 40	98	41.9
	41 - 50	106	45.3
	51 and above	27	11.5
Experience	10 years and below	150	64.1
	11 – 20 years	64	27.4
	21 years and above	20	8.5
Title	School Administrator	95	40.6
	Assistant Administrator	139	59.4
Education	Bachelor's Degree	129	55.1
	Post Graduate	105	44.9
School Type	Pre-School and Primary School	76	32.48
	Middle School	60	25.64
	High School	98	41.88

2.3. Data Collection Tool

One of the most important features of a scale is that it is a standard measurement tool. In order for a scale to be a standard measurement tool, it must have two main features that are the reliability, which is an indicator of the stability in the measurement values, and the validity, which allows it to accurately measure the feature it aims to measure (Ercan & Kan, 2004). Many studies and analyzes were carried out to ensure the validity and reliability of the scale developed in this study.

2.3.1. Development of Marmara Job Stress Scale

Four stages below were followed in the development of the job stress scale:

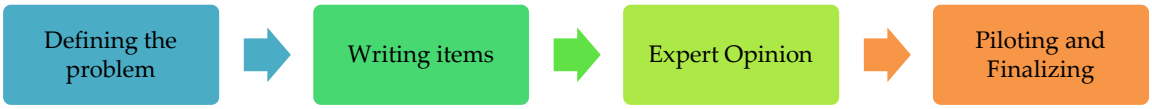

Figure 2. *Scale Development Process* (Büyüköztürk, et. al., 2019).

In the scale development process, it is suggested that it is necessary to determine a theoretical background or a definition in order to determine the structure that is intended to be measured (DeVellis, 2014). In order to develop the scale, literature review was firstly made and the scales used in the field of education were examined (Pehlivan, 1993). In this context, situations that force an employee to deviate from his regular functions due to work-related factors are accepted as the definition of job stress (Beehr & Newman, 1978). After a comprehensive review on the literature and the scales, 19 school administrators were interviewed by the researcher using a semi-structured interview form developed by the researcher. Table 2 presents the demographic data of the school administrators with whom qualitative interviews were conducted.

Table 2. *Demographic Characteristics of School Administrators*

Demographics		n	%
Gender	Female	5	26.3
	Male	14	73.7
Title	School Administrator	4	21..1
	Assistant Administrator	15	78.9
Marital status	Married	17	89.5
	Single	2	10.5
School Type	Pre-school and Primary School	7	36.9
	Middle School	2	10.5
	High School	10	52.6

Codes and themes were determined based on the interviews and the literatüre. In line with the determined codes and the data obtained from the literature, an item pool was created and a 65-item draft scale was developed. The items in the draft scale were examined by a Turkish Language and Literature teacher and a field expert. After the suggestions, 5 items were removed from the draft scale and the number of items was reduced to 60. While removing those items, the content validity of the scale was also taken into consideration. Content validity is related to the extent to which the questions that form a test represent the whole of the behaviors to be measured (Büyüköztürk et al., 2019).

The draft scale form that emerged after the above-mentioned processes is in 5-point Likert type and it was scaled as "Never" (0), "Rarely" (1), "Sometimes" (2), "Mostly" (3), "Always" (4). There is no reverse item in the draft scale, and while a participant can obtain a total score from each sub-dimension of the scale, a total score cannot be obtained from the overall scale.

2.3.2. Data Analysis

The scale form was applied to 236 school administrators working in the state pre-schools, primary schools, secondary schools and high schools that are affiliated to Silivri and Büyükçekmece District Directorate of National Education in the 2022/2021 academic year. 2 forms were excluded from the analysis as they were filled incompletely.

In order to test the construct validity of the scale, the normality test was applied to determine whether the data showed a normal distribution before the Exploratory Factor Analysis was performed. The Kaiser-Meyer-Olkin (KMO) was used to determine whether the data were suitable for the Exploratory Factor Analysis (EFA) and Bartlett's test was used to detect whether the scale could be divided into factors. For the factor analysis, first the principal components and then the vertical rotation analyzes were performed. A 3-factor structure was obtained as a result of the EFA. Item-total correlation values of these factors were calculated.

In order to determine the reliability of the scale, Cronbach Alpha internal consistency tests and independent t-test analysis between 27% lower and upper groups were performed. The relevant data were analyzed in the SPSS program.

3.Findings

This part of the study includes the findings obtained as a result of the validity and reliability studies of the scale developed.

3.1. Validity

The Kaiser-Meyer-Olkin (KMO) Test was performed to determine whether the data obtained from the draft scale was suitable for the factor analysis. Bartlett's test was used to determine whether the scale could be divided into factors and whether the data showed a multivariate normal distribution.

Table 3. *Kaiser-Meyer-Olkin and Bartlett's Test Results of Marmara Job Stress Scale*

Kaiser-Meyer-Olkin (KMO)		.937
Bartlett's Test	x^2	9719.964
	df	1770
	Sig	.000

As Table 3 shows, Kaiser-Meyer-Olkin (KMO=.937) and Barlett's test values (9719.964; p<.000) were found to be suitable for the factor analysis (Leech, Barrett & Morgan, 2005; Seçer, 2015; Demir, 2020; Büyüköztürk, 2020; Can, 2020), and the factor analysis was initiated by performing principal components analysis. In line with this, the eigenvalues of the factors and the amount of variance they explained in the first analysis on the Job Stress Scale are presented in Table 4.

As presented in Table 4, 11 factors with eigenvalues greater than 1 were determined. It is seen that 11 factors explain 66.88% of the total variance. The eigenvalue of Factor 1 is 22.81% and the variance it explains is 38.02%.

Table 4. *Initial Eigenvalues and Explained Variance of the Job Stress Scale*

Factor	Eigenvalue	Variance	Cumulative
1	22.812	38.021	38.021
2	3.855	6.424	44.445
3	2.539	4.232	48.677
4	1.975	3.291	51.968
5	1.778	2.963	54.931
6	1.379	2.298	57.228
7	1.277	2.128	59.356
8	1.239	2.065	61.421
9	1.138	1.897	63.319
10	1.099	1.832	65.150
11	1.040	1.734	66.884

The general opinion for item factor loading is that the item should have a factor load of at least .30 and above (Seçer, 2015). For this reason, the items with the item loads below .35 and the items with the item loads that are close to each other for .10 and below were extraction. When extraction the items with the item loads below .35, the extraction process was initiated with the item with the lowest load value, then the analysis was renewed each time and the loads on other items were checked again. As a result of the analyzes, the 3rd, 25th, 52nd, 54th, 58th and 59th items were excluded from the scale. After these 6 items were excluded, the VARIMAX orthogonal rotation technique was performed to see the distribution of the items to the factors. The most commonly used method for vertical rotation is the Varimax method (Demir, 2020). In the Varimax method, priority is given to the columns of the factor loadings matrix in order to achieve a simple structure and meaningful factors (Tavşancıl, 2018). The goal of varimax orthogonal rotation is to simplify factors (Tabachnick & Fidell, 2007). The factor loads and the variance rate of the scale are presented in Table 5.

Table 5. *Final Eigenvalues and Explained Variance of the Job Stress Scale*

Factor	Eigenvalues	Variance	Cumulative
1	12.904	23.897	23.897
2	12.328	22.830	46.727
3	2.491	4.613	51.340

When Table 5 is examined, it is seen that the first factor is stronger than the other factors. 23.89% of the 51.34% explained total variance is explained by the first factor, 22.83% by the second factor and 4.16% by the third factor. The factor loads of the items as a result of the analyzes are shown in Table 6:

Table 6. *Factor- Item Loads of the Job Stress Scale*

Madde	1	2	3
1	0,586		
2	0,559		
4	0,624		
5	0,752		
6	0,628		
7	0,685		
8	0,585		
9	0,631		
10	0,742		
11	0,611		
12	0,656		
13	0,749		
14	0,484		
15	0,583		
16	0,670		
17	0,613		
18	0,552		
19	0,509		
20	0,620		
21	0,665		
22	0,711		

23	0,647		
24	0,735		
26	0,527		
27		0,677	
28		0,679	
29		0,621	
30		0,739	
31		0,667	
32		0,764	
33		0,738	
34		0,669	
35		0,573	
36		0,738	
37		0,733	
38		0,692	
39		0,645	
40		0,588	
41		0,570	
42		0,628	
43		0,709	
44		0,721	
45		0,716	
46		0,728	
47		0,572	
48		0,687	
49		0,574	
50		0,480	
51		0,579	
53			0,615
55			0,715
56			0,642
57			0,690
60			0,672

As can be seen in Table 6, there are 54 items left in the 3-factor-scale. The first factor's item load value ranges from .48 to .75, the second factor's item load value ranges from .48 to .76, and the third factor's item load value ranges from .61 to .71. By examining the items collected under the determined factors, the first factor of 24 items (1-24) that covers the antecedents of job stress was named as "Antecedents of Job Stress" the second factor of 25 items (25-50) was named as "Consequences of Job Stress" and the third factor of 5 items (50-54) was named as "Strategies for Coping with Job Stress". For instance, the item "*My workload causes me to have job stress*" takes places in the first factor (antecedents of job stress), "*I experience insomnia due to job stress*" in the second factor (the consequences of job stress), and "*I am active in the areas in which I am talented*" in the third factor (strategies for coping with job stress).

After the exploratory factor analysis, the item-total correlation analysis was performed to determine the relationship of the items with the sub-dimensions within the scale and the findings are given in Table 7.

As a result of the factor analysis, the order of the sub-dimensions and the items within the scale are given below;

- Antecedents of Job Stress: Items 1-24
- Consequences of Job Stress: Items 25-49
- Strategies for Coping with Job Stress: Items 50-54

Table 7. *Item-total correlation analysis*

Item No	Antecedents Total Score	Item No	Consequences Total Score	Item No	Strategies for Coping Total Score
1	.635**	27	.754**	53	.641**
2	.595**	28	.809**	55	.729**
4	.701**	29	.627**	56	.669**
5	.754**	30	.807**	57	.724**
6	.645**	31	.748**	60	.650**
7	.735**	32	.782**		
8	.712**	33	.783**		
9	.714**	34	.725**		
10	.754**	35	.544**		
11	.659**	36	.749**		
12	.685**	37	.819**		
13	.768**	38	.669**		
14	.604**	39	.618**		
15	.694**	40	.746**		
16	.770**	41	.705**		
17	.671**	42	.742**		
18	.670**	43	.821**		
19	.611**	44	.773**		
20	.714**	45	.784**		
21	.670**	46	.751**		
22	.722**	47	.658**		
23	.650**	48	.773**		
24	.768**	49	.713**		
26	.604**	50	.610**		
		51	.715**		

3.2. Reliability

In order to determine the reliability of the Marmara Job Stress Scale, the Cronbach Alpha internal consistency coefficient was calculated separately before and after the exploratory factor analysis. Table 8 presents the Cronbach Alpha coefficients.

Table 8. *Reliability Coefficients Before and After Exploratory Factor Analysis*

	Job Stress Scale	Cronbach-Alpha Internal Consistency Coefficient
Before EFA	Antecedents of Job Stress	α: .953
	Consequences of Job Stress	α: .937
	Strategies for Coping with Job Stress	α: .934
After EFA	Antecedents of Job Stress	α: .967
	Consequences of Job Stress	α: .951
	Strategies for Coping with Job Stress	α: .706

As can be seen in Table 8, before the EFA, the reliability coefficient for the "antecedents of job stress" sub-dimension of the scale is .953, the reliability coefficient for the "consequences of job stress" sub-dimension is .937, and the reliability coefficient for the "strategies for coping with job stress" sub-dimension is .934. After the EFA, the reliability coefficient for the "antecedents of job stress" sub-dimension of the scale is .967, the reliability coefficient for the "consequences of job stress" sub-dimension is .951, and the reliability coefficient for the "strategies for coping with job stress" sub-dimension is .706.

After the Cronbach Alpha internal consistency coefficients were calculated, the total scores of 234 school administrators were ranked from the smallest to the largest in order to reveal the distinctive features of the 3 factors that form the scale. The independent group t-test analysis was conducted to determine whether there was a difference between the 27% lower and upper groups of the study group.

Table 9. *T-Test Results of 27% Lower and Upper Groups for Antecedents of Job Stress*

Item	Group	N	Mean	ss	t	sd	p
Item 1	Lower	63	,95	,869	-13,606	124	,000
	Upper	63	3,08	,885			
Item 2	Lower	63	1,29	1,170	-10,858	124	,000
	Upper	63	3,24	,817			
Item 3	Lower	63	1,13	,793	-16,289	124	,000
	Upper	63	3,32	,714			
Item 4	Lower	63	,79	,936	-15,146	124	,000
	Upper	63	3,24	,875			
Item 5	Lower	63	1,87	,959	-10,993	124	,000
	Upper	63	3,49	,669			
Item 6	Lower	63	1,54	,964	-14,053	124	,000
	Upper	63	3,59	,638			
Item 7	Lower	63	1,35	,826	-14,454	124	,000
	Upper	63	3,38	,750			
Item 8	Lower	63	1,13	,813	-13,783	124	,000
	Upper	63	3,05	,750			
Item 9	Lower	63	1,03	,999	-15,413	124	,000
	Upper	63	3,41	,710			
Item 10	Lower	63	,97	,999	-11,474	124	,000
	Upper	63	2,95	,941			
Item 11	Lower	63	1,32	,858	-14,029	124	,000
	Upper	63	3,38	,792			
Item 12	Lower	63	1,19	1,030	-14,480	124	,000
	Upper	63	3,52	,759			
Item 13	Lower	63	,86	,965	-9,734	124	,000
	Upper	63	2,68	1,133			
Item 14	Lower	63	1,19	,877	-13,620	124	,000
	Upper	63	3,25	,822			
Item 15	Lower	63	,86	,737	-16,545	124	,000
	Upper	63	3,06	,759			
Item 16	Lower	63	,62	,906	-13,413	124	,000
	Upper	63	2,94	1,030			
Item 17	Lower	63	,73	,653	-12,111	124	,000
	Upper	63	2,51	,965			
Item 18	Lower	63	,83	,752	-10,389	124	,000
	Upper	63	2,59	1,116			
Item 19	Lower	63	1,52	,948	-14,207	124	,000
	Upper	63	3,57	,640			
Item 20	Lower	63	1,90	1,088	-11,034	124	,000
	Upper	63	3,63	,604			
Item 21	Lower	63	1,35	1,080	-13,798	124	,000
	Upper	63	3,56	,667			
Item 22	Lower	63	1,49	1,148	-12,756	124	,000
	Upper	63	3,62	,658			
Item 23	Lower	63	1,22	,870	-16,109	124	,000
	Upper	63	3,51	,716			
Item 24	Lower	63	,95	,869	-10,269	124	,000
	Upper	63	2,67	1,000			

According to Table 9, each of the items constituting the antecedents of job stress has a distinctive feature ($p<.05$). In other words, the items expressing the antecedents of job stress distinguish between individuals with low scores and individuals with high scores.

Table 10 shows the t-test results of the 27% lower and upper groups for the consequences of job stress.

Table 10. *T-Test Results of 27% Lower and Upper Groups for Consequences of Job Stress*

Item	Group	N	Mean	ss	t	sd	p
Item 25	Lower	63	,54	,534	-18.009	124	,000
	Upper	63	2,68	,779			
Item 26	Lower	63	,76	,588	-22.624	124	,000
	Upper	63	3,16	,601			
Item 27	Lower	63	,05	,215	-10.380	124	,000
	Upper	63	1,65	1,207			
Item 28	Lower	63	,46	,502	-19.528	124	,000
	Upper	63	2,84	,827			
Item 29	Lower	63	,14	,353	-14.961	124	,000
	Upper	63	2,13	,992			
Item 30	Lower	63	,30	,496	-13.776	124	,000
	Upper	63	2,40	1,100			
Item 31	Lower	63	,90	,734	-18.623	124	,000
	Upper	63	3,30	,710			
Item 32	Lower	63	,48	,820	-16.214	124	,000
	Upper	63	3,06	,965			
Item 33	Lower	63	,03	,252	-7.190	124	,000
	Upper	63	1,21	1,272			
Item 34	Lower	63	,43	,712	-14.071	124	,000
	Upper	63	2,63	1,021			
Item 35	Lower	63	,25	,439	-19.972	124	,000
	Upper	63	2,65	,845			
Item 36	Lower	63	,13	,381	-11.466	124	,000
	Upper	63	1,92	1,182			
Item 37	Lower	63	,13	,381	-10.222	124	,000
	Upper	63	1,87	1,301			
Item 38	Lower	63	,19	,470	-15.645	124	,000
	Upper	63	2,38	1,007			
Item 39	Lower	63	,29	,490	-14.673	124	,000
	Upper	63	2,14	,877			
Item 40	Lower	63	,33	,475	-14.449	124	,000
	Upper	63	1,98	,772			
Item 41	Lower	63	,08	,272	-18.846	124	,000
	Upper	63	2,41	,944			
Item 42	Lower	63	,75	,695	-18.152	124	,000
	Upper	63	3,05	,728			
Item 43	Lower	63	,65	,786	-17.031	124	,000
	Upper	63	3,00	,762			
Item 44	Lower	63	,11	,317	-15.447	124	,000
	Upper	63	2,16	1,003			
Item 45	Lower	63	,17	,423	-11.523	124	,000
	Upper	63	1,83	1,056			
Item 46	Lower	63	,67	,823	-16.512	124	,000
	Upper	63	3,00	,762			
Item 47	Lower	63	,16	,447	-14.624	124	,000
	Upper	63	2,40	1,129			
Item 48	Lower	63	,11	,479	-10.603	124	,000
	Upper	63	2,03	1,356			
Item 49	Lower	63	,43	,777	-14.107	124	,000
	Upper	63	2,76	1,058			

According to Table 10, it is seen that each of the items constituting the consequences of job stress has a distinctive feature ($p<.05$). In other words, the items expressing the consequences of job stress distinguish between individuals with low scores and individuals with high scores.

Table 11 shows the t-test results of the 27% lower and upper groups for the strategies for coping with job stress.

Tablo 11. *T-Test Results of 27% Lower and Upper Groups for Strategies for Coping with Job Stress*

Item	Group	N	Mean	ss	t	sd	p
Item 50	Lower	63	1,62	,941	-9,666	124	,000
	Upper	63	3,11	,785			
Item 51	Lower	63	1,35	,786	-14,203	124	,000
	Upper	63	3,25	,718			
Item 52	Lower	63	1,52	,954	-10,357	124	,000
	Upper	63	3,17	,834			
Item 53	Lower	63	1,10	,875	-14,085	124	,000
	Upper	63	3,21	,806			
Item 54	Lower	63	2,10	1,058	-9,465	124	,000
	Upper	63	3,56	,616			

According to Table 11, each of the items constituting the strategies for coping with work stress has a distinctive feature (p<.05). In other words, items expressing strategies for coping with work stress distinguish individuals with low scores from individuals with high scores.

Table 12 shows the t-test results of the 27% lower and upper groups based on the total points.

Table 12. *T-Test Results of the 27% Lower and Upper Groups Based on Total Scores*

Dimension	Group	N	Mean	ss	t	sd	p
Antecedents	Lower	63	1.17	.40	-32.744	124	.000
	Upper	63	3.21	.29			
Consequences	Lower	63	.34	.20	-36.134	124	.000
	Upper	63	2.42	.40			
Strategies	Lower	63	1.53	.42	-25.442	124	.000
	Upper	63	3.26	.33			

When Tables 9, 10, 11 and 12 are examined, it is seen that the total scores of the items and factors differ significantly (p < .005) between the 27% lower and upper groups. In this sense, it can be said that the reliability of the items in the scale is high and the participants are distinguished in terms of the features intended to be measured.

4. Discussion

This study aims to develop a valid and reliable scale to determine the antecedents and consequences of job stress experienced by school administrators and their strategies to cope with this stress. Within the study, the literature was reviewed and the existing scales were examined in order to determine the antecedents of job stress experienced by school administrators, the consequences of job stress and the strategies used to cope with job stress. In this context, the scale developed by Pehlivan (1993) was examined exclusively and the need for developing a new scale was determined upon the recommendation of the author (Yüksel, 2021). For this purpose, a 65-item draft scale was firstly developed based on the data obtained from the qualitative interviews and the literature review. The determined scale items were examined by a Turkish Language and Literature teacher and a field expert, and the number of items was reduced to 60 upon the feedback received. This scale was applied to 234 school administrators and "exploratory factor analysis" was performed to determine the construct validity of the scale.

Before the exploratory factor analysis, at first, the normality test and the Kaiser-Meyer-Olkin together with Bartlett's Test were performed to determine whether the data obtained were suitable for the factor analysis. In order to conduct the factor analysis, the KMO is expected to be higher than .60 (Büyüköztürk, 2020). Although the values greater than .50 are acceptable, the KMO value should be greater than .80 for a very good factor analysis (Cengiz, 2007). As a result of the analysis, the KMO value was calculated as .937 and the Bartlett's Test result as 9719.964 (p<.000). A significant Bartlett's value reveals that the data are normally distributed (Otrar & Argın, 2015). In the light of these results, it is seen that the data obtained are suitable for the factor analysis. Followin these, the exploratory factor analysis was performed to determine the validity of the scale. As a result of the exploratory factor analysis, the items 3, 25, 52, 54, 58 and 59 were excluded from the scale, respectively, and a scale with 3 factors and 54 items was obtained at the end. The 3-factor structure explains 51,340% of the total variance. The 3 factors were named as “Antecedents of Job Stress”, “Consequences of Job Stress” and “Strategies for Coping with Job Stress” according to the relevant literature.

After the validity analyzes of the scale, reliability analyzes were performed. Reliability analysis is an analysis that determines how accurately the test measures the feature intended to be measured (Demir, 2020). The internal consistency coefficient was calculated in order to determine the reliability of the scale. The reliability coefficient for the "antecedents of job stress" sub-dimension of the scale was found to be .967, the reliability coefficient for the "consequences of job stress" sub-dimension to be .951, and the reliability coefficient for the "strategies for coping with job stress" sub-dimension to be .706. A value between $0.70<\alpha<0.90$ is highly reliable, and a value between $0.90<\alpha<1.00$ indicates a very high level of reliability (Demir, 2020). Based on this information, it can be said that the factors of the scale are reliable at a high and a very high level.

In order to determine whether the factors were distinctive or not, the 27% lower and upper independent groups t-test was performed. T-tests are used to compare mean scores (Demir, 2020). When the items and the subdimension total scores obtained as a result of the 27% lower and upper independent groups t-test, it can be stated that there is a significant difference in favor of the upper group ($p<.01$). In this sense, it can be said that the items and factors are distinctive, and those who fill in the scale are distinguished in terms of the features intended to be measured. As a result of the validity and reliability studies, the final version of the factor and item distributions of the scale are listed as follows:

- Antecedents of Job Stress: Items 1-24
- Consequences of Job Stress: Items 25-49
- Strategies for Coping with Job Stress: Items 50-54

It can be said that the scale developed in this study is a valid and reliable scale. The scale was named as "**Marmara Job Stress Scale (MJSS)"**. The scale is in 5-point Likert-type which is scaled as (0) Never, (1) Rarely, (2) Sometimes, (3) Often, (4) Always. There is no reverse item in the scale. While a total score can be obtained from each sub-dimension of the scale, it is not possibl to obtain a total score from the overall scale. Therefore, sub-dimensions of the scale can also be used seperately. Scores obtained from the sub-dimensions are also interpreted separately. For instance, a high score in the antecedents of job stress means that the school administrators feel the antecedents of job stress at a high level.

While evaluating the sub-dimensions and items of the "Marmara Job Stress Scale", the following reference ranges should be considered:

0.00-0.79 = Very Low

0.80-1.59 = Low

1.60-2.39 = Moderate

2.40-3.19 = High

3.20-4.00 = Very High

The Marmara Job Stress Scale reveals the school administrators' antecedents of job stress, the consequences of job stress, and their strategies for coping with job stress. The validity and reliability studies of the scale were carried out with data collected from the preschool, primary, secondary and high school administrators, which proves that the scale can be used in other studies on school administrators. The Marmara Job Stress Scale is a scale whose each subdimension can be evaluated as a separate scale. The fact that confirmatory factor analysis, criterion validity and test-retest analyzes were not carried out in the scale consisting of 54 items and 3 sub-dimensions is considered as a limitation of the study. Therefore, confirmatory factor analysis is recommended in future studies.

5. References

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