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Analysis of Self-Efficacy Levels of Fencers

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ORIGINAL ARTICLE

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Abstract

Self-efficacy is an important factor that should be examined due to the effects of positive and negative situations experienced in the sport environment on sport performance. Self-efficacy in sport is a factor that affects success and performance of athletes. The aim of this study is to examine self-efficacy levels of fencers between the ages of 11 and 16 in terms of variables such as age, gender, sport age, being in the national team and level of income. A total of 118 fencers, 65 females and 53 males, participated voluntarily in the study. The data were collected by using a personal information form and Athlete Self-Efficacy Scale (ASES). Statistical analyses were performed in SPSS 22.0 V. and Lisrel 8.8 V. statistical package program and significance level was accepted as $p<.05$ in all analyses. Validity and reliability analyses showed that this scale can be used in individuals aged 11-16 years. According to the results of the study, it was found that self-efficacy levels of athletes differed significantly in terms of gender, age group, being in the national team, sport age and level of income. As a conclusion, it can be said according to the results of the study that athlete self-efficacy levels of fencers increase with the increase in age and sports experience.

Keywords: Fencing, Fencer, Self-efficacy, Sport Performance.

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Eskrim Sporcularının Öz Yeterlilik Düzeylerinin İncelenmesi

Öz

Öz yeterlik, spor ortamında yaşanan olumlu ve olumsuz durumların spor performansına etkisi nedeniyle incelenmesi gereken önemli bir faktördür. Sporda öz-yeterlik, sporcuların başarısını ve performansını etkileyen bir faktördür. Bu çalışmanın amacı, 11-16 yaş arasındaki eskrim sporcularının öz-yeterlik düzeylerini yaş, cinsiyet, spor yaşı, milli takımda olma ve gelir düzeyi gibi değişkenler açısından incelemektir. Araştırmaya 65 kadın, 53 erkek olmak üzere toplam 118 eskrim sporcusu gönüllü olarak katılmıştır. Veriler Kişisel Bilgi Formu ve Sporcu Öz-Yeterlik Ölçeği (SÖYÖ) kullanılarak toplanmıştır. İstatistiksel analizler SPSS 22.0 V. ve Lisrel 8.8 V. İstatistik paket programında yapılmış ve tüm analizlerde anlamlılık düzeyi $p<.05$ olarak kabul edilmiştir. Yapılan geçerlilik ve güvenirlilik analizleri bu ölçeğin 11-16 yaş yaş grubundaki bireylerde de kullanılabileceğini göstermiştir. Araştırma sonuçlarına göre sporcuların öz-yeterlik düzeylerinin cinsiyet, yaş grubu, milli takımda olma, spor yaşı ve gelir düzeyine göre anlamlı düzeyde farklılaştığı bulunmuştur. Sonuç olarak, eskrim sporcularının sporcu öz-yeterlik düzeylerinin yaş ve spor tecrübesi arttıkça arttığı söylenebilir.

Anahtar kelimeler: Eskrim, Eskrim Sporcusu, Öz-yeterlik, Spor Performansı.

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Introduction

Physical, physiological and psychological factors are very important for success and high level of performance in every sport discipline. Performance and success in sports is affected by factors including attitude, expectation, motivation, perception, self-confidence and self-efficacy. Self-efficacy is defined as the belief of an individual for being able to perform a task with success and activity level, efforts, determination and success of the individual are affected by self-efficacy to a great extent (Bandura, 2012). Self-efficacy beliefs of individuals mostly come from their individual and indirect experiences and personal qualities.

The theory of self-efficacy was put forward by Bandura (1997) to explain the differences in the abilities and achievements of individuals. According to Bandura (1986), self-efficacy beliefs are not individuals' thoughts about their skills, but their judgments of what they can do with those skills. It is thought that self-efficacy beliefs are the most important determinants of individuals' motivation levels while trying to accomplish their goals. It can be said that in competitive situations, higher self-efficacy beliefs will lead to better performance. Feltz and Weiss (1982) defined self-efficacy to be one of the most effective psychological structures that help individuals to be successful in sport. Various tasks are performed in all sports disciplines. Therefore, for success and high performance in sports disciplines, athlete self-efficacy should be examined.

Athletes' performance is affected by different factors. The most important psychological qualities for successful performance in sports are commitment, control, confidence and concentration (Saeed and Pandy, 2015). Another one of these factors is athletes' belief in their self-efficacy. As mentioned earlier, self - efficacy is how individuals evaluate themselves. However, self-efficacy in sports is not a such a simple concept. Self-efficacy belief is considered to be an important factor affecting an athlete's performance (Hardy et al., 2004). Self-efficacy in sports determines success in setting targets, learning, and both individual and collective performance (Myers et al., 2008). Individuals with high self-efficacy beliefs have increased determination and show higher effort. A positive relationship has been found in a large number of studies between self-efficacy and performance. For instance, Beauchamp et al. (2002) suggested that athletes who showed high performance had higher self-efficacy levels, while athletes who showed poor performance had lower self-efficacy levels.

Individuals may often evaluate their self-efficacy levels incorrectly, which means that they may have higher or lower perceptions about their actual self-efficacy levels. It is important for athletes to have an accurate belief about their self-efficacy levels so that they can set more realistic goals and as a result become more successful. When athletes are aware of their self-efficacy levels, they can

evaluate what they can do and what they actually do more accurately. Athletes who can make accurate evaluations of themselves can have a better understanding of their strengths and weaknesses, they can use their abilities and talents better and they can manage their performance and therefore their success and failure better.

Competitive orientations such as the desire to win or perform better than others have been considered to be related to athletes' efficacy expectations (Martin and Gill, 1995). Studies conducted on self-efficacy beliefs of athletes have shown self-efficacy to predict sport performance accurately and explain performance variance (Feltz and Lirgg, 2001). All athletes want to be successful, win and be the best in their discipline. This is also the case for fencing. Fencing is basically based on sword defense and attack systematics and is an active competition sport with its strategic nature, energy, speed and effort, endurance and continuity, stability, analysis power and strategic elements in tactics (Roi and Bianchedi, 2008). As in all sports disciplines, self-efficacy is also important for fencing. Therefore, we conducted the present study to examine self-efficacy levels of fencers in terms of some demographic variables.

Material and Method

Sample and Population

Koçak (2020), who developed the Athlete Self-Efficacy Scale, recommended in his study that the scale should be applied to younger athletes. In J. Piaget's stages of cognitive development, the period after the age of 11 is the period of abstract operations and Piaget stated that children at this age can understand abstract expressions (Bacanlı, 2011). For this reason, population of the present study consists of fencers between the ages of 11 and 16, while the sample consists of 118 fencers between the ages of 11 and 16 who were living in the provinces of Adıyaman, Ankara, Gaziantep and Samsun. All of the participants volunteered to participate in the study and Ondokuz Mayıs University Ethics Committee approved the study with 29.04.2022 dated and 2022-430 numbered decision.

Data Collection Instruments

Data were collected in the study by using a personal information form and Athlete Self-Efficacy Scale (ASS) developed by Koçak (2020). Personal information form includes of 5 questions prepared by the researchers to reveal the socio-demographic information status of the participants. "Athlete Self-Efficacy Scale" was used to measure self-efficacy levels of the athletes who participated in the study. The scale consists of 5-point Likert type self-assessment (1: Disagree - 5: Completely agree) with 16 items. The scale consists of four factors as sports discipline efficacy, psychological efficacy, professional thought efficacy and personality efficacy. Internal consistency coefficients of the scale in the original study were 0.898 for the whole scale, 0.841 for the sports discipline efficacy

factor, 0.756 for the psychological efficacy factor, 0.752 for the professional thought efficacy factor and 0.760 for personality efficacy factor.

Data Analysis

Athlete Self-Efficacy Scale developed by Koçak (2020) used in the present study was developed for adult athletes. Koçak (2020) recommended in his study that the scale should be applied to younger athletes. Since this is the first study to use this scale in younger age groups, validity and reliability of the results obtained from our sample were analysed in the present study. For this reason, within the context of reliability analyses of the scale used in the study, firstly, internal consistency coefficients were calculated for the factors of the scale and the total scale. Secondly, Confirmatory Factor Analysis (CFA) was used to test the construct validity of the scale for this age group. Finally, in the statistical evaluation of the data, Kolmogorov-Smirnov and Shapiro-Wilk test were used to test normality assumption ($P>0.05$). Student's t-test was used to find out whether the scale scores differed significantly according to gender, age group, being in the national team and income status in the study, while one-way ANOVA and Tukey multiple comparison test were used to find out whether the scale scores differed significantly for sport age variable in the study. SPSS 22.0 V. statistical package program was used for determining the Cronbach's alpha coefficients of the scale and for determining the difference among the total scores of the variables (gender, age, sport age, etc.); Lisrel 8.8 version package program was used for CFA analyses. Results were presented as n (%), mean and standard deviation values and considered significant at $p<0.05$ level.

Ethical Procedures

The study was initiated with the 29.04.2022 dated and 2022-430 numbered approval of Social and Human Sciences Ethics Committee of Ondokuz Mayıs University.

Results

Table 1

Frequency and Percentage Distribution of the Participants' Demographic Characteristics

Demographic variables		**n**	**%**
Gender	Female	65	55.1
	Male	53	44.9
	Total	118	100.0
Age	11-13	62	52.5
	14-16	56	47.5
	Total	118	100.0
Being in the national team	Yes	64	54.2

	No	54	45.8
	Total	118	100.0
Income status	Moderate	92	78.0
	High	26	22.0
	Total	118	100.0
Sport age	1-2	12	10.2
	3-4	44	37.3
	5-6	31	26.3
	≥7	31	26.3
	Total	118	100.0

In the study, it was found that 55.1% of the participants were female, 54.2% were in the national team, 78.0% perceived their level of income as moderate, 52.5% were between the ages of 11 and 13 and 37.3% had been doing this sport for 3-4 years (Table 1).

Reliability coefficients (Cronbach Alpha) calculated for the internal consistency of the answers given by the athletes who participated in the study were found as 0.939 for the total scale, 0.875 for sport discipline efficacy, 0.766 for psychological efficacy, 0.807 for professional thought efficacy, and 0.802 for personality efficacy. Therefore, the scale was found to be appropriate for evaluating the athlete self-efficacy levels of fencing athletes between the ages of 11 and 16.

Table 2

Confirmatory Factor Analysis Results Related to Self-Efficacy

Factors/Items	**Standard Loads**	**t-value**	**Construct reliability**	**R2**
Sport Discipline Efficacy (SDE)				
SE1	0.78	11.04**	94.7%	0.61
SE2	0.81	11.60**		0.65
SE3	0.79	11.26**		0.62
SE4	0.76	10.69**		0.58
Psychological Efficacy (PE)				
SE5	0.70	9.48**	84.2%	0.49
SE6	0.63	8.20**		0.39
SE7	0.69	9.29**		0.48
SE8	0.68	9.03**		0.46
Professional Thought Efficacy (PTE)				
SE9	0.70	9.48**	80.7%	0.48
SE10	0.77	10.99**		0.59
SE11	0.79	11.46**		0.63
SE12	0.69	9.38**		0.48
Personality Efficacy (PerE)				

SE13	0.69	9.34**		0.48
SE14	0.65	8.67**		0.43
SE15	0.77	10.91**	80.2%	0.60
SE16	0.73	10.09**		0.54

Table 3

Confirmatory Factor Analysis Fit Indices of Self-Efficacy Scale

Fit criterion	**Value**	**Level of fit**
χ2=134,65/sd = 96	1.40	Good fit
RMSEA	0.052	Acceptable fit
NFI	0.97	Good fit
NNFI	0.99	Good fit
CFI	0.99	Good fit
GFI	0.90	Acceptable fit
AGFI	0.86	Acceptable fit

The initial findings obtained from the CFA results applied to determine the construct validity of the Athlete Self-Efficacy Scale show that the scale has acceptable values (Table 2). When the modification indices, which were determined within the scope of CFA analysis and which would improve the fit indices by decreasing the chi-square values, were examined, it was found that there were two modifications that were determined to positively affect the fit indices. For this reason, the relationships between items 1 and 2 and items 9 and 12 among the items under the same factor were freed and the analysis was repeated (Figure 1). As a result of the repeated analysis, it was observed that the fit indices (χ^2/df = 1.40, RMSEA = 0.052, NFI= 0.97, NNFI= 0.99, CFI=0.99, GFI=0.90, AGFI= 0.86) improved (Table 3).

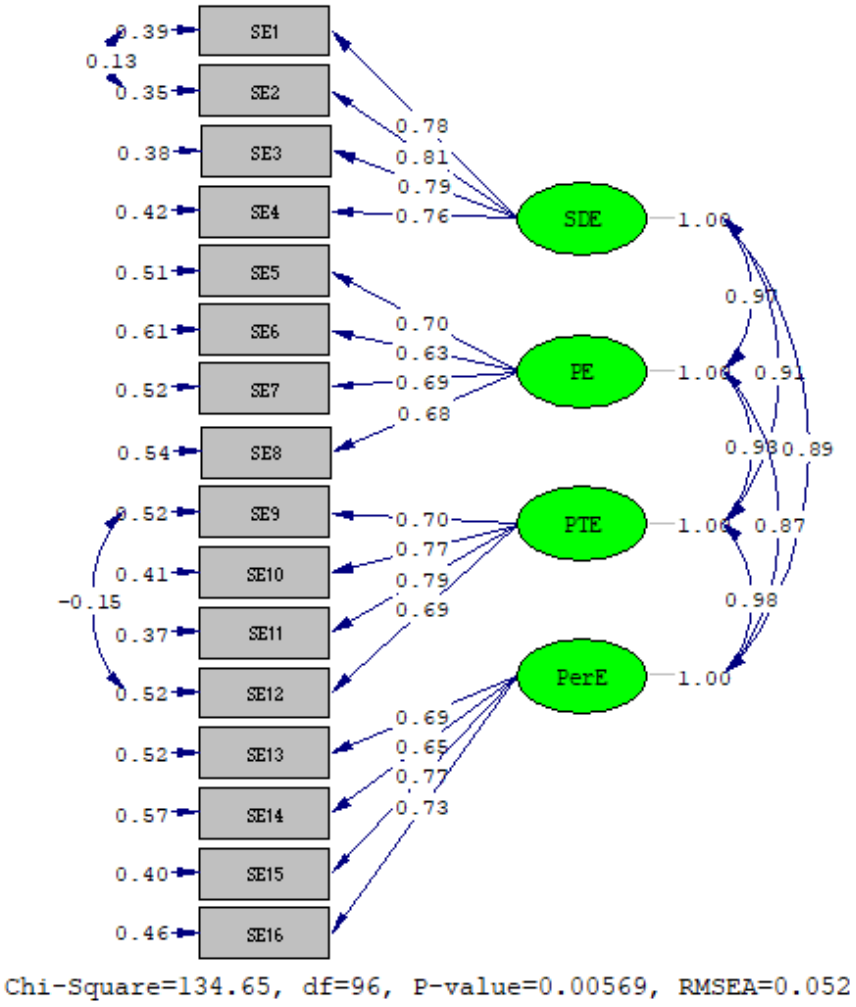

Figure 1 CFA, Factor-Item Relationship

Table 4

Self-Efficacy Levels of Fencers in Terms of Gender

Total scale and factors	Gender	n	Mean	SD	P-value
Athlete Self-efficacy Scale	Female	65	64.52	10.57	0.164
	Male	53	67.15	9.60	
Sport discipline efficacy (SDE)	Female	65	15.60	2.95	0.063
	Male	53	16.60	2.82	
Psychological efficacy (PE)	Female	65	16.32	2.86	0.512
	Male	53	16.66	2.66	
Professional thought efficacy (PTE)	Female	65	16.00	2.94	0.263
	Male	53	16.60	2.86	
Personality efficacy (PerE)	Female	65	16.60	2.81	0.155
	Male	53	17.28	2.26	

No significant difference was found between Athlete Self-efficacy Scale total score and factor total scores of the athletes in terms of the variable of gender (P>0.05; Table 4).

Table 5

Self-Efficacy Levels of Fencers in Terms of Being in the National Team

Total scale and factors	Being in the national team	n	Mean	SD	P-value
Athlete Self-efficacy Scale	Yes	64	68.28	9.94	0.002
	No	54	62.65	9.70	
Sport discipline efficacy	Yes	64	16.70	3.08	0.008
	No	54	15.28	2.54	
Psychological efficacy	Yes	64	17.11	2.64	0.006
	No	54	15.72	2.74	
Professional thought efficacy	Yes	64	17.11	2.69	0.001
	No	54	15.28	2.86	
Personality efficacy	Yes	64	17.36	2.39	0.038
	No	54	16.37	2.74	

Athlete Self-Efficacy Scale total score and subscale total sores were found to be significantly different in terms of being in the national team ($P<0.05$; Table 5). Total scores of athletes who were in the national team were found to be higher than those of the participants who were not.

Table 6

Self-Efficacy Levels of Fencers in Terms of Age Groups

Total scale and factors	Age	n	Mean	SD	P-value
Athlete Self-Efficacy Scale	11-13	62	62.69	8.92	0.001
	14-16	56	69.04	10.53	
Sport discipline efficacy	11-13	62	15.23	2.60	0.001
	14-16	56	16.96	3.01	
Psychological efficacy	11-13	62	15.71	2.72	0.001
	14-16	56	17.32	2.59	
Professional thought efficacy	11-13	62	15.45	2.67	0.001
	14-16	56	17.18	2.91	
Personality efficacy	11-13	62	16.31	2.20	0.007
	14-16	56	17.57	2.83	

Athlete Self-Efficacy Scale total score and factor scores of the participants were found to be significantly different in terms of age groups ($P<0.05$; Table 6). It was found that the athletes in the 14-16 age group had higher total scores than the athletes in 11-13 age group.

Table 7

Self-Efficacy Levels of Fencers in Terms of Level of Income

Total scale and factors	Level of income	n	Mean	SD	P-value
Athlete Self-Efficacy Scale	Moderate	92	64.33	10.27	0.005
	High	26	70.58	8.37	
Sport discipline efficacy	Moderate	92	15.64	2.96	0.004
	High	26	17.50	2.32	
Psychological efficacy	Moderate	92	16.28	2.90	0.157
	High	26	17.15	2.15	
Professional thought efficacy	Moderate	92	15.89	2.84	0.007
	High	26	17.62	2.79	
Personality efficacy	Moderate	92	16.51	2.64	0.002
	High	26	18.31	1.83	

Athlete Self-Efficacy Scale total score and factor scores of the athletes except for the factor of psychological efficacy were found to be significantly different in terms of the variable of level of income ($P<0.05$; Table 7). Total scores of athletes who had high level of income were found to be higher than the athletes who had moderate level of income.

Table 8

Self-Efficacy Levels of Fencers in Terms of Sport Age

Total scale and factors	Sport Age	n	Mean	SD	P-value
Athlete Self-Efficacy Scale	1-2	12	53.92 c	11.39	<0.001
	3-4	44	63.43 b	8.78	
	5-6	31	69.16 a	9.18	
	≥7	31	70.03 a	8.20	
Sport discipline efficacy	1-2	12	13.58 b	2.47	<0.001
	3-4	44	15.11 b	2.72	
	5-6	31	17.10 a	2.56	
	≥7	31	17.29 a	2.73	
Psychological efficacy	1-2	12	13.50 b	3.09	<0.001
	3-4	44	16.14 a	2.63	
	5-6	31	17.19 a	2.60	
	≥7	31	17.39 a	2.14	
Professional thought efficacy	1-2	12	12.17 b	3.46	<0.001
	3-4	44	15.84 a	2.37	
	5-6	31	17.13 a	2.45	
	≥7	31	17.61 a	2.20	
Personality efficacy	1-2	12	14.67 b	3.50	<0.001

3-4	44	16.34 ab	2.22
5-6	31	17.74 a	2.52
≥7	31	17.74 a	2.08

Athlete Self-Efficacy Scale total score and factor scores of the athletes were found to be significantly different in terms of sport age ($P<0.05$; Table 8). It was found that the athletes who had a sport age of 5 years and more had higher total scores than the athletes who had a sport age of 1-2 years.

Discussion and Conclusion, Recommendations

This study was conducted to examine the self-efficacy levels of fencers between the ages of 11 and 16. Fencing is not a widespread sport in Turkey. While there were only 247 registered athletes in 2007, this number increased to more than 4.000 registered and active athletes as of 2019 (www.eskrim.org.tr). However, this is still a low number for a country with a population of more than 83 million as of 2019. Since the sport is not widespread in the country, studies conducted on fencing are also scarce. In the literature review conducted for the study, few studies were found on fencing conducted in Turkey and these studies were not on the self-efficacy levels of athletes. For example, Toros and Duvan (2011) conducted a study on collective efficacy of fencers, Ilıkkan (2021) conducted a thesis on collective competence of student fencers, Kalkan and Zekioğlu (2017) examined the psychological factors affecting performance on fencing players. Although there are more international studies conducted on fencing; similar to the situation in Turkey, these studies do not discuss self-efficacy levels of fencers. Roi and Bianchedi (2008) conducted a study on performance and injury in fencing, Akpinar et al. (2015) examined motor asymmetry in elite fencers, Watanabe et al. (2022) conducted a study on neuromuscular characteristics in junior fencers, Thompson et al. (2022) examined lower extremity injuries in U.S. national fencing team members and U.S. fencing Olympians, Park and Brian Byung examined injuries in elite Korean fencers, Turner et al. (2014) conducted a study on Olympic fencing performance, and Tarragó et al. (2023) examined the temporal demands of elite fencing. As can be seen, most of the studies conducted on fencing in the world focus on physical aspects of fencing. Therefore, considering the lack of studies conducted on the self-efficacy of fencers, the results of the present study were discussed with the results of similar studies conducted in literature.

While there are not many studies conducted on fencers and even fewer studies on the self-efficacy of fencers, there are more studies conducted on self-efficacy of athletes from different sports disciplines. For example, Asan (2023) conducted a study on self-efficacy levels of athletes in different disciplines according to different variables, Doğaner et al. (2020) investigated identity and general

self-efficacy of athletes in terms of different variables, Şimşek (2022) conducted a thesis on the relationship between self-efficacy, psychological well-being, athlete burn-out and stress in elite volleyball players, Çakıroğlu (2021) examined the role of athletic self-efficacy, Şirin et al. (2023) investigated effects of self-efficacy levels of athlete students on academic achievement, Sivrikaya (2019) conducted a study on the effect of self-efficacy on performance of football players, and Gilson et al. (2012) examined the self-efficacy and strength training effort of athletes.

In the present study, self-efficacy levels of fencers were examined in terms of gender and no statistically significant difference was found in the factor of sport discipline efficacy. While no statistically significant difference was found, it was found that male fencers had higher sport discipline efficacy scores than female fencers. Similar to the results of our study, Şimşek (2022) found a significant difference in the factor of sport discipline efficacy, with male athletes having higher scores. Also, similar to the results of our study, Asan (2023) did not find significant difference between participants' athlete self-efficacy levels in his study.

Another variable examined in the present study was participants' being in the national team. Statistically significant difference was found between the mean total scale score and mean scores of all factors in terms of the variable of being in the national team. It was found that the athletes in the national team had higher scores than the athletes who were not. Athletes in national teams are a selected group and they have high skills and abilities and they are respected in the society. These characteristics are effective in national team athletes' having higher self-efficacy beliefs. Different from the results of our study, Şimşek (2022) did not find statistically significant difference between self-efficacy levels of athletes in terms of the variable of being in the national team. This difference may be due to the different age groups of the participants in both studies. Şimşek (2022)'s study was conducted on adult participants, while our study was conducted on adolescents.

The third variable examined in the present study was participants' age. Statistically significant difference was found between the mean total scale score and mean scores of all factors in terms of the variable of age. It was found that the athletes between the ages of 14 and 16 had higher mean scores in all of the factors and the total scale. Based on this result, it can be said that as children get older, they have more belief in their efficacy. In Şimşek (2022)'s study, statistically significant difference was found between the mean total scale scores, sport discipline efficacy mean score and psychological efficacy mean score. Similar to the results of our study, it was found in Şimşek (2022)'s study that athletes had higher scores as they got older.

The fourth variable examined in the present study was participants' sport age. Mean total scale score and mean scores of all factors were found to be statistically significantly different in terms of

the variable of sport age. It was found that the athletes with a sport age of 5 and higher years had the highest mean scores in all of the factors and the total scale. Based on this result, it can be said that as athletes spend more years in their discipline, their self-efficacy beliefs increase. Similarly, in Şimşek (2022)'s and Yıldız's (2022) study, the participants had higher mean scores from all factors of the scale and the total scale as their experience in their sports discipline increased. It is an expected result that athletes' self-efficacy beliefs are lower in individuals with the least sports experience. It can be said that self-efficacy and sports experience are positively correlated. As sports experience increases, individuals make a certain progress. They use their cognitive and psychomotor skills better, and this causes an increase in their self-efficacy beliefs. However, there are also studies which did not find significant difference in terms of sports experience (Çetinoğlu, 2016; Ertoğan, 2017).

The last variable examined in the study was income status as perceived by the participants. Statistically significant difference was found between the mean total scale score and mean scores of all factors except for the psychological efficacy factor in terms of the variable of income status. It was found that the athletes who perceived their income status as high had higher self-efficacy scores than the athletes who perceived their income status as moderate. Similarly, it was found in Sakarya (2013)'s study that income status had an effect on adolescents' self-efficacy levels. High level of income can provide convenience in increasing the diversity of areas where individuals can evaluate their self-efficacy. Different from the results of our study, it was found in Doğaner et al. (2020)'s study that income status did not affect athletes' self-efficacy levels.

As a conclusion, athlete self-efficacy levels of fencers were found to increase with the increase in age and sports experience. It can be seen that the group with the least sports experience has the lowest athlete self-efficacy beliefs. Sports experience contributes positively to the sports performance of individuals, creating awareness about where individuals can better use their knowledge and skills and under what conditions they can be successful. Therefore, as sports experience increases, self-efficacy beliefs also increase.

Therefore, when the results of the present study are evaluated, it can be recommended to conduct activities that will increase the self-efficacy levels and perceptions of students from the beginning of the education process, especially in physical education and sports classes. Self-efficacy can be taught to students as a concept in the education process to make students become aware of and increase their self-efficacy levels through various studies. In addition to these, support can be given by experts to increase the feelings of self-efficacy, taking into account age groups.

Ethics Committee Permission Information

Ethics review board: Ondokuz Mayıs University Social and Human Sciences Ethics Committee

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Statement of Researchers' Contribution Rates

Study Design: AE, SÇ

Data Collection: AE

Statistical Analysis: SÇ

Data Interpretation: AE, SÇ

Preparing the text: AE, SÇ

Literature Review: AE

Conflict of Interest

Authors have no conflict of interest to declare.

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