Comparison of decision making skills and self-efficacy perception levels in adolescents in terms of gender and grade variables

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In this study it is aimed to reveal the relationship between secondary school students' decision-making skills in adolescence and their self-efficacy perceptions regarding science learning. The sample of the study consists of a total of 564 students from six public schools located in four city centers in the Central Black Sea Region. 251 of these students are female and 313 are male. The research was carried out with the descriptive survey model. As the data collection tools, Self-Efficacy Perception scale regarding Science Learning (SEPRSL) and the Adolescent Decision Making Scale (ADMS) are resorted to. The analysis of the data is carried out with a statistical package program. When the self-efficacy scores are examined depending on gender, it is found that the self-efficacy belief levels of female students are higher than male students, yet not significantly. Also, students have decision-making skills below the average level. When the results of the study are evaluated in general, it is determined that there is a relationship between self-efficacy perception for science learning and adolescent decision-making skills, and when evaluated in terms of gender, there is generally a difference in favor of female students. Based on these results, it can be said that it will be useful to produce and implement projects that include activities in which students will use their decision-making skills in order to increase their self-efficacy perceptions of science learning.

Introduction

Physical Science is a branch of science that emerges from the attempt to make sense of the events that take place in their environment with the effects of people or that spontaneously exist in nature (Kaptan, 1999). In this discipline, information is structured by

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passing through stages called scientific process skills (Tan & Temiz, 2003). Observation, which is one of the scientific process skills, starts in fact with the opening of the eyes to the world. Therefore, it can be articulated that physical science education is a process that continues from birth to death. This process can either be formal or informal. The main aim of formal physical science education is to raise individuals as physical science literate (Ministry of Education [MNE], 2018).

Science literacy, with its most general definition, is a combination of science-related skills, attitudes, values, understandings and knowledge necessary for individuals to develop their research-inquiry, critical thinking, problem-solving and decision-making skills, to continue lifelong learning, and to maintain their curiosity about the world around them (Feinstein, 2010; Kavak, Tufan, & Demirelli, 2006; Norris & Philips, 2003). Based on this definition, it can be uttered that cognitive, affective and psychomotor dimensions play a critical role in gaining physical science literacy. Considering that these dimensions are not independent from each other in the learning process, the relationship between them is indeed important. There are a fair number of skills and behaviors under each dimension of these learning. Self-efficacy skill is in the affective domain dimension; Decision making skills are among the skills that cover both affective and cognitive skills.

Self-efficacy belief was first introduced into the literature by Bandura (1997) as the key concept of Social Cognitive Learning theory. Bandura expressed this concept as the perception of self-efficacy that individuals hold as to how much of the knowledge and skills they are able to use/need to use to successfully overcome any situation they face. Self-efficacy belief is a perception of competence that leads individuals to seek the source of the problem in situations such as failure, as well as providing the development of success, attitude, knowledge and skills (Yıldırım & İlhan, 2010). According to Ergül (2006), self-efficacy belief is an effective determinant in success and plays an important role in the change of behavior. It is known that individuals with high self-efficacy beliefs are more successful in problem solving (Altunçekiç, Yaman, & Koray, 2005). Caymaz (2008) examined the self-efficacy belief in terms of physical science literacy and interpreted this concept as an individual's beliefs in their level of having the necessary knowledge, skills, attitude regarding science learning. According to Saracaloğlu, Yenice, & Özden (2013), individuals who have this information are capable of making more conscious decisions. Thus, it will be possible for individuals who are physical science literate to use their decision making skills effectively in solving the problems they encounter in daily life.

Decision making skills of students are an effective factor in the learning process (Avşaroğlu & Üre, 2007). In many studies decision making is defined as choosing one of the most suitable possibilities under existing conditions (Beyth-Marom, Fischoff, Jacobs Quadrel, & Furby, 1991; Emhan, 2007; Furby & Beyth-Marom, 1992; Von Winterfeldt & Edwards, 1986). This behavior is an activity that starts with the realization of a situation to be decided on and is completed by determining when and how the individual decides against this situation (Alver, 2005). Norfolk (1989) emphasizes that individuals often face complex decision-making situations in daily life. The decisions made in this process differ according to the conditions, environmental factors and personal development levels. In particular in adolescence, decision-making skills are known to have important effects on personality development (Çolakkadıoğlu, 2012). As a matter of fact, decision making is one of the factors that also affect self-efficacy (Deniz, 2004; Narangerel, 2020; Titrek, Konak, & Titrek, 2013). Forbes (2005) stated in his study that decision-making skill makes a significant difference on entrepreneurial self-efficacy. The studies in which decision-making and self-efficacy beliefs

are handled together are predominantly studies with career decision-making self-efficacy scales (Betz, Klein, & Taylor, 1996). In these studies, the extent to which the levels of self-efficacy beliefs changed decision making for the future of the relevant participants are examined. In this study, it is aimed to investigate the relationship between secondary school students' decision making processes and their sub-dimensions and their self-efficacy towards science learning. It is considered that this research will contribute to the related literature since not many studies are witnessed where these related skills are discussed in a united fashion.

Method

In the research, descriptive survey method was applied to determine the self-efficacy perceptions of the participants and their decision making skills in adolescence. The aim in the descriptive research model is to reveal the features examined as they exist (Karasar, 2012). In this study, the opinions of the participant students were determined by one-time assessments with graded scales and no intervention was made whilst getting the opinions of the participant students.

Sample

The sample of the study consists of a total of 590 students from six public schools located in four city centers in the Central Black Sea Region. Since the data of 26 of these students are not included in the process due to the reasons stated in the analysis of the data section, a total of 564 students were determined as the sample. Appropriate sampling method was preferred in sample selection. Demographic information related to the sample is given in Table 1.

Table 1. Demographic information related to the research sample

Variables		f	%
Gender	Female	251	44.5
	Male	313	55.5
Grade	5	185	32.8
	6	135	23.9
	7	128	22.7
	8	116	20.6

When Table 1 is examined, it is seen that 55.5% of the students participating in the study are males and 44.5% are females. When analyzed by grade levels, fifth grade students make up 32.8% of participants, sixth graders make up 23.9%, seventh graders make up 22.7% and eighth graders make up 20.6% of the total.

Data Collection Tools

The data of the research were obtained with two different data collection instruments. The first of these is the Self-Efficacy Scale regarding Science Learning developed by Yaman (2016). This scale was first developed by Kaptan & Korkmaz (2001), then adapted by Yaman & Yalçın (2005) for classroom teachers, and then revised by Yaman in 2016 in order to find out the self-efficacy perceptions of secondary school students. The scale consists of three sub-factors. These factors are named as "individual success oriented self-efficacy", "performance oriented self-efficacy" and "result oriented self-efficacy" respectively. As a result of the reliability study conducted by Yaman (2016), the internal-consistency coefficient of the scale

was determined as .83. For the reliability level of the data collected for this study, the Cronbach Alpha coefficient was examined and the internal consistency coefficient was found to be .86. The coefficients of internal consistence at the end of the analysis to determine the reliability level of the sub-factors are as follows: .75, .68 and .57. There are 17 items in the Likert type scale. The highest total score that can be obtained on the scale is 85, and the lowest total score is 17. The sample items of the scale are as follows: I think I have enough knowledge on physical science subjects; I consider myself very talented in physical science, I find myself more talented in physical science than my friends.

The second scale used in the study is the Adolescent Decision Making Scale (ADMS) adapted by Çolakkadıoğlu & Güçray (2007). The original version of this scale was developed in 1989 by Mann, Harmoni and Power. Çolakkadıoğlu & Güçray carried out the adaptation to Turkish, validity and reliability studies in 2007. The scale consisting of five sub-factors aims to assess adolescents' decision making skills. As a result of the structure validity studies, these sub-factors are named as "self-esteem, prudence-selectivity, panic, avoidance of responsibility and Indifference". There are 30 items in the scale which is in four grading type. The structure validity of the scale was examined in two stages, applied to 1582 students in the first stage and 382 students in the second stage. It is stated that Cronbach Alpha values for each sub-factor of the scale are .79; .78; .77; .65 and .73. It is found that the reliability coefficients in this study are .82; .80, .75, .70, and .74. The highest score that can be obtained on ADMS is 90 and the lowest score is 0. Sample items of this scale are: I trust my decision-making ability, I prefer to leave the decisions to others, I do not like taking responsibility for decision-making.

Data Analysis

After the data obtained from the sample were transferred to a computer program, the reverse items were converted and descriptive analyzes were performed on the data. For this purpose, firstly, whether there are outliers in the dataset was checked. Since the scores of individuals with outliers in their answers have a high effect in factor solutions, it is recommended to delete them from the data file and thus to clear them from this error (Tabachnick & Fidell, 2014). It was determined that there are 26 outliers in the data set of this research and these were removed. The authors stated that this does not have a significant impact on the results, since the loss data rate is less than 5%. With the exclusion of these students from the data set, the number of samples decreased to 564 students. After this process, it was examined whether the data met the normality assumption. With these tests it was tested if the data came from a normally distributed universe and thusly if it had the generalizability feature. In light of the normality test performed with kurtosis and skewness tests, the data that appeared to have a normal distribution were analyzed by parametric analyzes. It was detected that the skewness and kurtosis values were between -1.00 and +1.00 for each variable. Also, Box's test results were used for the multi-way ANOVA and it was determined that the variances were equal. Pearson Moments Product Correlation Coefficient was used to determine the relationship between self-efficacy and decision-making skills. The collected data was intended to see whether there were differences between the groups as well as the relationships between the variables. In order to figure out the relationship between self-efficacy and decision-making skills, Pearson Product-Moment Correlation Coefficient was made use of. The collected data is for determining if there are differences between the groups as well as the relationships between the variables. The values obtained for the correlation analysis are classified as follows: Low relationship from .00 to .29; Medium from .30 to .69; High relationship from .70 to 1.00 (Büyüköztürk, 2006). Eta-square (effect size) value was

also referred to for variance analysis. This analysis was carried out to determine to what extent the variable, whose effect was examined independently from the sample and the tests applied, existed in the research results (Field, 2005). The eta-square value obtained was interpreted according to the classification determined by Cohen (1988). The effect sizes were defined as small for $\eta2 \leq .01$; medium for $.01 < \eta2 \leq .06$ and high for $.06 < \eta2 \leq 0.14$. One-way ANOVA analysis was performed to test the direction of the difference between the groups in the multi-way variance analysis, and the Scheffe test, one of the post-hoc analysis, was resorted to for the difference between the groups. The confidence interval for these analyzes was calculated as 95%. Factorial variance analysis, where a dependent variable is examined according to two independent variables, was used in data analysis. By using factorial variance analysis, how the students' self-efficacy and decision-making skills were affected by gender and class variables was analyzed.

Findings

This section includes the findings out of the analysis of the data obtained from the sample. Descriptive statistics of the scores that students got from self-efficacy scale regarding science learning and also from adolescents decision making scale are given below.

Table 2. Descriptive statistical results of the average scores from the self-efficacy scale regarding science learning and from the adolescent decision-making scale

Variables	N	$\overline{X}$	S
Factor 1. Self-efficacy regarding science learning	564	3.53	.69
Factor 1.1. Individual	564	3.48	.70
Factor 1.2. Performance	564	3.60	.85
Factor 1.3. Result	564	3.53	.88
Factor 2. Decision making	564	1.42	.32
Factor 2.1. Self-esteem	564	1.73	.48
Factor 2.2 Prudence	564	1.99	.57
Factor 2.3 Indifference	564	1.33	.56
Factor 2.4. Panic	564	1.04	.60
Factor 2.5. Avoidance of responsibility	564	0.99	.58

As can be seen in Table 2, the average score of the participants on the Self-Efficacy Scale regarding Science Learning is 3.53 out of 5. This score indicates that students' self-efficacy perceptions are above average. The average scores that the students got from the sub-factors are also accepted as an indicator of their having self-efficacy perceptions above average for each sub-dimension. When the average scores of the students on the decision-making scale are examined, it is observed that the average of the decision-making score is 1.42 out of 3 points and this implies that the decision-making skill levels are below the average. When the sub-dimensions are studied, it is confirmed that the self-esteem and prudence levels of the students are above average and the tendencies of Indifference, panic and avoidance of responsibility are lower than average. Whether the total scores obtained from both scales show a significant difference according to the gender of the students is determined by the following analysis.

Table 3. Results of independent samples t-test analysis of the total and sub dimension scores of the self-efficacy scale and decision-making scale according to students' gender

Variables	Gender	n	$\overline{X}$	S	df	t	p
Factor 1. Self-efficacy regarding science learning	Girl	251	3.58	.66	562	1,53	.128
	Boy	313	3.49	.71			
Factor 1.1. Individual	Girl	251	3.54	.67	562	1,77	.078
	Boy	313	3.43	.73			
Factor 1.2. Performance	Girl	251	3.68	.81	562	1,72	.086
	Boy	313	3.55	.87			
Factor 1.3. Result	Girl	251	3.52	.88	562	,18	.854
	Boy	313	3.53	.88			
Factor 2. Decision making	Girl	251	1.38	.31	562	2,58	.010
	Boy	313	1.45	.33			
Factor 2.1. Self-esteem	Girl	251	1.74	.47	562	,74	.460
	Boy	313	1.72	.48			
Factor 2.2. Prudence	Girl	251	2.03	.56	562	1,31	.192
	Boy	313	1.97	.57			
Factor 2.3. Indifference	Girl	251	1.31	.54	562	1,01	.313
	Boy	313	1.35	.58			
Factor 2.4. Panic	Girl	251	.94	.58	562	3,54	.000
	Boy	313	1.12	.60			
Factor 2.5. Avoidance of responsibility	Girl	251	.88	.56	562	4,51	.000
	Boy	313	1.92	.58			

When Table 3 is scrutinized, it is spotted that the students' self-efficacy average scores regarding science learning are close to each other according to their gender and there exists no statistically significant difference. The females' scores in self-efficacy total score and individual achievement and performance dimensions do not differ significantly and the males' scores in result oriented self-efficacy do not differ significantly but are partially high. It is found that the average scores of male students are higher than the female students in the total score of the decision-making scale and its sub-dimensions, panic and avoidance of responsibility sub-dimensions and the difference in points is statistically significant ($p < .05$). Although it is diagnosed that the average scores of male students are higher than the scores of female students in the Indifference dimension of the decision-making scale and that the score of female students is higher than the score of male students in self-esteem and prudence dimensions, it is highlighted that the difference in points is not statistically significant. So as to delve into the differentiation of the scores of the participating students obtained from to the scales according to the grade level, the ANOVA analysis presented in the table below is performed.

Table 4. ANOVA analysis findings showing differentiation of average scores from the scales according to grade level

Variables	Grade	N	$\overline{X}$	S	SS	MS	sd	F	p	Dif.
Factor 1. Self-efficacy regarding science learning	5th Grade	185	3.67	.72	10.04	3.34	3 -560	7.19	.000	5-8
	6th Grade	135	3.51	.72						
	7th Grade	128	3.54	.60						
	8th Grade	116	3.29	.66						
	Total	564	3.52	.69						
Factor 1.1. Individual	5th Grade	185	3.64	.73	11.58	3.86	3 -560	8.08	.000	5-8
	6th Grade	135	3.44	.73						
	7th Grade	128	3.48	.63						
	8th Grade	116	3.25	.64						
	Total	564	3.48	.70						

Factor 1.2. Performance	5th Grade	185	3.68	.85	4.45	1.48	3 -560	2.08	.103	
	6th Grade	135	3.61	.92						
	7th Grade	128	3.63	.73						
	8th Grade	116	3.44	.85						
	Total	564	3.60	.85						
Factor 1.3. Result	5th Grade	185	3.71	.92	19.04	6.35	3 -560	8.59	.000	5-8
	6th Grade	135	3.54	.87						
	7th Grade	128	3.53	.71						
	8th Grade	116	3.20	.89						
	Total	564	3.52	.88						
2. Decision making	5th Grade	185	1.44	.37	.38	.13	3 -560	1.21	.312	
	6th Grade	135	1.37	.31						
	7th Grade	128	1.42	.30						
	8th Grade	116	1.43	.28						
	Total	564	1.41	.32						
Factor 2.1. Self-esteem	5th Grade	185	1.68	.49	2.00	.67	3 -560	2.96	.031	8-5
	6th Grade	135	1.69	.49						
	7th Grade	128	1.74	.48						
	8th Grade	116	1.83	.42						
	Total	564	1.73	.48						
Factor 2.2. Prudence	5th Grade	185	2.04	.57	2.45	.81	3 -560	2.56	.054	
	6th Grade	135	1.88	.59						
	7th Grade	128	2.04	.56						
	8th Grade	116	1.97	.52						
	Total	564	1.99	.57						
Factor 2.3. Indifference	5th Grade	185	1.34	.56	.24	.08	3 -560	.25	.863	
	6th Grade	135	1.29	.58						
	7th Grade	128	1.35	.56						
	8th Grade	116	1.33	.56						
	Total	564	1.33	.56						
Factor 2.4. Panic	5th Grade	185	1.04	.70	.39	.13	3 -560	.36	.782	
	6th Grade	135	1.07	.59						
	7th Grade	128	1.01	.58						
	8th Grade	116	1.01	.46						
	Total	564	1.03	.60						
Factor 2.5. Avoidance of responsibility	5th Grade	185	1.09	.62	3.15	1.05	3 -560	3.13	.021	5-8
	6th Grade	135	,91	,53						
	7th Grade	128	,95	,58						
	8th Grade	116	,98	,56						
	Total	564	,99	,58						

When Table 4 is dwelled upon, it is discovered that the students' general self-efficacy beliefs create statistically significant differences according to their grade levels (p < .05). It is determined that the differences are between the fifth and the eighth grades and took place in favor of the fifth grade. In general, when the averages of self-efficacy beliefs and sub-dimensions are examined, it is identified that the average scores at the fifth grade level are highest and those in the eighth grade are the lowest.

When the differentiation of the average scores obtained from the decision-making scale according to the grade level is examined, a significant difference between the grade levels in the sub-dimensions of self-esteem and avoidance of responsibility (p<.05) is revealed. While 8th grade students have the highest average score in the self-esteem sub-dimension, the students with the lowest score are fifth grade students. In the avoidance of responsibility sub-dimension, the highest average is in the fifth grades and the lowest average score is in the sixth grades. However, the significant difference is tracked down between the fifth and eighth grades. After the ANOVA analysis, post-hoc tests are conducted to determine which group

favor the difference. To that end it is discerned that in self-esteem sub-dimension the difference is between the five and eighth grades and in favor of the eighth grades, and in avoidance of responsibility sub-dimension the difference is significant between five and eighth grades and in favor of fifth grades. The findings examining the effects of gender and class level on the students' self-efficacy decision making and self-efficacy average scores are shared in Table 5.

Table 5. Factorial variance analysis findings examining the effects of gender and class level on the students' self-efficacy decision making and self-efficacy average scores

Variables	Impact	SS	sd	MS	F	p	η2
	Gender	1.66	1	1.66	3.69	.055	.007
	Grade	8.79	3	2.93	6.50	.000	.034
Self-efficacy	Gender*Grade	6.01	3	4.44	4.44	.004	.023
	Error	57.04	555	.10			
	Total	1194.10	563				
	Gender	.82	1	.73	7.04	.008	.013
	Grade	.32	3	.120	1.16	.324	.006
Decision making	Gender*Grade	.40	3	.30	1.23	.297	.007
	Error	250.35	555	.45			
	Total	7286.05	564				

When Table 5 is examined, the differentiation of students' decision making skills and self-efficacy perceptions according to gender, class and gender*class interaction was observed. The results obtained display that adolescents' decision-making skills are affected by the gender variable, and self-efficacy perception differs according to class and gender-class interaction (p<.05). It was determined that the effect level of these variables on decision-making skills and self-efficacy perceptions is "small" (η2<.05). Büyüköztürk (2006) emphasizes that the eta-square value explains the magnitude of the effect of the independent variable on the dependent variable, and accentuates that this value varies between .00 and 1.00. Accordingly, η2 values at .01, .06 and .14 levels are interpreted as "small", "medium" and "wide" effect size in the same order. The findings regarding the relationship between students' self-efficacy perceptions and their decision-making skills are given in Table 6.

Table 6. The relationship between secondary school students' self-efficacy perceptions of science learning and decision making skills

Variables	1.	1.1	1.2	1.3	2	2.1	2.2	2.3	2.4
1. Self-efficacy regarding science learning									
Factor 1.1: Individual	.94**								
Factor 1.2: Performance	.88**	.71**							
Factor 1.3: Result	.80**	.65**	.63**						
2. Decision making	.10*	.10*	.08	.07					
Factor 2.1. Self-esteem	.06	.04	.02	.11*	-.40*				
Factor 2.2: Prudence	.28**	.24**	.28**	.23**	.37**	.10*			
Factor 2.3: Indifference	.05	.06	.04	-.02	.69**	.00	.11**		
Factor 2.4: Panic	.04	-.04	-.03	-.01	.69**	.12**	-.08	.36**	
Factor 2.5: Avoidance of responsibility	-.06	-.03	-.07	-.08	.72**	.09*	-.06	.47**	.53**

When Table 6 is explored, it is diagnosticated that there is a significant and high-level relationship between the self-efficacy perception for science learning and the sub-dimensions of the scale. That being said, the relationship between total score of self-efficacy belief regarding science learning and total scores of decision making (r = .07) is weak. When the relationship between the scores obtained by the participants from the sub-dimensions of the decision-making scale and their self-efficacy perceptions regarding science learning is

investigated, it is monitored that there is a weak and significant relationship between the self-esteem sub-dimension and there is no significant relationship between the other sub-dimensions. It is noticed that there are positive and significant relationships between the sub-dimensions of the self-efficacy scale regarding science learning (individual self-efficacy, performance-oriented self-efficacy and result-oriented self-efficacy), and prudent selectivity, which is the sub-dimension of adolescent decision-making scale.

Discussion

Individuals routinely use their decision making processes in their daily lives. Decision making is a process that includes plentiful sub-dimensions and requires the existence of plenty of competencies. According to Evans (1990), decision making is not an inherent skill, but a status of competence that develops based on experience over time and differs in every individual. The concept of self-efficacy is defined as people's beliefs regarding the competencies they have in dealing with a situation (Bandura, 1997). The decision-making skills that individuals use to solve a problem are affected by their self-efficacy beliefs. In other words, it can be pronounced that an individual who has a high self-efficacy belief that can take an action with their effective decision-making skills, to put it in a different way, there is a relationship between this belief and skill. In relation to the results obtained in this research, it is determined that there is a statistically significant relationship between the self-efficacy perceptions of secondary school students regarding science learning and their decision making skills.

When the self-efficacy scores are examined depending on gender, it is found that the self-efficacy belief levels of female students are higher than male students, nonetheless, this difference is not significant. Koç & Arslan (2017), in their studies which they examined the academic self-efficacy of primary school second grade students, concluded that self-efficacy perceptions of female students are higher than those of male students. The results obtained in this study are in parallel with the study of Koç & Arslan. With that being said, in the literature, it is seen that self-efficacy perception does not vary according to gender in numerous studies and in some others (Demirtaş, Cömert, & Özer, 2011; Durdukoca, 2010; Işıksal & Aşkar, 2012; Korkut & Babaoğlan, 2012) male students have higher self-efficacy perceptions. Considering the results of this study and other studies in the literature, it can be declared that the self-efficacy perception has the potential to produce different results in terms of gender within the context of sampling or education level. When these two independent variables are considered together, it is concluded that the students' grade levels and class-gender interactions impose a significant difference on their self-efficacy perceptions. It is verified that these differences are between the fifth and eighth grades and the difference is in favor of the fifth grades. It can be argued that the reason for this difference is owing to the high stakes national examination administered for entrance to high school in the eighth grade. Bandura (1977) underlined that besides performance, learning from others, encouragement or persuasion, anxiety as a negative arousal have effects on individuals' self-efficacy expectations. Since the exam is also an important source of anxiety, it may have had an impact on students' self-efficacy levels at the time of the study. When the literature is examined, there are results about a positive relationship between self-efficacy and anxiety (Dadandı, Kalyon, & Yazıcı, 2016). It is considered that in this study the difference in self-efficacy perception depending on class levels is because of this very reason.

Conclusion

One of the results obtained in the study is that students have decision-making skills below the average level. In the science curriculum, it is stressed that decision-making skills are important with respect to raising science literate individuals. In this context, it can be expressed that the development of decision making skills that can be considered as low is of utmost importance as regards accomplishing science teaching goals. Karataş Memiş, Bozkurt, Cevizci, Avun,, & Öğretmen (2016), in their study, enunciated a remarkable result that there is a slightly negative relationship between science literacy and decision making skills. When decision making skills are examined by gender, it is conceived that there is a significant difference and this difference is in favor of females. Kuzgun (1992) found that the female students' indecision scores are higher than those of male students in the study for which he examined male and female students' decision making strategies. The results of the study are consistent with the results of this research. What is more, although it is observed that there is a difference in favor of females in the whole scale, it is found that there are significant differences in favor of male students in the sub-dimensions (panic and avoidance of responsibility). It is concluded that class level and class-gender interaction are not an effective variable on decision-making skills.

When the relationship between the variables discussed in the study are looked into, a high level of positive correlation is found between overall scores of belief regarding science learning and its sub-factors. It is ascertained that there is a great relationship especially between individual achievement and overall score. Even though there is a great relationship between self-efficacy belief sub-factors, it is evidenced that the lowest relationship, compared to others, is between expectation of result and performance oriented self-efficacy. This unveils that the students' self-efficacy beliefs and sub-factors are related to each other and generally give results like a single variable. In other words, it can be claimed that taking action for a single factor to boost the self-efficacy beliefs of students can contribute to the increase in other factors.

Contrary to self-efficacy belief, the relationship between general scores regarding decision-making skills and sub-factors or relationship between sub-factors are determined not to have a certain direction or power. It is measured that the relationship between the general score of this skill and the score of the avoidance of responsibility sub-factor is highest and the relationship between the general score of this skill and the self-esteem sub-factories are at the lowest level. It is pinpointed that there is a very low negative relationship between prudence sub-factor of decision-making and sub-factors of panic and avoidance responsibility, and there is no relation between Indifference and self-esteem factors. The most striking result regarding the decision-making dimension is that there is a moderate negative relationship between general decision-making score and self-esteem. These findings show that the relationship between sub-factors and other sub-factors does not have a certain direction and power alongside the general scores and sub-factors of decision-making skills. As it can be understood from here, separate actions should be taken for each sub-dimension in order to both evaluate and improve decision making skills. Based on these results, it is recommended to conduct separate activities for each sub-dimension in future studies to be carried out to enhance their decision making skills.

When the results of the study are evaluated in general, it is determined that there is a relationship between self-efficacy perception for science learning and adolescent decision-making skills, and when evaluated in terms of gender, the results point to a general difference

in favor of female students. In compliance with these results, it can be thought that it will be useful to produce and implement projects that include activities in which students will use their decision-making skills in order to increase their self-efficacy perceptions of science learning.

The study can be repeated with different independent variables from the independent variables in this study. The sample group in this study consists of secondary school students. It can later be applied to high school or university level students in other studies.

It is believed that this study, which sheds light on the relationship between decision-making and self-efficacy belief in respect of different variables and the relationship between them, offers results of crucial importance for the development of interventions enabling positive practices. It can be said that one of the effective ways to determine to what extent these two variables change together might be longitudinal survey studies. For this, the self-efficacy beliefs and decision-making skills of students who have recently registered to secondary school can be assessed for four consecutive years. Different school types, regions and socio-economic levels can also be taken into account as variables for this four-year data collection.

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