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THE EXERCISE DEPENDENCY AND DRIVE FOR MUSCULARITY OF INDIVIDUALS WHO EXERCISE REGULARLY

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Abstract:
The purpose of this investigation is to reveal the drive for muscularity and exercise dependence of individuals who do physical activities for at least a year. 126 women and 214 men were recruited from gyms in Bolu. The ages of the participants ranged from 18 to 40. The Drive for Muscularity Scale was used, which was created by McCreary and Sasse in 2000 and translated to Turkish by Yıldız in 2015. To measure exercise dependency of individuals, the Exercise Dependency Scale developed by Tekkurşun *et al.*, in 2018 was used. In the result of this survey, a positive, moderately significant relationship was noticed between the drive to be muscular and exercise dependence, additionally, gender, sports history, weekly exercise duration, age and type of exercise were also correlated to the desire for individuals who exercise to be muscular and exercise dependency. Likewise, a significant difference in exercise dependencies was determined. Furthermore, it was concluded that 14% to 24% of the factors related to exercise addiction may be explained by the desire to be muscular. At the exercise dependence scores in our study in general, we may say that individuals are evaluated as "normal" in all independent variables except for one sub-dimension.

Keywords: drive for muscularity, exercise dependence, gender, age, exercise duration, exercise types

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1. Introduction

Nowadays, physical appearance has become a matter of effort for both men and women. While women believe that their ideal body size should be thinner and more elegant, men believe that they should have a more muscular and structured body. Individuals who have the ideal body perception for themselves see physical activities as a way to gain it. While planned, regular physical activities may help them to have a healthy life however, excessive amounts of exercise may cause some negative consequences (Hausenblas *et al.*, 2008; Hausenblas and Downs, 2002).

Exercise dependence (ED) is defined as "*a craving for exercise that results in uncontrollable excessive physical activity and manifests in physical symptoms, psychological symptoms or both"* (Hausenblas and Downs, 2002, p: 90).

In addition to exercise dependence, individuals who exercise also have a wish to be more physically muscular or structured. McCreary *et al.* (2005) express the Drive for Muscularity (DFM) as "*a desire to increase muscularity level*".

According to Edward, Tod and Molnar (2014), high levels of DFM are associated with exercise dependence, which means that the situations are related to each other in physical activities. Thus, we may consider ED and the DFM as two situations that interact with and trigger each other in physical activity environments.

Studies showed that the relationship between age and ED declines with age, as person gets older, they become less dependent (Hale *et al.*, 2010). Also, ED symptoms positively correlated with the length of involvement in physical activity and exercise frequency (Karademir, 2021; Costa *et al.*, 2013).

When we look at the studies (Hoffman, Garcia and Worschburger, 2018), it can be said that, besides women, men also experience serious body image concerns. With this study, we wanted to see the concern differences according to gender.

The majority of studies on DFM and ED in Turkey have focused on male participants, and female participants have been ignored. With this study, we wanted to include and expand many exercises that men and women can do together in the gym, such as reformer, bodybuilding, Pilates, weight training, and many more, to both men and women. We will also learn more about ED and the desire to be muscular in Turkish culture among both male and female participants.

This study has several aims. The leading aim is to determine the levels and relation of exercise dependency and muscularity desire in individuals who exercise regularly. Other aims are to determine the role of individuals' age, gender, exercise history, activity types and activity duration on exercise dependence and muscularity desire.

2. Material and Methods

2.1 Participants

214 men and 126 women participated in this research. Individuals were recruited from gyms in Bolu/Turkey in the fall of 2023. All participants were over 18 years of age and had a history of regular exercise for at least 1 year. Participation was on a voluntary basis.

2.2 Research Design

In the research, two scales, the Drive for Muscularity Scale (DMS) and the Exercise Dependence Scale (EDS) were tested.

In the first section of the study, participants answered questions about their age, gender, the type of exercise they do, how many hours a week they exercise, how often they exercise, and whether they have an exercise history. Here, we divided the exercise types of the participants into two groups. While the participants in the first group are called "body shaping (BS)" because they do activities such as Pilates, Zumba, and Reformer, the second group consists of people who do weight training, boxing or fitness exercises for "bodybuilding (BB)" purposes.

The DMS was created by McCreary and Sasse in 2000 and was translated into Turkish by Ali Yıldız in 2015. The DMS scale has 15 questions. The scale measures individuals' attitudes about their muscularity and craving to be more muscular. Items of the scale are reverse-scored so that higher scores specify a greater drive for muscularity. The scale has two subscales, Muscularity Oriented Body Image Attitude (MOBIA) and muscle development behaviors (MDB). In the factor analyses obtained while adapting the scale to Turkish, two subscales compatible with the original study were identified. Those are attitude being muscular (questions 1, 7, 9, 11 - 15) and muscular development training behavior (questions: 2 - 6, 8). Question number 10, which the authors left the decision of other researchers in the original study, was not used here.

The EDS contains 17 questions and was developed by Tekkurşun Demir *et al.* in 2018. The EDS has three subscales. These are 'Too Much Focus and Emotion Change' (TMFEC), 'Postponement of Individual-Social Needs and Conflict' (PI-SNC), and the third one is 'Tolerance Development and Passion' (TDP). Scores from the scale are evaluated as between 1 - 17 as "normal", 18 - 34 as "slightly risky", 35 - 51 as "risky", 52 - 69 as "dependent", and 70 - 85 as "highly dependent", respectively. The Cronbach's alpha was found to be 0.90.

2.3 Statistical Analysis

For the analysis of the data, the single-factor MANOVA was used to measure the DFM and ED of individuals who exercise. Furthermore, the relationship between ED and the DFM data was analyzed with the Pearson correlation test and a positive relationship was observed. One of the sub-problems of the study was to find out the predictive effect of the DFM on ED. For this purpose, a simple linear regression test was used.

3. Results

Table 1: Results of Pearson correlation of DFM, TMFEC, PI-SNC and TDP

		DFM	TMFEC	PI-SNC	TDP
Drive for Muscularity (DFT)	**Pearson Correlation**	1	0.375**	0.405**	0.494**
	Sig. (2-tailed)		0.000	0.000	0.000
	N	340	0.340	340	340

There is a significant, positive and moderate relationship between DFM and sub-scales of ED: TMFEC (r = 0.375), PI-SNC (r = 0.405), and TDP (r = 0.495).

Table 2: Comparison of drive for muscularity and exercise dependence according to gender

	Gender	N	$\bar{X}$	S	df	F	p
MOBIA	Male	214	27.037	7.589	1-338	9.40	0.002*
	Female	126	24.294	8.584			
MDB	Male	214	21.145	6.255	1-338	47.73	0.000*
	Female	126	16.191	6.605			
DFM (total)	Male	214	48.182	11.830	1-338	31.10	0.000*
	Female	126	40.484	13.046			
TMFEC	Male	214	25.687	5.497	1-338	0.078	0.780
	Female	126	25.516	5.356			
PI-SNC	Male	214	15.935	4.903	1-338	2.59	0.109
	Female	126	15.071	4.556			
TDP	Male	214	12.285	3.764	1-338	6.75	0.010*
	Female	126	11.167	3.947			

In accordance with the MANOVA test for Table 2 results, there is a significant difference between gender and both ED and DFM (Wilks Lambda (l) = .861, $F_{(5-334)} = 10.80$, $p < 0.01$). MOBIA ($F = 9.40$, $p < 0.05$), MDB ($F = 47.73$, $p < 0.05$), and total DFM of men ($F = 31.10$, $p < 0.005$) are found to be significantly different from that of women. In addition, there is a significant difference in favors of men in TDP ($F = 6.75$, $p < 0.05$). Also, men and women are in the "low-risk group" in terms of TMFEC sub-scales in the 18 - 34 range, and this group is in the "normal group" for PI-SNC in the range of 1 - 17.

Table 3: Comparison of drive for muscularity and exercise dependence according to sport background

	Exercise Background	N	$\bar{X}$	S	df	F	p
MOBIA	Yes	262	26.277	7.583	1-338	1.17	0.280
	No	78	25.154	9.528			
MDB	Yes	262	20.290	6.526	1-338	25.40	0.000*
	No	78	16.013	6.758			
DFM (total)	Yes	262	46.569	12.094	1-338	10.97	0.001*
	No	78	41.167	14.348			
TMFEC	Yes	262	25.519	5.448	1-338	0.42	0.517
	No	78	25.974	5.422			
PI-SNC	Yes	262	16.141	4.727	1-338	14.35	0.000*

	No	78	13.846	4.596			
TDP	Yes	262	11.981	3.640	1-338	0.93	0.335
	No	78	11.500	4.546			

Results of the MANOVA test in Table 3 showed that ED and DFM scores create a significant difference according to exercise background (Wilks Lambda (l) = 0.882, $F_{(5-334)}$ = 8.915, $p < 0.01$). It can be seen that MDB (F = 25.40, $p < 0.05$) and total DFM scores of participants with a sports background differ significantly compared to participants with no sports background (F = 10.97, $p < 0.05$). On the other hand, PI-SNC scores are higher for individuals with exercise backgrounds (F = 14.35, $p < 0.05$). Additionally, both groups are in the "low-risk group" for TMFEC sub-scales and in the "normal group" for PI-SNC.

Table 4: Comparison of drive for muscularity and exercise dependence of individuals according to their exercise duration in a week

	Weekly Exercise Duration (hours)	**N**	**$\bar{X}$**	**S**	**df**	**F**	**p**
MOBIA	1-3	69	24.841	8.031	3-336	1.65	.179
	4-7	136	25.927	7.643			
	8-10	88	25.932	7.488			
	10 +	47	28.192	10.006			
MDB	1-3	69	15.435	6.630	3-336	12.42	0.000*
	4-7	136	19.537	6.234			
	8-10	88	20.387	5.914			
	10 +	47	22.319	7.918			
DFM (total)	1-3	69	40.275	12.243	3-336	6.62	0.000*
	4-7	136	45.463	12.088			
	8-10	88	46.318	11.995			
	10 +	47	50.511	14.916			
TMFEC	1-3	69	24.652	5,685	3-336	6.16	0.000*
	4-7	136	25.677	4,412			
	8-10	88	24.761	6,346			
	10 +	47	28.511	5,047			
PI-SNC	1-3	69	14.232	4.902	3-336	2.56	0.055
	4-7	136	16.140	4.535			
	8-10	88	15.773	4.792			
	10 +	47	15.830	5.092			
TDP	1-3	69	10.073	4.184	3-336	8.63	0.000*
	4-7	136	11.934	3.269			
	8-10	88	12.330	3.777			
	10 +	47	13.469	4.242			

The MANOVA results reveal that there is a significant difference in DFM and ED scores according to exercise duration in a week (Wilks Lambda (l) = 0.829, $F_{(15-916)}$ = 4.29, $p < 0.01$). Individuals who do sporting activities 10 hours or more in a week have higher scores for the MDTB sub-scale (F = 12.42, $p < 0.05$) and total DM scores. (F = 6.62, $p < 0.05$). However, in terms of ED, it can be seen that individuals who do sport 10 hours or more showed higher scores in TMFEC and TDP (F = 6.16, $p < 0.05$) when compared to other

groups (F = 8.63, p < 0.05). Again, all participants who engage in TMFEC are classified as the "low risky group", while PI-SNC scores are classified as the "normal group".

Table 5: Comparison of drive for muscularity and exercise dependence due to age

	Age	N	$\bar{X}$	S	df	F	p
MOBIA	18-28	214	26.967	7.975	2-337	4.71	0.010*
	29-39	85	24.977	7.888			
	40+	41	23.244	8.215			
MDTB	18-28	214	21.065	6.441	2-337	26.41	0.000*
	29-39	85	17.482	5.983			
	40+	41	13.927	6.627			
DFM (total)	18-28	214	48.033	12.390	2-337	16.57	0.000*
	29-39	85	42.459	11.954			
	40+	41	37.171	12.337			
TMFEC	18-28	214	25.869	5.477	2-337	.589	0.555
	29-39	85	25.224	5.491			
	40+	41	25.171	5.162			
PI–SNC	18-28	214	16.094	4.950	2-337	3.08	0.047*
	29-39	85	14.636	4.169			
	40+	41	15.146	4.892			
TDP	18-28	214	12.196	3.848	2-337	6.32	0.002*
	29-39	85	12.000	3.858			
	40+	41	9.902	3.455			

The results of the MANOVA display that there is a significant difference between DFM and ED according to age (Wilks Lambda (l) = 0.823, $F_{(10-666)} = 6.79$, p < 0.01). Participants between the ages 18-28 evaluated in the total DFM (F = 16.57, p < 0.05) and sub-scales as a MOBIA (F = 4.71, p < 0.05) and MDB (F = 26.41, p < 0.05) were found to be significantly different from other age groups. However, in terms of ED, PI-SNC scores and TDP scores were significantly higher among 18 - 28 years. On the other hand, TMPEC scores showed that individuals were classified as a "low risky group", while PI-SNC and TDP scores are classified as a "normal group".

Table 6: Comparison of drive for muscularity and exercise dependence according to exercise type

	Purpose of Exercise	N	$\bar{X}$	S	df	F	p
MOBIA	BS	101	23.951	8.638	1-338	9.70	0.000*
	BB	239	26.895	7.669			
MDB	BS	101	15.218	6.605	1-338	60.98	0.000*
	BB	239	21.038	6.137			
DFM (total)	BS	101	39.169	13.189	1-338	36.63	0.000*
	BB	239	47.933	11.763			
TMFEC	BS	101	25.287	5.463	1-338	.549	0.459
	BB	239	25.766	5.432			
PI–SNC	BS	101	14.594	4.893	1-338	6.64	0.010*
	BB	239	16.046	4.688			

TDP	BS	101	11.287	4.222	1-338	3.30	0.700
	BB	239	12.117	3.685			

Note: BS: Body Shaping, BB: Body Building.

MANOVA results tabulated in Table 6 displayed that the DFM and ED of individuals significantly differ according to exercise types (Wilks Lambda (l) = 0.832, $F_{(5-334)} = 13.51$, $p < 0.01$). Participants who do exercise for bodybuilding (BB) purposes significantly differ from participants who exercise to shape (SB) their bodies in both total scores ($F = 36.63$, $p < 0.05$), sub-scales ($F = 9.70$, $p < 0.05$), and of DFM ($F = 60.98$, $p < 0.05$). In terms of ED, it was determined that those who exercise for BB have a significant difference compared to individuals who SB in PI-SNC. On the other hand, individuals are in the "low-risk group" in TMFEC and the "normal group" for PI–SNC and TDP.

Table 7: Results of multiple regression analyses with DFM and TMFEC

Model	R	R^2	Adj. R^2	Std. Err. of the Estimate	F	p
1	0.375[a]	0.140	0.138	5.049	55.249	0.000*

[a] Predictor: desire to be muscular (Constant)

When Table 7 is examined, one may notice DFM is positive and a significant predictor of TMFEC ($R = .375$, $R^2 = .14$, $F = 55.249$, $p < 0.1$). By this finding, one may see that there is 14% of the total variance regarding to TMFEC, and it can be explained by the DFM.

Table 8: Results of multiple regression analyses with DFM and PI-SNC

Model	R	R^2	Adj. R^2	Std. Err. of the Estimate	F	P
1	0.405[a]	0.164	0.162	4.384	66.452	0.000*

[a] Predictor: desire to be muscular (Constant)

When Table 8 is examined, it is seen that the DFM is a positive and significant predictor of PI–SNC ($R = 0.405$, $R^2 = 0.164$, $F = 66.452$, $p < 0.1$). According to this finding, it can be stated that 16% of the total variance regarding the PI–SNC dimension can be explained by the DFM.

Table 9: Results of multiple regression analyses with DFM and TDP

Model	R	R^2	Adj. R^2	Std. Err. of the Estimate	F	p
1	0.494[a]	0.244	0.241	3.366	108.923	0.000*

[a] Predictor: desire to be muscular (Constant)

Table 9 shows that DM is a positive significant predictor of TDP ($R = 0.494$, $R^2 = 0.244$, $F = 108.923$, $p < 0.1$). According to this finding, it can be indicated that 24% of the total variance regarding the TDP dimension can be reported by the DFM.

4. Discussion

The major objective of this study is to determine the levels and relation of exercise dependence and drive for muscularity of individuals who exercise regularly. Other purposes are to determine the role of individuals' age, gender, exercise history, activity types and activity durations on exercise dependency and drive for muscularity.

In this study, we found a significant (positive), moderate relationship between DFM and ED, which is steady with the results obtained by other studies: Hale *et al.* (2010) DFM scores predict ED scores, and their study displayed positive and moderate correlation between ED and DFM. Edwards *et al.* (2014) and Liu *et al.*, (2019) examining ED and DFM relationship studies also reveal similar results as ours.

Studies on ED and DFM are generally conducted with male participants. The number of studies conducted with both genders is relatively low. Our findings regarding ED indicate that men have higher ED scores compared to women for TDP but not for TMPEC and PI-SNC. In addition, all of the values showed that the participants were not at risk level for ED. Although there are studies on this content that show differences between men and women in ED, the majority of studies have found results consistent with ours. It is quite understandable that men and women who go to gyms, even though they have varied desires, do not have different levels of ED. Consistent with the past studies; we found significant differences for muscularity based on gender. This means men are exercising to be more muscular appearance, whereas women participate in activities for different purposes. Scores for DFM (T), MDB and MOBIA reveal that men have a higher desire to be muscular than women. Our results matched with McCreary, Saucier and Courtenay (2005); Ata (2021); Hale (2013); Costa (2013); Hamurcu (2023); Kayhan *et al.* (2021) and Olave *et al.* (2021).

Our findings about age have common results that, younger individuals (ages 18 - 28) had the highest DFM and ED. According to Szabo (2000), as cited by Hale *et al.* (2010), exercise dependence drops with age as older individuals have more balanced lifestyles. Hale *et al.* (2010) found that younger lifters lift more often than older lifters and young people evolve higher levels of DFM and may be at risk for developing more ED. Bucchianeri *et al.* (2014) found adult men exhibited significantly greater DFM than other age groups. Considering that the age range of 18-28 is a period in which appearance and body perception are important. It is understandable that individuals in these ages have high ED and DFM values. Besides, as people get older, their physical activity level decreases gradually and they participate less in exercises.

The results we obtained for both ED and DFM values of individuals who exercised 10 hours or more per week were determined to be higher than those of individuals in other groups: Karademir (2021); Costa *et al.* (2013); Arslanoğlu *et al.*, (2021) and Kayhan *et al.*, (2021) found that exercise frequency was associated with exercise dependence. As Ata (2021) said, as the frequency of going to the gym increases, DFM also increases. As all these studies and ours show, the increase in the frequency of people participating in exercises is closely related to the increase in ED and DFM levels.

Our findings indicated that individuals with exercise backgrounds had higher DFM (T) scores than individuals with no exercise history. Also, individuals with an exercise background had higher PI-SNC scores when compared to individuals with no exercise background. There are no other differences in ED and DFM for other scores. Karademir (2021) and Demirel (2020) found persons with exercise backgrounds had higher ED, while Hale and others (2013) did not find any difference in ED between novice and experienced bodybuilders. According to Housenblas and Downs (2002), as cited in Hale *et al.* (2013), exercise history alone is not an adequate predictor of ED. Cicioğlu *et al.* (2019) stated that it is not surprising that individuals who exercise more regularly and for a longer time have a higher exercise addiction.

In our study, people were divided into two groups according to exercise types: individuals who participated in activities like Zumba, Pilates, reformer, etc., categorized as body shaping (BS), while individuals who were active as weight lifting, fitness, and powerlifting categorized as bodybuilding (BB). Findings showed that in all categories, the BB group had higher scores for ED and DFM than BS. According to Hale *et al.* (2010), bodybuilders and power lifters tend to become to be riskier for developing ED behaviors. In addition, Hale *et al.* (2013) found different levels of ED among bodybuilders, fitness lifters and recreational weightlifters.

Finally, when we looked at how DFM predicts ED, we found that DFM is a positive and significant predictor of ED. As Edward, Tod, and Molnar (2014) noted, high levels of DFM are associated with exercise dependence, meaning that the conditions are interrelated in physical activity. Therefore, it is reasonable to think that ED and DFM are interdependent in order to be improved by individuals who exercise regularly.

5. Conclusion

This study found a positive and moderate significant relation between DFM and ED. While no gender difference was found in terms of ED, a significant difference was found in terms of DFM. Moreover, individuals between the ages of 18 - 28 had the highest level of ED and DFM when compared to other age groups. Sports background has influenced DFM total, MDB and PI-SNC levels. Individuals who exercise regularly for body-building purposes had higher levels of DFM and ED than individuals than those who exercise for body shaping. When we look at the exercise dependence scores in our study in general, we may say that individuals are scale evaluated as “normal” in all independent variables except for one sub-dimension. The TMFEC sub-dimension for exercise dependence is in the low-risk category in all variables.

Ethical Approval

Ethics Committee: Bolu Abant Izzet Baysal University Human Research Ethics Committee in Social Sciences, No: 2023/79, 02.09.2023.

Conflicts of Interest Statement

There is no financial or personal conflict of interest on the part of the authors in this study.

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