

A study on cognitive flexibility, emotional intelligence and coping strategies

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Abstract

The purpose of this study is to determine if there is a relationship between cognitive flexibility, emotional intelligence and coping strategies in high school students. 460 high school students participated in the study. In the cognitive flexibility scale of high school students, there was a difference according to the variables of department type and sports branch. For the emotional intelligence scale, there was a difference in gender, fitness status, school type and department type. On the scale of coping strategies, there was a difference in sports branch. As a result, it has been concluded that there is a positive and significant relationship between cognitive flexibility and emotional intelligence of high school students at the excellent level, and as their cognitive flexibility scores increase, their emotional intelligence becomes more positive, and there is a negative and non-significant relationship between coping strategies, cognitive flexibility and emotional intelligence.

Keywords: Coping strategies, cognitive flexibility, emotional intelligence, high school students, survey model.

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1. Introduction

Cognitive flexibility is the process by which people find different alternative paths, gain confidence and are aware of what is happening (Martin et al., 1998). Cognitive flexibility means that people can find different solutions to any problem and offer different alternatives, except for common applications. Cognitive flexibility is the ability to adapt outside of everyday life, develop a sense of confidence and understand things mentally (Thurston & Runco, 1999).

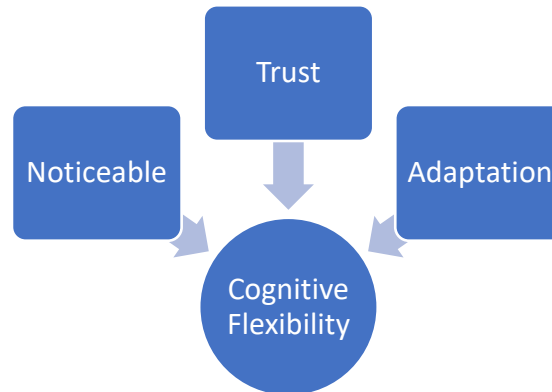


Figure 1

Model of Cognitive Flexibility: Venn Diagram Showing Cognitive Flexibility at the Intersection of Consciousness, Adaptability and Confidence (Crocker, 2018)

Being aware is a strategy for carefully managing options and making choices by grouping all options under one category (Anderson, 2002). Adaptation is adjusting to the environment and the conditions that develop, given the variables. Confidence lies in the behaviours one will exhibit given various situations (Bilgin, 2009). These parts are cognitive flexibility (Stahl, 2005).

Emotions are the response of individuals to any living or non-living object (Cakar & Arbak, 2004). Intelligence is the process of creating practical solutions, executing quotations and implementing ideas in the face of concrete and abstract situations (Headless, 2004). Emotional intelligence is the tendency of the individual to act differently and control the individual's life, with joy, fear and negative thoughts being effective (Yurtavustu, 2013). The fact that people do not give up the psychological or psychomotor behaviours that they like, the ability to compensate for their behaviour when they are excited, to develop ideas in the face of psychological pressure, to empathise with the person who is there and to always have hope for the future is emotional intelligence (Goleman, 2004).

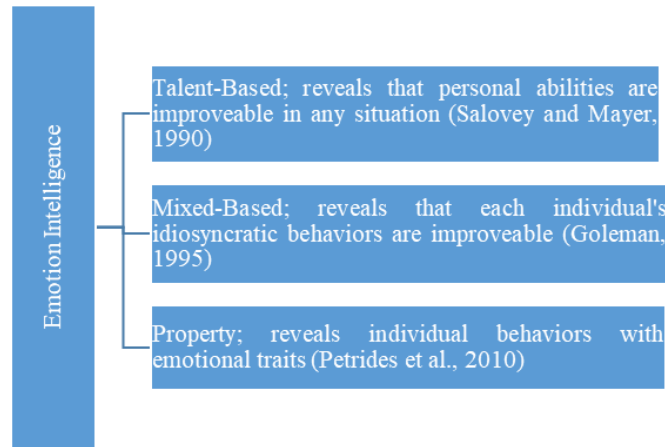


Figure 2

Emotional Intelligence Models (Yazıcı, 2009)

Stress is internal and external characteristics that negatively affect the environmental tolerance of individuals (Richlin-Klonsky & Hoe, 2013). It also includes situations that are specific to individuals and have negative effects on their bodies, as well as on those who are mentally exhausted (Baltas & Baltas, 1996). Stress characteristics physical (like stomach cramps, rapid heart palpitations and increased body temperature), emotional (aggressive and lack of joy in life), mental (unhealthy thinking and wrong decisions) and behavioural (addiction to harmful substances and sleep problems) (Altuntas, 2003).

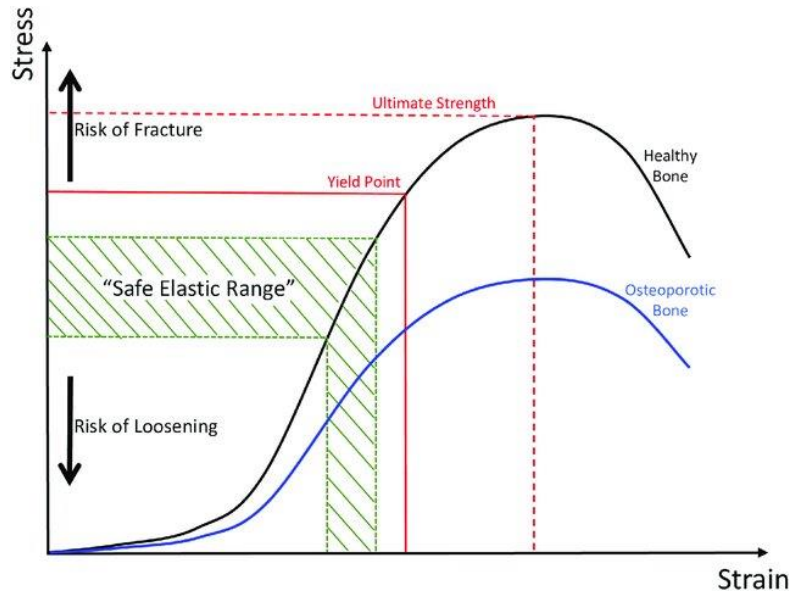


Figure 3

Stress–Strain Curve (Boughton & Ark, 2018)

When a person is exposed to stress, the number of heartbeats increases and causes an ‘alarm’. To eliminate this alarm, the body activates the ‘resistance’ mechanism, and if the person cannot cope psychologically and physically, an ‘exhaustion’ state occurs (Stark, 2001).

In coping strategies, the important thing is to resolve things well, maintain a healthy imagination and remain calm in any case (Cuceloğlu, 1991). The environment influences the strategies for coping with the family's thoughts and financial situations (Anderson, 1998).

When examining the literature, we find that there are works on cognitive flexibility, emotional intelligence and coping strategies in the field of social sciences. Aslan et al. (2021) studied the level of cognitive flexibility and spatial anxiety of football referees. Iscioglu (2021) studied the level of cognitive flexibility and social skills of high school students. Mentés and Saygin (2019) studied the mental resilience and cognitive flexibility of e-athletes and traditional athletes. Serter and Bicer (2021) studied the level of emotional intelligence of coaches. Oeztuerk-Çelik et al. (2021) studied the emotional level of elite female athletes. Tezelli and Dilmac (2021) studied the relationship between emotional intelligence and social anxiety of teacher candidates. Kalkavan et al. (2021) studied the stress level of high school physical education students. Başakçioğlu (2019) explored the stress coping strategies of football and volleyball athletes. Deniz and Yılmaz (2006) studied on emotional intelligence and stress coping styles of university students.

Looking at the studies, it seems that they found different groups of samples dealing with cognitive flexibility, emotional intelligence and coping strategies, both together and separately. It can be argued that during this time when students' reliance on technology outweighs their cognitive flexibility, emotionally they exhibit discrepancies in their feelings and show only one-sided thinking styles when it comes to coping strategies. The purpose of working on this need is to examine the interactions between cognitive flexibility, emotional intelligence and coping strategies of high students based on their age categories, gender, grade level, school type, department, athletic status and sport. The basic problems in working on this study are as follows:

1. Are there statistically significant differences between the gender, fitness, age category, grade level and school type in the cognitive flexibility, emotional intelligence and coping strategies of high school students depending on the type of department and sport?
2. Is there a statistically significant relationship between the cognitive flexibility, emotional intelligence and coping strategies of high school students?

2. Method

This section includes the research model, research group, data collection instruments and data analysis.

2.1. Research model

The survey model among quantitative research methods was used in this research. Survey studies present issues and current situations (Buyukozturk, 2017). This method, which is commonly used in social sciences, is the descriptive method used to analyse the main coverage areas of the sample group (gender, age, industry and school type) (Can, 2020).

2.2. Research group

In this study, 475 high school students from the Sincan district of Ankara province were interviewed. The data of only 460 students were used to improve the statistics. The demographic data of the participants in the study are shown in Table 1.

Table 1
Demographic Data of the Participants

Features	Categories	<i>f</i>	%
Gender	Boy	201	43.7
	Girl	259	56.3
State of sports	Yes	256	55.7
	No	204	44.3
Age categories	15	159	34.6
	16	130	28.3
	17	138	30.0
	18	33	7.2
High school type	Science high school	40	8.7
	Anadolu high school	304	66.1
	Vocational high school	78	17.0
	Imam-Hatip high school	38	8.3
Class level	9th grade	118	25.7
	10th grade	109	23.7
	11th grade	192	41.7
	12th grade	41	8.9
Chapter type	Numerical	106	23.0
	Equal weight	79	17.2
	Verbal	24	5.2
	Foreign language	52	11.3
Type of sport	No chapter	199	43.3
	Individual sports	170	37.0
	Team sports	78	17.0
Total	No branch	212	46.1
		460	100.0

Table 1 shows that the number of high school students included in the study is 460. '201' of these students are boys (43.7%) and '259' are girls (56.3%). 55.7% of the students play sports and 44.3% do not play sports. As for the age of the students, 34.6% are 15 years old, 28.3% are 16 years old, 30% are 17 years old and 7.2% are 18 years old. School type in the study group shows up to 66.1% in Anatolian high schools and only 8.3% in Imam Hatip high schools. A maximum of 41.7% were in 11th grade and only 8.9% were in 12th grade. For section type, 43.3% had no sections and only 5.2% were verbal sections. For sports types, 17% were interested in team sports and 46.1% were interested in sports majors.

2.3. Data collection instruments

For this study, the cognitive flexibility scale, emotional intelligence scale, coping scale and personal information form created by the researchers were used. The cognitive flexibility scale (BEO), developed by Martin and Rubin (1995), consists of 12 items and is rated on a 6-point Likert-type measurement instrument in the form of (1) 'strongly disagree' to (6) 'strongly agree'. In this study, the internal magnitude coefficient (α) of the measurement instrument was found to be 80 and the test-retest

reliability coefficient was found to be 0.83. In the reliability study conducted by Martin and Anderson (1998), the internal consistency of the BEO was calculated to be 72 (0.73 and 0.81). The demonstration of a positive relationship between BEO scores and competence in communication skills and abilities is considered evidence of the relative validity of the BEO (Martin & Rubin, 1995) as individuals develop levels of cognitive flexibility (like 2, 3, 6 and 10). The scores that can be obtained with the measurement instrument, where the items are reversed, range from 10 to 60. The amount of points obtained indicates that the level of cognitive flexibility is also high. In another study, Maltby et al. (2004) calculated the internal coefficient of BEO to be 0.92.

Regarding the emotional intelligence scale (DZO), the theoretical basis of the 33-item emotional intelligence scale, developed by Schutte et al. (1998) and used extensively in research on emotional intelligence, is based on the three-dimensional model of emotional intelligence (Mayer & Salovey, 1990). The emotional intelligence scale, modified by Austin et al. (2004), consists of 20 positive and 21 negative items, totalling 41 items. This scale was formed by including some items from Schutte et al.'s emotional intelligence scale from positive to negative to give more space to the negative items and by adding some new items that primarily target the 'usefulness of emotions' factor, which has previously shown lower reliability than other factors. The scale was in the range of (1) strongly disagree, (2) disagree, (3) neither, (4) agree and (5) strongly agree. The scale consists of three factors: optimism/mood regulation (optimism/mood regulation), use of emotions (movements of use) and expression of emotions (evaluation and expression of emotions). The scale measures these three factors and overall emotional intelligence.

The adolescent coping scale (EBCO) was adapted into Turkish by Price, Light, and Hamarta (2014); the adolescent coping strategy developed by Spirito et al. (1988) is known in international literature as KIDCOPE (ABC): items 3, 6, 8 and 10; evasive coping (KBC): items 1, 2, 9 and 11; and negative coping (OBC): items 4, 5 and 7. Each lower score on the scale is obtained by collecting the corresponding items in order. The achievable scores vary from 0 to 12 for ABC and KBC and from 0 to 9 for OBC. The level of the score means that the corresponding coping approach is used more frequently. The internal capacity coefficient of the scale ranges from $\alpha = 0.43$ to $\alpha = 0.77$ due to the lack of substance in various studies (Cheng & Chan, 2003; Spirito et al., 1988; Vigna et al., 2010), but this value is acceptable in the majority of studies.

2.4. Data collection

The data for this study are collected online. The data collection instruments were prepared so that the responses can be collected online using Google Forms, and then sent to the students of the high school in the Sincan district of Ankara through a link. The research was approved by the Social Sciences Ethics Committee of Bandirma Onyedi Eyluel 2.5 College.

2.5. Analysis of the data

Statistical Package for the Social Sciences (SPSS) 26.0 was used to analyse the data obtained in the research. First, the data were processed and transferred to the SPSS programme. Then, the inverted materials found on the scales were converted. Another process before the analysis is to perform the necessary extractions for single variables and multivariable outliers. To this end, data from 15 students who were converted to Z-standard scores and fell outside the ± 3 limits were removed from the analysis.

To determine the methods used in analysing data, the normality of the distribution of data was tested first. Normality analysis for data obtained from BEO, DZO and EBCO was carried out separately. The normal dispersion test was carried out in all sub-dimensions of both. The results of the Kolmogorov–

Smirnov test were taken into account because the number of people in the sub-categories was generally more than 30. Also, the values of the title and skew are evaluated. In addition to the assumption of normality, the assumption of homogeneity was tested and Levene’s test was used. It was found that homogeneity assumption was provided as a result. In all of this information, the use of parametric and non-parametric tests was deemed appropriate in the analysis of the data obtained from both inventories. In this respect, independent samples *t*-test was used to test two variables and a one-way variant analysis (ANOVA) was used to test three and more variables. Least Significant Difference (LSD) testing from *post-hoc* tests was used to identify the source of the difference when significant differences were detected as a result of the ANOVA. Pearson’s product–moment correlation coefficient (*r*) was used to test the relationship between the levels of cognitive flexibility, emotional intelligence and coping strategies of high students. Also, the process of processing cognitive flexibility, emotional intelligence and coping strategies has been tested with simple linear regression analysis. The results can be seen in Table 2.

Table 2

Cognitive Flexibility, Emotional Intelligence and Coping Strategies Descriptive Statistics on Total Scores

Scale score	Minimum	Maximum	Distortion	Pressure
Cognitive Flexibility	2.58	6.00	-0.399	0.458
Emotional Intelligence	1.68	4.56	-0.214	0.165
Coping Strategies	1.18	4.00	0.945	3.255

Based on the scale’s basic skew values, the cognitive flexibility and emotional intelligence scales show normal dispersion using parametric tests, and because the scale of coping strategies does not show normal distribution, non-parametric tests were used.

3. Results

The findings as a result of the research are presented in tables in this section.

Table 3

Results of t-Testing of High School Students' Cognitive Flexibility and Emotional Intelligence Levels by Gender

Factors	Gender	<i>n</i>	\bar{X}	<i>S</i>	<i>sd</i>	<i>t</i>	<i>p</i>
Cognitive flexibility total	Boy	201	4.48	0.70	458	0.375	0.708
	Girl	259	4.46	0.60			
Optimism	Boy	201	3.63	0.56	458	-2.499	0.013
	Girl	259	3.74	0.49			
Emotion usage	Boy	201	3.29	0.59	458	-4.627	0.000
	Girl	259	3.54	0.56			
Evaluation of emotions	Boy	201	3.46	0.67	458	-2.182	0.005
	Girl	259	3.63	0.60			
Emotional intelligence total	Boy	201	3.47	0.43	458	-3.950	0.000
	Girl	259	3.62	0.39			

Although there is no difference in the level of cognitive flexibility of high school students, according to Table 3, emotional intelligence in the areas of total size [$t(460) = 0.000; p > 0.05$], optimism size [$t(460) = 0.013; p > 0.05$], emotion use size [$t(460) = 0.000; p > 0.05$] and evaluation of emotions [$t(460) = 0.005; p > 0.05$] show that female students seem to have a higher average score than male students in terms of the level of emotional intelligence.

Table 4

Mann–Whitney U Test Results of High School Students' Coping Levels by Gender

Factors	Gender	n	Queue average	Queue total	U	p
Active coping	Boy	201	233.94	47,022.00	25,338	0.621
	Girl	259	227.83	59,008.00		
Avoidant coping	Boy	201	218.85	43,988.50	23,688	0.094
	Girl	259	239.54	62,041.50		
Negative coping	Boy	201	218.18	43,853.50	32,553	0.074
	Girl	259	240.06	62,176.50		
Coping total	Boy	201	220.42	44,304.50	24,004	0.150
	Girl	259	238.32	61,725.50		

According to Table 4, for the overall level of coping and the sub-dimensions of high school students [$U = 25,338; p > 0.05$], no significant differences were found by gender in the level of coping.

Table 5

T-test Results of High School Students' Levels of Cognitive Flexibility and Emotional Intelligence by State of Playing Sports

Factors	The state of sports	n	\bar{x}	S	sd	t	p
Cognitive flexibility total	Yes	256	4.53	0.70	458	2.301	0.022
	No	204	4.39	0.60			
Optimism	Yes	256	3.73	0.52	458	1.587	0.113
	No	204	3.65	0.52			
Emotion usage	Yes	256	3.37	0.58	458	-2.729	0.007*
	No	204	3.52	0.58			
Evaluation of emotions	Yes	256	3.55	0.61	458	-0.315	0.753
	No	204	3.57	0.67			
Emotional intelligence total	Yes	256	3.55	0.41	458	-0.447	0.655
	No	204	3.56	0.42			

Although there is no difference between the level of cognitive flexibility of high school students and the overall level of emotional intelligence, according to Table 5, the level of emotional intelligence is the size of emotion use, which is the lower dimension [$t(460) = 0.007; p > 0.05$]. The average scores of non-sports students are higher than those of sports students in terms of their lower level of emotional intelligence.

Table 6

Mann–Whitney U Test Results of High School Students' Coping Levels by Gender

Factors	The state of sports	n	Queue average	Queue total	U	p
Active coping	Yes	256	233.56	61,072.00	24,048	0.141
	No	204	220.38	44,958.00		
Avoidant coping	Yes	256	224.80	57,548.00	24,652	0.297
	No	204	237.66	48,482.00		
Negative coping	Yes	256	228.52	58,500.00	25,604	0.715
	No	204	232.99	47,530.00		
Coping total	Yes	256	229.88	58,850.00	25,954	0.911
	No	204	231.27	47,180.00		

According to Table 6, no significant differences were found between total coping and the sub-dimensions of high school students [$U = 24,048$; $p > 0.05$] in terms of coping level related to the condition of sports.

Table 7

ANOVA Results by Age Categories of Cognitive Flexibility and Emotional Intelligence Levels of High School Students

Factors	Age categories	n	\bar{X}	S	Source of variance	Squares total	sd	Squares average	F	p
Cognitive flexibility total	15	159	4.42	0.63	Intergroup	0.985	3	0.328	0.79 5	0.497
	16	130	4.48	0.60	Intergroups	188.466	456	0.413		
	17	138	4.53	0.68	Total	189.451	459			
	18	33	4.41	0.68						
Optimism	15	159	3.65	0.48	Intergroup	1.298	3	0.433	1.58 6	0.192
	16	130	3.76	0.50	Intergroups	124.365	456	0.273		
	17	138	3.66	0.58	Total	125.663	459			
	18	33	3.78	0.55						
Emotion usage	15	159	3.44	0.56	Intergroup	1.239	3	0.413	1.21 1	0.305
	16	130	3.50	0.57	Intergroups	155.588	456	0.341		
	17	138	3.38	0.60	Total	156.827	459			
	18	33	3.38	0.69						
Evaluation of emotions	15	159	3.57	0.64	Intergroup	1.140	3	0.380	0.64 0	0.421
	16	130	3.62	0.61	Intergroups	184.374	456	0.404		
	17	138	3.50	0.65	Total	185.513	459			
	18	33	3.50	0.67						
Emotional intelligence total	15	159	3.52	0.40	Intergroup	0.664	3	0.221	1.30 1	0.274
	16	130	3.61	0.40	Intergroups	77.562	456	0.170		
	17	138	3.53	0.42	Total	78.225	459			
	18	33	3.56	0.50						

Table 7 shows that the cognitive flexibility of high school students in total [$F(3, 459) = 0.497$; $p < 0.05$], total emotional intelligence [$F(3, 459) = 1.301$; $p < 0.05$] and lower variables were not found to differ significantly by age category.

Table 8

Kruskal–Wallis H Test Results by Age Categories of Cognitive Flexibility and Emotional Intelligence Levels of High School Students

Factors	Age categories	n	Queue average	sd	χ^2	p
Active coping	15	159	229.03	3	0.770	0.857
	16	130	238.19			
	17	138	224.41			
	18	33	232.74			
Avoidant coping	15	159	235.14	3	1.439	0.697
	16	130	236.83			
	17	138	219.72			
	18	33	228.26			
Negative coping	15	159	225.68	3	2.282	0.516
	16	130	234.59			
	17	138	225.11			
	18	33	260.15			
Coping total	15	159	230.06	3	2.929	0.403
	16	130	242.05			
	17	138	216.58			
	18	33	245.30			

According to Table 8, no significant differences were found in the overall coping magnitude and lower dimensions of high school students [$\chi^2 = 2.929$ ($sd = 3$, $n = 459$), $p < 0.05$] with respect to coping levels.

Table 9

ANOVA Results by High School Type of Cognitive Flexibility and Emotional Intelligence Levels of High School Students

Factors	High school type	n	\bar{X}	S	Source of variance	Squares total	sd	Squares average	F	p	Difference
Cognitive flexibility total	Science high school	40	4.63	0.60	Intergroup	2.213	3	0.738	1.796	0.147	
	Anadolu high school	304	4.48	0.63	Intergroups	187.238	456	0.411			
	Vocational high school	78	4.35	0.74	Total	189.451	459				
	Imam-Hatip high school	38	4.417	0.53							
Optimism	Science high school	40	3.70	0.64	Intergroup	0.598	3	0.199	0.727	0.536	
	Anadolu high school	304	3.71	0.52	Intergroups	125.064	456	0.274			

	Vocational high school	78	3.61	0.53	Total	125.663	459		
	Imam-Hatip high school	38	3.71	0.44					
Emotion usage	Science high school	40	3.67	0.63	Intergroup	11.808	3	3.936	
	Anadolu high school	304	3.48	0.57	Intergroups	145.019	456	0.318	1-3
	Vocational high school	78	3.09	0.52	Total	156.827	459		2-3
	Imam-Hatip high school	38	3.48	0.51					4-3
Evaluation of emotions	Science high school	40	3.53	0.77	Intergroup	2.021	3	0.674	
	Anadolu high school	304	3.61	0.65	Intergroups	184.492	456	0.402	1.674 0.172
	Vocational high school	78	3.45	0.53	Total	185.513	459		
	Imam-Hatip high school	38	3.45	0.53					
Emotional intelligence total	Science high school	40	3.60	0.49	Intergroup	1.714	3	0.571	
	Anadolu high school	304	3.58	0.41	Intergroups	76.511	456	0.168	3.406 0.018
	Vocational high school	78	3.42	0.38	Total	78.225	459		2-3
	Imam-Hatip high school	38	3.56	0.35					

According to Table 9, although the scores of cognitive flexibility did not differ from those of the high school students who participated in the study, the handling of emotions is sub-dimensional when the dimensions of emotional intelligence [$F(3, 459) = 0.000; p < 0.05$] of the vocational high school of the science high school, the Anatolian high school and the Imam Hatip high school, as well as overall emotional intelligence [$F(3, 459) = 0.018; p < 0.05$], are assessed. The Anatolian high school had a higher mean score than the vocational high school.

Table 10

Kruskal–Wallis H Test Results by Age Categories of High School Students' Coping Levels

Factors	High school type	<i>n</i>	Queue average	<i>sd</i>	χ^2	<i>p</i>
Active coping	Science high school	40	217.75	3	0.637	0.888
	Anadolu high school	304	233.41			
	Vocational high school	78	225.50			
	Imam-Hatip high school	38	230.91			
Avoidant coping	Science high school	40	217.54	3	3.708	0.295
	Anadolu high school	304	238.75			
	Vocational high school	78	210.12			

	Imam-Hatip high school	38	219.96			
	Science high school	40	238.14			
Negative coping	Anadolu high school	304	238.69	3	5.732	0.125
	Vocational high school	78	200.78			
	Imam-Hatip high school	38	217.92			
	Science high school	40	214.85			
	Anadolu high school	304	240.89			
Coping total	Vocational high school	78	203.53	3	5.943	0.114
	Imam-Hatip high school	38	219.24			

According to Table 10, no significant differences were found in the total coping size and lower dimensions of high school students [$\chi^2 = 5.943$ ($sd = 3$, $n = 459$), $p < 0.05$] in terms of coping levels in relation to the school type.

Table 11

ANOVA Results by Grade Type of Cognitive Flexibility and Emotional Intelligence Levels of High School Students

Factors	Class type	<i>n</i>	\bar{x}	<i>s</i>	Source of variance	Squares total	<i>sd</i>	Squares average	<i>F</i>	<i>p</i>
Cognitive flexibility total	9th grade	118	4.42	0.60	Intergroup	0.590	3	0.197	0.475	0.700
	10th grade	109	4.47	0.62	Intergroups	188.861	456	0.414		
	11th grade	192	4.51	0.69	Total	189.451	459			
	12th grade	41	4.46	0.62						
Optimism	9th grade	118	3.62	0.45	Intergroup	1.186	3	0.395	1.448	0.228
	10th grade	109	3.74	0.51	Intergroups	124.477	456	0.273		
	11th grade	192	3.69	0.57	Total	125.663	459			
	12th grade	41	3.78	0.53						
Emotion usage	9th grade	118	3.39	0.58	Intergroup	11.758	3	0.253	0.738	0.530
	10th grade	109	3.48	0.54	Intergroups	156.069	456	0.342		
	11th grade	192	3.42	0.61	Total	156.827	459			
	12th grade	41	3.51	0.59						
Evaluation of emotions	9th grade	118	3.52	0.64	Intergroup	0.581	3	0.194	0.478	0.698
	10th grade	109	3.61	0.58	Intergroups	184.932	456	0.406		
	11th grade	192	3.57	0.67	Total	185.513	459			
	12th grade	41	3.52	0.61						
Emotional intelligence total	9th grade	118	3.48	0.39	Intergroup	0.901	3	0.300	1.771	0.152
	10th grade	109	3.59	0.40	Intergroups	77.324	456	0.170		
	11th grade	192	3.57	0.42	Total	78.225	459			
	12th grade	41	3.59	0.47						

Table 11 shows that the cognitive flexibility of high school students is in total size [$F(3, 459) = 0.700$; $p < 0.05$], with a high emotional intelligence total [$F(3, 459) = 0.152$, $p < 0.05$]. There was no significant difference in lower sizes by class.

Table 12

Kruskal–Wallis H Test Results by Class Type of High School Pupils' Coping Levels

Factors	Class type	n	Queue average	sd	X ²	p
Active coping	9th grade	118	223.07	3	2.123	0.547
	10th grade	109	244.99			
	11th grade	192	229.67			
	12th grade	41	217.23			
Avoidant coping	9th grade	118	230.53	3	1.566	0.667
	10th grade	109	242.35			
	11th grade	192	226.98			
	12th grade	41	215.40			
Negative coping	9th grade	118	225.17	3	4.289	0.232
	10th grade	109	247.90			
	11th grade	192	219.83			
	12th grade	41	249.54			
Coping total	9th grade	118	220.16	3	6.910	0.075
	10th grade	109	259.58			
	11th grade	192	222.03			
	12th grade	41	222.60			

According to Table 12, no meaningful differences were found in the total coping size and lower dimensions of high school students [X^2 (sd = 3, n = 459) = 6.910, $p < 0.05$] in terms of coping levels.

Table 13

ANOVA Results by Section Type of Cognitive Flexibility and Emotional Intelligence Levels of High School Students

Factors	Chapter type	n	\bar{X}	S	Source of variance	Squares total	sd	Squares average	F	p	Fark
Cognitive flexibility total	Numerical	106	4.62	0.62	Intergroup	4.746	4	1.186	2.923	0.021*	1–3
	Equal weight	79	4.43	0.64	Intergroups	184.705	455	0.406			
	Verbal	24	4.18	0.45	Total	189.451	459				
	Foreign language	52	4.50	0.76							
	No chapter	199	4.43	0.64							
Optimism	Numerical	106	3.75	0.55	Intergroup	0.66	4	0.165	0.601	0.662	
	Equal weight	79	3.70	0.51	Intergroups	125.003	455	0.275			
	Verbal	24	3.59	0.53	Total	125.663	459				
	Foreign language	52	3.70	0.66							
	No chapter	199	3.67	0.47							
Emotion usage	Numerical	106	3.57	0.58	Intergroup	4.862	4	1.216	3.640	0.006*	1–3
	Equal weight	79	3.89	0.61	Intergroups	151.965	455	0.334			
	Verbal	24	3.11	0.56	Total	156.827	459				
	Foreign language	52	3.47	0.55							
	No chapter	199	3.40	0.57							

Evaluation of emotions	Numerical	106	3.53	0.74	Intergroup	2.566	4	0.641	1.595	0.174
	Equal weight	79	3.58	0.62	Intergroups	182.947	455	0.402		
	Verbal	24	3.32	0.55	Total	185.513	459			
	Foreign language	52	3.71	0.64						
	No chapter	199	3.56	0.59						
Emotional intelligence total	Numerical	106	3.59	0.45	Intergroup	1.547	4	0.387	2.295	0.058
	Equal weight	79	3.58	0.41	Intergroups	76.678	455	0.169		
	Verbal	24	3.37	0.31	Total	78.225	459			
	Foreign language	52	3.64	0.45						
	No chapter	199	3.52	0.39						

Table 13 shows the cognitive flexibility scores [$F(4, 459) = 0.021$; $p < 0.05$] and emotion usage is sub-dimensional when looking at emotional intelligence dimensions [$F(4, 459) = 0.006$; $p < 0.05$]. Numerical chapter type students had a higher average score than verbal chapter type students.

Table 14

Kruskal–Wallis H Test Results by Section Type of High School Students' Coping Levels

Factors	Chapter type	<i>n</i>	Queue average	sd	χ^2	<i>p</i>
Active coping	Numerical	106	241.46	3	2.141	0.710
	Equal weight	79	215.68			
	Verbal	24	227.48			
	Foreign language	52	220.68			
	No chapter	199	233.47			
Avoidant coping	Numerical	106	225.17	3	4.954	0.292
	Equal weight	79	244.65			
	Verbal	24	209.85			
	Foreign language	52	200.92			
	No chapter	199	237.94			
Negative coping	Numerical	106	230.31	3	5.219	0.266
	Equal weight	79	236.19			
	Verbal	24	254.63			
	Foreign language	52	194.20			
	No chapter	199	234.92			
Coping total	Numerical	106	231.42	3	4.115	0.391
	Equal weight	79	234.28			
	Verbal	24	222.75			
	Foreign language	52	197.15			
	No chapter	199	238.15			

According to Table 14, no meaningful differences were found in the total coping size and lower dimensions of high school students [χ^2 ($sd = 3$, $n = 459$) = 4.115, $p < 0.05$] in terms of coping levels relative to the division.

Table 15

ANOVA Results by Sports Type of Cognitive Flexibility and Emotional Intelligence Levels of High School Students

Factors	The type of sport	n	\bar{x}	S	Source of variance	Squares total	sd	Squares average	F	p	Fark
Cognitive flexibility total	Individual sports	170	4.57	0.65	Intergroup	3.837	2	1.919	4.724	0.009*	1-3
	Team sports	78	4.52	0.58	Intergroups	185.614	457	0.406			
	No branch	212	4.37	0.64	Total	189.451	459				
Optimism	Individual sports	170	3.74	0.51	Intergroup	0.838	2	0.419	1.533	0.217	
	Team sports	78	3.71	0.55	Intergroups	124.825	457	0.273			
	No branch	212	3.64	0.52	Total	125.663	459				
Emotion usage	Individual sports	170	3.41	0.54	Intergroup	1.511	2	0.755	2.223	0.109	
	Team sports	78	3.34	0.64	Intergroups	155.316	457	0.340			
	No branch	212	3.49	0.59	Total	156.827	459				
Evaluation of emotions	Individual sports	170	3.54	0.61	Intergroup	0.149	2	0.074	0.183	0.833	
	Team sports	78	3.59	0.64	Intergroups	185.365	457	0.406			
	No branch	212	3.56	0.66	Total	185.513	459				
Emotional intelligence total	Individual sports	170	3.56	0.40	Intergroup	0.023	2	0.011	0.066	0.936	
	Team sports	78	3.54	0.43	Intergroups	78.203	457	0.171			
	No branch	212	3.55	0.42	Total	78.225	459				

Table 15 shows the cognitive flexibility scores [$F(4, 459) = 0.009; p < 0.05$]. Although the mean scores of individual sport students were higher compared to non-sport students, the overall and lower dimensions of emotional intelligence did not differ significantly by sports type.

Table 16

Kruskal–Wallis H Test Results by Sports Type of Coping Levels of High School Students

Factors	The type of sport	n	Queue average	sd	χ^2	p
Active coping	Individual sports	170	245.31	3	3.441	0.179
	Team sports	78	219.74			
	No branch	212	222.58			
Avoidant coping	Individual sports	170	210.26	3	8.697	0.013*

	Team sports	78	261.65			
	No branch	212	235.27			
	Individual	170	229.63			
	sports					
Negative coping	Team sports	78	233.03	3	0.037	0.981
	No branch	212	230.27			
	Individual	170	227.80			
	sports					
Coping total	Team sports	78	243.04	3	0.844	0.656
	No branch	212	228.05			

According to Table 16, χ^2 (sd = 3, n = 459) = 0.844 is the total size of high school students' coping (p < 0.05), although there is no difference in the avoidant coping sub-size [χ^2 (sd = 3, n = 459) = 8.697, p < 0.05] of team athletes, individual and non-majors.

Table 17

Spearman's Correlation Values for Relationship Between Cognitive Flexibility, Emotional Intelligence and Coping Levels

	Cognitive flexibility		Cognitive flexibility		Cognitive flexibility	
	<i>r</i>	<i>p</i>	<i>r</i>	<i>p</i>	<i>r</i>	<i>p</i>
Cognitive flexibility			0.547**	0.000	-0.043	0.357
Emotional intelligence	0.547**	0.000			0.039	0.399
Coping strategies	-0.043	0.357	0.039	0.399		

Table 17 reveals that there is an excellent significant relationship between cognitive flexibility and emotional intelligence in high school students (Spearman's r = 0.547; p = 0.000 < 0.05). Accordingly, it can be said that the higher the cognitive flexibility scores of high school students, the more positive their emotional intelligence scores. The relationship between coping strategies, cognitive flexibility and emotional intelligence is negatively insignificant.

4. Discussion

In this study, high school students' cognitive flexibility, emotional intelligence level and coping strategies, state of sports, age category, grade level, type of high school, relationship between high students' cognitive flexibility levels, emotional intelligence and coping strategy were evaluated by the categories of department type and sports type.

When the statistics of high school students were analysed for gender differences, it was found that girls scored higher than male students in emotional intelligence, although there were no differences in cognitive flexibility and coping strategies. Iscioglu (2020), in their research on the level of cognitive flexibility of high school students, stated that male students score higher than female students. Lerche et al. (2018) and Mentés and Saygın (2019) studies on e-sportsmen state that physical activity has a difference in older people. In their research on cognitive flexibility, Kara (2020) concluded that there is no difference in decision-making and level of cognitive flexibility among karate athletes. Orhan and Karagozöglu (2021), concluded that concerning the emotional intelligence of athletes, male athletes

perform better than female athletes. Dosseville et al. (2014) and Sentuna et al. (2021) concluded that there was no gender difference when examining coaches' emotional intelligence. Kalkavan et al. (2021) touched upon coaching strategies in their work on sports in high school students and for families with special needs. Akcesme (2017) researched elementary and high school administrators. Cerit (2019), in his research for high school students, and Knotan (2018), on sports students, researched dealing with stress. Sulu-Tugyanoglu (2020) concluded that there is a statistically different difference among athletes.

In examining high school students' statistics based on the variability of sports, it was found that students who did not engage in emotion use, the lower level of emotional intelligence, had higher scores than those who played sports, although there were no differences in cognitive flexibility and coping strategies. Emotional intelligence, Kocak (2021) found that the level of emotional intelligence in taekwondo athletes also increases with an increasing sports background. Karotte (2019) concluded that there is a difference in the level of emotional intelligence in the work of gymnast families concerning variability in sports. Laborde et al. (2018) concluded in the field of sport and physical activity that sport has a positive impact on emotional intelligence. Cognitive flexibility, Masley et al. (2009), when studying the relationship between cognitive flexibility and endurance training, concluded that there is a positive relationship between them and that there is no difference in the study of cognitive flexibility in individuals who exercise and who do not exercise (Kara, 2020). Venckunas et al. (2016) the effects of running training on cognitive flexibility has a positive impact on aerobic capacity and cognitive flexibility in research. Latorre-Roman et al. (2021) concluded that active recess increases students' cognitive flexibility.

When high school students' statistics are analysed by age category, there are no statistical differences in levels of cognitive flexibility, emotional intelligence and coping strategies. For cognitive flexibility, Land (2020) studied the decision-making of karate athletes and the level of cognitive flexibility. Lerche et al. (2018), on cognitive flexibility, concluded that physical activity has an age difference in the elderly. For emotional intelligence, Orhan and Karagozöglu (2021), on emotional intelligence in athletes, stated that individuals aged 33–40 years scored higher than individuals aged 18–25 years. Sentuna et al. (2021) stated that coaches in the 36 and older category scored higher than coaches in the 18–23 years in their study on emotional intelligence. Kocak (2021) concluded that taekwondo athletes scored higher than athletes aged 24 and under 19. Çelik et al. (2021) concluded in their study on the level of emotional intelligence in female athletes that emotional intelligence increases with age, while Oezdenk (2018) concluded for sports coaches and Yanar (2017) for racquet athletes that there is no difference. For strategies for dealing, Kalkavan et al. (2021) for sports high school students, Karadagli (2019) for his research on students preparation and Persaud and Persaud (2016) for sports science faculties showed that university students do not differ by age; Kevenci (2018) found a statistically different study for sports students and Idayeva (2020) found for university students.

When high school students' statistics are analysed by grade level, there are no statistical differences in cognitive flexibility and coping strategies. For emotional intelligence, Cakmak (2018) concluded that there is no difference between grade levels when examining the emotional response level of university students. For coping strategies, Leonard et al. (2015) concluded in the study of coping strategies on high school students in private schools that students experience more chronic stress than other grade levels and that there is a difference in coping strategies.

When the statistics of high school students are examined according to the school type variable, although there is no statistical difference in cognitive flexibility and coping strategies, it was found that the average scores compared to the students of vocational high school of scientific high school,

Anatolian high school and Imam Hatip high schools were higher than those of the students of scientific high school. Iscioglu (2020) concluded that there is no difference in the study of cognitive flexibility of high school students according to the type of school.

When the statistics of high school students are examined according to the department type variable, there are no statistical differences in the level of coping strategies, where the average scores of numerical students in the sub-dimension of cognitive flexibility and emotional use are higher than those of verbal students.

In examining the statistics of high school students according to the sports field variable, it was found that the mean scores of students who participated in individual sports were higher in cognitive flexibility than those who did not participate in individual sports, and that team athletes had higher scores in the abstinent coping subscale compared to individual athletes and non-major athletes; that there were no statistical differences in the magnitude of emotional intelligence. For cognitive flexibility, Arslan (2018) concluded that emotional intelligence among team and individual athletes showed that team athletes have a higher score average. Menten and Saygin (2019) did not distinguish between traditional sports and e-sports athletes. Orhan and Karagozoglu (2021) stated that athletes score higher than those who play individual sports in emotional intelligence research. Castro-Sanchez et al. (2018) in emotional intelligence research of athletes showed that team athletes differ from individual athletes. Mayer et al. (1999) concluded that there is a difference in research on emotional intelligence in traditional meetings. Bahadir et al. (2015), Yaliz (2013), Celik et al. (2021) carried out studies on elite female athletes and Sentuna et al. (2021) concluded that there was no difference in the branch variable in the coach's study for the level of emotional intelligence. For coping strategies, Kalkavan et al. (2021) concluded that there was no difference in their work for sports high school students. Sulu-Tugyanoğlu (2020) concluded that there was no difference for dealing with stress.

5. Conclusion

As a result, it has been concluded that there is a significant positive correlation between the cognitive flexibility and emotional intelligence of high school students at the level of excellence, and as their cognitive flexibility scores increase, their emotional intelligence becomes more positive, and there is a negative and non-significant relationship between coping strategies, cognitive flexibility and emotional intelligence management. In the study of Tezelli and Dilmaç (2021) on pre-service teachers, it was found that there is a positive and significant relationship between emotional intelligence and subjective well-being levels. Tümkeya et al. (2016) found a positive relationship between emotional intelligence and life satisfaction in their study on teaching staff. Jacobs et al. (2008) concluded that there is a negative significant relationship between emotional intelligence and anxiety in generalised social life. Deniz and Yılmaz (2006) found a positive significant relationship between emotional intelligence and stress coping styles among university students.

6. Recommendations

Based on previous conclusions, and to complement the requirements of the study to benefit from it, the following recommendations are made:

1. The cognitive flexibility, emotional intelligence and coping strategies of different groups of samples can be studied.
2. Our study can be investigated with a qualitative method.

3. In an experimental study, two identical examples can be applied to the group with different learning strategies, and then the differences in cognitive flexibility, emotional intelligence and coping strategies and pre-test and post-test parameters can be studied.

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