Akdeniz Spor Bilimleri Dergisi

Mediterranean Journal of Sport Science

ISSN 2667-5463

The Effect of 12-Week Strength Training Intervention with Mastery Motivational Climate on Some Performance Parameters

Muhammet Cihat ÇİFTÇİ, Salih ÇABUK, Baki YILMAZ

DOI: https://doi.org/10.38021asbid.1253811

ORIJINAL ARTICLE

Ankara Yıldırım Beyazit University, Faculty of Sport Science, Ankara/Türkiye

Abstract

The purpose of this study was to investigate the impact of a 12-week strength training intervention implemented within a mastery motivational climate on specific performance parameters in sedentary individuals. A repeated measures design was used in the study. Participants underwent performance tests, which included squat jump, depth jump, and sit-and-reach test. A total of 29 sedentary participants (age = 21.79±1.08) were randomly assigned to the experimental (EG; n= 14) and control (CG; n= 15) groups. In EG, the perceived motivational climate during the intervention program was manipulated. The Task and Ego Orientation in Sport Questionnaire (TEOSQ) was utilized to examine the extent to which participants were influenced by the manipulated motivational climate. In the EG, significant statistical differences were noted in the pre-test and post-test values for total scores and task orientation scores on the TEOSQ (p= 0.001, d= 0.979; p= 0.002, d= 1.087, respectively). Conversely, no significant statistical differences were observed in the CG ($p < 0.05$). No significant interaction effects were founded between groups and over time for the natural logarithmic-transformed squat jump height (p= 0.590, η^2= 0.011), natural logarithmic-transformed depth jump height (p= 0.810, η^2= 0.002), ground contact time in depth jump (p= 0.506, η^2= 0.017), reactive strength index (p= 0.324, η^2= 0.036), and sit-and-reach test (p= 0.144, η^2= 0.077). The findings are deliberated within the framework of pertinent literature.

Keywords: Exercise Motivation, Strength Training, Reactive Strength Index, Exercise and Sports Psychology.

Corresponding Author:
Muhammet Cihat ÇİFTÇİ
mcciftci@ybu.edu.tr

12 Haftalık Ustalık Motivasyonel İklimde Uygulanan Kuvvet Antrenmanı Müdahalesinin Bazı Performans Parametreleri Üzerine Etkisi

Öz

Araştırmada ustalık motivasyonel iklimde uygulanan 12 haftalık kuvvet antrenmanı müdahalesinin sedanter bireylerde bazı performans parametreleri üzerine etkisini incelemek amaçlanmıştır. Çalışmada tekrarlanan ölçüm tasarımı kullanılmıştır. Katılımcılara performans testi olarak squat sıçraması, derinlik sıçraması ve otur-uzan testi uygulanmıştır. Toplam 29 sedanter katılımcı (yaş = 21.79±1.08) seçkisiz yöntemle deney (EG; n= 14) ve kontrol (KG; n= 15) grubuna ayrılmıştır. EG'nin müdahale programı esnasında algıladıkları güdüsel iklim manipüle edilmiştir. Katılımcıların manipüle edilen güdüsel iklimden ne düzeyde etkilendiğini incelemek için Sporda Görev ve Ego Yönelimi (TEOSQ) ölçeği kullanılmıştır. Deney grubunda TEOSQ ölçeğinde aldıkları toplam ve görev yönelimi alt boyutunda puan ortalamaları açısından ön test ve son test değerleri arasında istatistiksel olarak anlamlı fark bulunmuştur (sırasıyla p= 0.001, d= 0.979; p= 0.002, d= 1.087). Kontrol grubunda ise istatistiksel olarak anlamlı bir farklılık bulunamamıştır ($p < 0.05$). Logaritmik dönüşümlü squat sıçrama yüksekliği (p= 0.590, η^2= 0.011), logaritmik dönüşümlü derinlik sıçraması yüksekliği (p= 0.810, η^2= 0.002), derinlik sıçramasında zemine temas süresi (p= 0.506, η^2= 0.017), reaktif kuvvet indeksi (p= 0.324, η^2= 0.036) ve otur uzan testi (p= 0.144, η^2= 0.077) değişkenleri açısından gruplar arasında ve zaman içerisinde anlamlı bir etkileşim etkisi tespit edilememiştir. Bulgular ilgili literatür çerçevesinde tartışılmıştır.

Anahtar kelimeler: Egzersiz Motivasyonu, Kuvvet Antrenmanı, Reaktif Kuvvet İndeksi, Egzersiz ve Spor Psikolojisi

Received:
27.02.2022

Accepted:
20.12.2023

Online Publishing:
28.12.2023

Introduction

Achieving a healthy and balanced lifestyle involves ensuring a harmonious interplay between mental, physical, and emotional aspects. To accomplish this, many individuals endeavour to emphasize their dietary choices and maintain a regular regimen of physical exercise (Arı et al., 2020; Dursun et al., 2020). Regular participation in physical activity does not only enhances physiological health but also serves as an effective tool for preventing chronic diseases (Department of Health and Human Services, 2000; Blair et al., 1989). In a longitudinal study, it has been proposed that incorporating light-intensity physical activity into a sedentary lifestyle may have a beneficial impact on both overall mortality and fatalities related to cardiovascular diseases (Dohrn et al., 2018). Resistance training, a method recommended by national health organizations such as the American College of Sports Medicine and the American Heart Association, is a popular exercise for adolescents, healthy adults, older individuals, and clinical populations (individuals with cardiovascular or neuromuscular diseases) (Kraemer and Ratamess, 2004). A series of studies have been encountered proposing the positive benefits of various strength programs on body weight, body mass index (BMI), percentage of body fat, lean mass, flexibility, and strength values in sedentary individuals of various ages. (Kyrölainen et al., 2018; Brown and Harrison, 1986; Chamberlin et al., 2017; Mazini et al., 2018; Santos et al., 2010; Keeler et al., 2001; Torres-Banduc et al., 2020; Monteiro et al., 2008; Cureton et al., 1998; Öktem and Akın, 2022; Ivey et al., 2001; Barbosa et al., 2002). Training designed for any purpose is generally organized to offer athletes/individuals the chance to practice and improve their skills. The training approach, aligned with an individual's desired achievement goals, can influence the person's motivation (Van de Pol and Kavussanu, 2011). In this context, it is crucial to comprehend the structuring of strength and conditioning programs that aid in the enhancement of intrinsic motivation. Research investigating motivational processes within the context of success underscores the pivotal role of climate in fostering positive experiences in sports, a phenomenon clearly evident in the psychological literature (Braithwaite et al., 2011; Chamberlin et al., 2017). Motivational studies in the field of sports are typically approached from a social-cognitive perspective (Gencer, 2021, Gökalp and Tepeköylü). In this context, success is defined as the achievement of a goal that is personally or socially valued within the realm of physical activity (Roberts et al., 2012). The achievement goal theory, characterized by a social-cognitive perspective, places ability at the core of efforts towards success and underscores that individuals can address it in various ways (Gencer, 2021). Although the achievement goal theory has its roots in the field of education, numerous sports scientists have scrutinized fundamental principles within physical activity environments, encompassing sports and physical education.

The achievement goal theory has been incorporated into the conceptual framework of the motivational climate term, entailing the scrutiny of environmental factors that guide individuals' capabilities toward distinct objectives (Braithwaite et al., 2011; Gencer, 2021). An approach to defining an individual's ability involves the perception of self-improvement and mastery of skills, while another approach entails comparing one's own ability with that of different individuals. To state it more explicitly, individuals associated with the first description strive to improve and master tasks, while those corresponding to the second description aspire to surpass others. Within this context, motivational climate is articulated as the pursuit of maximum effort in the physical domain, the selection of challenging tasks, and personal development. In contrast, performance climate is characterized by the aspiration to outperform others (Braithwaite et al., 2011; Hassan and Morgan, 2015). Ames and Archer (1988) have identified specific environmental characteristics and instructional cues that could potentially impact an individual's goal approach in an achievement environment (Ames and Archer, 1988). These are based on Epstein's (1989) six-dimensional TARGET (Task, Authority, Recognition, Grouping, Evaluation, and Time) structures (Johnson et al., 2019).

Despite evidence supporting the potential advantages of establishing a climate in physical activity environments, there has been observed that the mastery motivational climate design is more commonly utilized in the context of physical education applications (Barkouskis et al., 2008; Digelidis et al., 2003; Deci and Ryan, 2002). In addition to, sports scientists have posited that the social context in physical activity environments is associated with individuals' motivation and potential outcomes related to exercise. Nevertheless, there is a notable scarcity of studies investigating the social contexts of exercise environments (Brown et al., 2017). This study aims to contribute to the literature by designing physical activity interventions that take into account the motivational drives of sedentary individuals, with the goal of organizing more suitable exercise programs for them. Considering all the information, the study aims to investigate the impact of a 12-week strength training intervention implemented within a mastery motivational climate on specific performance parameters in sedentary individuals.

Material and Methods

The study was conducted in accordance with the principles outlined in the Helsinki Declaration and approved by the ethics committee of the Ankara Yildirim Beyazit University (No: 25; Date: 30.07.2021).

Research Model

The model of this study was repeated measurement design. Repeated measures design is a research design that involves multiple measurements of the same variable under different conditions or over two or more time periods on the same subjects. In this study, researchers utilized a randomized controlled 2x2 (group x time) factorial design to examine the effects of two independent variables on the dependent variables. Factorial designs allow for the examination of the main effects of independent variables on dependent variables (Passer, 2020).

Research Group

Thirty-two sedentary university students had volunteered as participant. However, during 12-week intervention program, 2 participants from the EG, and 1 participant from the CG, expressed a desire to discontinue due to specific personal reasons. In the study, one of the exclusion criteria was defined as attending all sessions of the intervention program. Therefore, analysis of the study was made on 29 participants. All the participants were divided into EG (n=14) and CG (n=15). In the EG, consisting of 4 man and 10 women, the mean values for age (years), body height (cm), body weight (kg), and body mass index (BMI; kg/m^2) were 22.21±0.89, 166.78±7.78, 60.7±8.95, and 21.79±2.68, respectively. On the other hand, in the CG, consisting of 4 man and 11 women, the mean values for age, body height, body weight, and BMI were 21.40±1.12, 164.94±9.50, 57.29±9.44 and 20.96±2.00, respectively (Table 3).

Tests and Measurements

Body Weight, Height, Body Mass Index, and Body Fat Percentages

Body weight and body fat percentage were measured through a body composition analyser (Tanita MC-780 ST) with an accuracy of ±0.1 kg. The body height was measured using a Holtain brand portable stadiometer, a height measuring device with an accuracy of ±1 mm. The measurements were taken while the participants were in their athletic attire and barefoot, assuming an anatomical stance. The obtained values for body weight were recorded in kilograms (kg), body fat percentage in percentage (%), and body height in centimetres (cm). BMI was calculated by dividing the body weight value in kilograms by the square of the height value in meters ($\frac{Body\ Weight\ (kg)}{Height^2\ (m)}$).

Squat Jump Height (SJH)

SJH was determined using the “Squat Jump” protocol available in the Optojump Next® system (Bolzano, Bozen, Italy). The Optojump Next® system, which measures the flight time of vertical jumps with an accuracy of 1/1000 seconds (1 kHz), predicts jump height using ground contact time and flight time, based on the **Equation 1** (Byrne et al., 2017; Glatthorn et al., 2011).

$$\frac{(9.81 \times flight\ time)^2}{8}$$

Equation 1. Jump height formula.

Participants were instructed to stand upright inside the photocell device, which was positioned on a flat surface in parallel to each other, with their bodies in a vertical position. They were directed to maintain a straight-ahead gaze with their eyes, place their hands on their waists, keep their chests upright, and bend their knees to a 90° angle. Additionally, they were asked to jump to the highest level they could, avoid bending their knees upon take-off, and complete the test with their knees held straight and tense. As a result of knee flexion during the jump, the test was repeated. The test was repeated twice for each participant with 30-second rest intervals in between, and the average values of the two tests were used for statistical analysis (Ersöz et al., 1996). In this study, ICC was calculated to be 0.76 for SJH.

40 cm Depth Jump (DJ_{40})

DJ_{40} was determined using the “Drop Jump” protocol available in the Optojump Next® system (Bolzano, Bozen, Italy). The Optojump Next® system predicts the reactive strength index based on the equation 2 (Byrne et al., 2017).

$$\frac{Flight\ Height\ (m)}{Ground\ Contact\ Time\ (s)}$$

Equation 2. Reactive Strength Index formula.

Samuel et al. (2021) suggested that the Optojump Next® system demonstrates an intraclass correlation coefficient (ICC) of 0.94 and a coefficient of variation of 7.11 in the DJ (Samuel et al., 2021). Participants were directed to ascend onto a platform with a height of 40 cm. While on the platform, they were required to extend one leg forward and place their hands on their waist. Subsequently, they were instructed to descend into the inner section of the photocell device, which was positioned parallel to the ground. Participants were mandated to expeditiously jump to the maximum attainable height immediately upon coming into contact with the ground. They were instructed to abstain from bending their knees during the jump and to conclude the test with their knees maintained in a state of tension. If the knee did not move in the desired direction during the test, the measurement was repeated. Each participant underwent the test on two occasions, with 30-second rest intervals between the repetitions. The average values from these two tests were utilized for statistical analysis (Lloyd et al., 2009). In this study, ICCs were calculated to be 0.55, 0.88 and 0.65 for ground contact time, depth jump height and reactive strength index, respectively.

Sit-and-Reach (SaR) Test

Participants were given instructions to sit on the ground, ensuring that their bare feet remained flat on the surface while keeping their knee joints unaltered. They were then directed to position their feet onto the SaR test platform. Following this, participants were required to gradually extend their upper bodies forward, using their fingertips to reach as far as possible without bending their knees. The extension of their arms and fingers was maintained in a straight and stretched position, and the maximum distance they could reach was meticulously measured in centimetres (cm). Each participant underwent the test on two occasions, with 30-second rest intervals between the repetitions. The average values from these two tests were utilized for statistical analysis (Attrey et al., 2017). In this study, ICC was calculated to be 0.87 for sit-and-reach test.

Task and Ego Orientation in Sport Questionnaire (TEOSQ)

The questionnaire was developed to measure the participants' task and ego orientations and it consists of 13 items. In the task orientation dimension, there are 7 questions, whereas in the ego orientation dimension, there are 6 questions. Questionnaire is 5 likert type scale ranging from 1 “absolutely disagree” to 5 “absolutely agree”. Low scores obtained from the questionnaire indicate a lower level of task or ego orientation, whereas high scores represent a higher level of task or ego orientation. The questionnaire was developed by Duda (1989, 1992) and Duda and Nicholls (1992). The test-retest reliability for task and ego orientations has been reported as 0.68 and 0.75, respectively (Duda, 1989). A recent study has suggested that the internal validity of the questionnaire, in terms of task orientation and ego orientation, was determined to be 0.79 and 0.81, respectively (Whitehead and Duda, 1998). The Turkish adaptation of the questionnaire was conducted by Toros (2004). In this adaptation, it was reported that the task and ego orientation factors collectively explain 58% of the overall variance. Furthermore, it has been reported that the internal consistency and test-retest reliability for task and ego orientations are 0.87, 0.85, 0.65, and 0.72, respectively (Toros, 2004). In this research, the Cronbach's Alpha coefficient for internal validity of task and ego orientations during the pre-tests were calculated as 0.87 and 0.85, respectively. In the post-tests, these coefficients were determined to be 0.85 and 0.94, respectively.

Intervention Program

The participants adhered to a 12-week exercise intervention, supervised by researchers, and engaged in it three days a week. The intervention program was primarily derived from the American College Health Association Guide, edited by Thompson et al. (2009), with additional input from the literature, including recommendations from Garber et al. (2011). The exercises were customized to accommodate the participants' fitness levels, and the program was designed for beginners. The intensity of the exercises was gradually increased according to the participants' level of adaptation to exercise as a result of the weights they lifted each week. The decision to increase or decrease the weight was made based on the participant's individual assessment. Simultaneously, the instructor assumed responsibility for guiding the participants in the application of fundamental exercise principles. Consequently, participants were encouraged to adhere to these fundamental exercise principles, challenge themselves, and take initiative when necessary. In the initial 6 weeks, the intervention sessions had a duration of 40-50 minutes, whereas in the subsequent 6 weeks, the duration extended to a range of 60-70 minutes. Prior to commencing the intervention program, participants were surveyed regarding any pre-existing health issues. The instructor initiated the intervention program by implementing a warm-up routine that gradually escalated from less strenuous to more demanding movements. The warm-up exercises encompassed running, knee pulls, lateral walking, and bodyweight squats, respectively. Specifically, knee pulls and squats were performed in three sets of ten repetitions, while running and lateral walking were executed at a tempo ranging from 30% to 40% in a 20-meter area. The intervention program was finalized with static stretching movements, thereby concluding the one-day program. Both the experimental and control groups administered to intervention program.

Table 1

Intervention Program

The First Six Weeks of the Intervention			**The Last Six Weeks of the Intervention**		
Exercises	**Set x Reps**	**Intensity**	**Exercises**	**Set x Reps**	**Intensity**
Bench Press	2 x 10	Low	Bench Press	3 x 10	Low
Leg Press	3 x 12	Low	Leg Press	3 x 12	Moderate
Biceps Curl	3 x 10	Moderate	Biceps Curl	3 x 10	Moderate
Leg Extension	3 x 10	Low	Leg Extension	3 x 12	Moderate
Triceps Curl	3 x 10	Moderate	Triceps Curl	3 x 15	Moderate
Butterfly	2 x 10	Low	Butterfly	3 x 12	Low
Lat Pulldown	3 x 10	Low	Lat Pulldown	3 x 10	Low
Core exercises (Sit-ups, Planks, etc.)	5 min.	Low	Core exercises (Sit-ups, Planks, etc.)	10 min.	High
Cardio	10 min.	Low	Cardio	15 min.	High

Experimental Manipulation

The motivational climate perceived was manipulated during the intervention program for EG. The TARGET model developed by Epstein (1988) was adapted to the study to manipulate the motivational climate during intervention program (Epstein, 1988). The model includes components related to task, authority, recognition, grouping, evaluation, and time in terms of success situations. The structure of these components is crucial for the perceived motivational climate.

Task

In a mastery climate, individuals work at their own ability levels with different tasks. Students are not only encouraged but also supported in establishing realistic, short-term, self-referential objectives.

Table 2

TARGET model with Mastery Motivational Climate Adapted to Intervention Program

TARGET Components	Mastery Climate
Task	All goals are determined by the practitioner. Participants merely implement the intervention program.
Authority	After the practitioner demonstrates, participants are not intervened with as long as the movements are executed correctly.
Recognition	Recognition of participants' achievements is kept special and individual development is rewarded.
Grouping	Participants engage in either small collaborative groups or individual work, with a high degree of flexibility maintained in the grouping structure.
Evaluation	Evaluation is conducted with explicit reference to individual goals, effort, participation, and progress.
Time	The time for participants to complete the skill was left flexible. Support is given to improve their timing to complete the program.

Authority

Authority indicates the engagement of individuals in the decision-making process. Within a mastery climate, individuals participate in decision-making processes, whereas in a performance climate, decisions are executed by the executive. Consequently, allowing authority in a mastery climate not only amplifies intrinsic motivation but also fosters the development of individual traits, including leadership and self-evaluation.

Recognition

In a mastery climate, recognition is ascertained by assessing participants according to their individual efforts and skill development throughout the process, with a focus on individual goals. The augmentation of task orientation occurs when the recognition component is suitably adapted.

Grouping

In a mastery climate, a preference exists for collaborating in small groups, whereas in a performance climate, the group size tends to be larger. The dynamic structure of groups within a mastery climate bolsters task orientation through the promotion of individual-based goal assessment.

Evaluation

Since evaluation in a mastery climate is based on individual change and development, individual evaluation contributes to the tendency to mastery.

Time

A specific duration is required for acquiring a specific motor skill. Within a mastery climate, temporal provisions are established for both developmental and learning progress.

Manipulation Check

In order to gauge the extent to which participants were influenced by the manipulated motivational climate, the TEOSQ was utilized. Through an analysis of the scores obtained on this questionnaire, the researchers assessed the participants' perception of the motivational climate conditions imposed on them. In cases where participants in the mastery climate displayed high scores in task orientation, it served as an indicator of the effective implementation of the manipulation. Additionally, the primary researcher conducted individual observations throughout the 12-week intervention sessions. These observations were carried out to monitor the exercises during the sessions and to assess the degree to which the manipulation was successfully implemented.

Statistical Analysis

Statistical procedures were performed using SPSS version 22.0. The data distributions were assessed using the Shapiro-Wilk normality, skewness-kurtosis tests, and histogram graphs. All data that normally distributed are presented as mean ± standard deviation (X ± SD). When the data did not normally distributed (squat and depth jump height), a natural logarithmic transformation (NL) was applied (Flatt et al., 2020). Independent Sample T-test was used in order to assess the difference between pre-test and post-test result in the intervention program. Moreover, Student T-test was used in order to compare the pre-test and post-test scores in the TEOSQ. Two-ways repeated ANOVA test used to determine interaction effect (group x time). Effect size in repeated ANOVA test was exhibited as eta squared (η^2; small > 0.01, medium ≥ 0.06, large ≥ 0.14). In contrast, in the Student T-test, it was summarized as Cohen's d (d; small ≥ 0.2, medium ≥ 0.5, large ≥ 0.8) (Seo et al., 2021; Cohen, 1962). ICC was calculated. For ICC, mean rating, absolute agreement, and 2-way mixed effects model, was chosen. ICCs were interpreted using the following thresholds: ICC ≤ 0.49, small; ≥ 0.50 ICC < 0.75, moderate; ≥ 0.75 ICC < 0.9, good; and ICC ≥ 0.9, perfect (Koo and Li, 2016).

Furthermore, Cronbach's Alpha coefficients were calculated for the internal validity of the pre-test and post-test of TEOSQ. Statistical significance was accepted at $\alpha < 0.05$.

Results

Table 3

The results of descriptive statistics according to pre-test scores in EG and CG

Variables	Group	n	X̄	SD	t	p
Age (year)	EG	14	22,21	0,89	**2,171**	**0,039***
	CG	15	21,40	1,12		
	∑	29	21,79	1,08		
Body Height (cm)	EG	14	166,78	7,78	0,573	0,571
	CG	15	164,94	9,50		
	∑	29	165,83	8,62		
Body Weight (kg)	EG	14	60,79	8,95	0,987	0,332
	CG	15	57,29	9,44		
	∑	29	58,92	9,20		
BMI (kg/m^2)	EG	14	21,79	2,68	0,941	0,356
	CG	15	20,96	2,00		
	∑	29	21,36	2,35		
Body Fat Percentage (%)	EG	14	23,57	6,50	1,106	0,279
	CG	15	20,69	7,53		
	∑	29	22,08	7,08		

n: Sample Size; X̄: Mean; SD: Standard deviation; BMI: Body mass index; EG: Experimental group; CG: Control group; ∑: Sigma.
*p < 0,05.

The alterations in performance parameters, both before and after the implementation of the intervention program within the context of a motivational climate, have been presented in Table 4. No significant interaction effects were observed between groups and over time for the natural logarithmic-transformed squat jump height (F= 0.297, p= 0.590, η^2= 0.011), natural logarithmic-transformed depth jump height (F= 0.059, p= 0.810, η^2= 0.002), ground contact time in depth jump (F= 0.454, p= 0.506, η^2= 0.017), reactive strength index (F= 1.010, p= 0.324, η^2= 0.036), and sit-and-reach test (F= 2.262, p= 0.144, η^2= 0.077).

Table 5 presents the results of the Student T-test conducted in the TEOSQ. In EG, a statistically significant difference was found between the mean scores of TEOSQ and the sub-dimension of task orientation when comparing pre-test and post-test results (p= 0.001, t= 4.774, d= 0.979; p= 0.002, t= 3.751, d= 1.087, respectively). Specifically, the mean scores in the EG for TEOSQ and the task orientation sub-dimension during the pre-test were 3.83±0.36 and 3.86±0.35, respectively. However, during the post-test, these scores increased to 4.25±0.49 and 4.28±0.42, respectively. In contrast, no statistically significant difference was observed in the CG (p > 0.05).

Table 4

The Results of Comparison of Performance Parameters between Group and Over Time

Variables	**Group**	**n**	**Pre-Test**		**Post-Test**		**Group x Time Interaction**		
			X̄	**SD**	**X̄**	**SD**	**F**	**p**	**η^2**
NL_SJH (cm)	EG	14	2,88	0,34	3,03	0,25	0,297	0,590	0,011
	CG	15	2,80	0,27	2,99	0,22			
NL_DJ$_{40}$H (cm)	EG	14	2,81	0,39	3,01	0,26	0,059	0,810	0,002
	CG	15	2,75	0,29	2,93	0,24			
DJ$_{40}$_GCT (s)	EG	14	0,38	0,11	0,30	0,07	0,454	0,506	0,017
	CG	15	0,36	0,08	0,30	0,06			
RSI (m/s)	EG	14	0,50	0,24	0,72	0,21	1,010	0,324	0,036
	CG	15	0,47	0,19	0,64	0,15			
SaR (cm)	EG	14	31,36	8,00	33,30	7,12	2,262	0,144	0,077
	CG	15	29,36	8,84	33,06	8,86			

n: Sample Size; X̄: Mean; SD: Standard deviation; EG: Experimental group; CG: Control group; NL_SJH: Natural logarithm-transformed squat jump height; NL_DJ$_{40}$H: Natural logarithm-transformed depth jump height; DJ$_{40}$_GCT: Ground contact time in depth jump; RSI: Reactive strength index; SaR: Sit-and-reach test; η^2: Eta square.

Table 5

The Results of Pre-test and Post-test of TEOSQ

Variables	**Group**	**n**	**Pre-Test**		**Post-Test**		**t**	**p**	**d**
			X̄	**SD**	**X̄**	**SD**			
TEOSQ (Total)	EG	14	3,83	0,36	4,25	0,49	**4,774**	**0,001***	**0,979**
	CG	15	3,62	0,62	3,57	0,71	0,261	0,798	0,691
TO	EG	14	3,86	0,35	4,28	0,42	**3,751**	**0,002***	**1,087**
	CG	15	3,67	0,78	3,69	0,70	0,094	0,926	0,012

n: Sample Size; X̄: Mean; SD: Standard deviation; EG: Experimental group; CG: Control group; TEOSQ: Task and Ego Orientation in Sport Questionnaire; TO: Task orientation; d: Cohen's d.
*p < 0,05

Discussion and Conclusion

This study aimed to investigate the effects of a 12-week strength training intervention implemented in a mastery motivational climate on certain performance parameters in sedentary individuals. A total of 29 sedentary university students, with an average age of 21.79±1.08 years, participated in our research. Examination of the body mass index values of the participants revealed no significant differences between the groups, indicating similar physical characteristics (Table 3). In a study conducted by Torres-Banduc et al. (2010) involving physically inactive and young sedentary adults, it was observed that the average ages of the traditional resistance training group, plyometric training group, and control group were comparable to those of our study group (Torres-Banduc et al., 2020). Hernandez-Alvarez et al. (2018), examining sedentary young individuals, observed similarities in age, height, body weight, and BMI within their group, aligning with our study (Hernandez-Alvarez et al., 2018). Additionally, Gelecek et al. (2006) and Yıldız et al. (2015), in their investigations on sedentary young individuals, also noted comparable physical demographic characteristics among participants, consistent with our research. Consequently, it can be inferred that the physical attributes observed in sedentary university students enrolled in this study are reflective of sample groups depicted in related literature.

During the exercise intervention applied to the experimental group, participants were instructed to collaborate with their teammates. Additionally, they were asked to make decisions on what, how, and when to perform, and evaluate their learning experiences based on criteria provided to them. According to the results of the study, a statistically significant difference was observed in the task orientation sub-dimension mean score between the pre-test and post-test in the EG. However, no statistically significant difference was observed in CG. In this context, it is evident that the 12-week strength training program applied to the experimental group has been influenced by the motivational climate. This result aligns with studies manipulated in physical activity applications such as sports and physical education (Smith et al., 2007; Barkouskis et al., 2008; Morgan and Carpenter, 2002; Brown et al., 2017).

In the literature, the design of a motivational climate is observed to be more commonly used in physical education practices, influencing coaches and children. Theeboom et al. (1995), using Epstein's (1989) TARGET model, demonstrated in various team (soccer, basketball, and volleyball) and individual (swimming, wrestling, martial arts, and athletics) sports applications that children in a mastery-focused group significantly enjoyed higher levels and exhibited better motor skills compared to those in a performance-focused group. Researchers have suggested that this outcome could lead to more positive experiences for young athletes when learning new skills in a mastery-focused motivational climate (Theeboom et al., 1995). In a sports environment, a coach strongly influences the quality and nature of the sports experience through the attitudes and values they convey to the athletes (Smith et al., 2007). It can also be considered that in such settings the attitude of the university students toward the sport participation might alter their behaviour (Yıldız et al., 2017). Hassan and Morgan (2015) have been proposed that an intervention program applied to coaches using the TARGET model could significantly increase athletes' perceptions of mastery climate and task goal orientations if the coaching behaviours included more elements of mastery (Hassan and Morgan, 2015). In Korea, a task-involving climate among students participating in physical education classes has been found to be positively associated with sports skill performance (Yoo, 1999). Yoo (2003) conducted a study with 60 male university students at the beginner level in tennis, suggesting that a task-involving climate improved students' tennis performance, while an ego-involving climate reduced their tennis performance (Yoo, 2003).

In this study, it was found that the intervention in the mastery motivational climate had no significant effect on natural logarithmic-transformed squat jump height, natural logarithmic-transformed depth jump height, ground contact time in depth jump, reactive strength index, and sit-and-reach test in groups and over time. This may be attributed to the students in the motivational climate perceiving the meaning of performance differently. For instance, Zorlu et al. (2020) suggests that personality factors might have impact on the achievement motivations in sports. Therefore, it could be argued that personality factors of the participants might have influenced the current results. The structure of the achievement climate can alter the personal meaning of success and influence behavioural patterns (Ames, 1992; Yoo, 2003). As a result, students in the motivational climate may have set relevant performance parameters as challenging tasks for themselves. No study investigating the effects of a 12-week strength training intervention in a mastery motivational climate on performance parameters has been encountered in the literature. Therefore, it is considered that the data obtained from the study could be beneficial to strength and conditioning coaches, researchers in sports psychology, and coaches. In conclusion, the 12-week strength training intervention applied in the motivational climate had no effect on natural logarithmic-transformed squat jump height, natural logarithmic-transformed depth jump height, ground contact time in depth jump, reactive strength index, and sit-and-reach test.

When evaluating the results of the study, it is important to consider certain limitations. This research targets university students with no prior experience in any sports discipline. Therefore, the generalizability of the obtained results to a broader adult or amateur/professional athlete population may be limited. Future research examining the effects of exercise interventions applied in both motivational and ego climates on various performance parameters is deemed beneficial. Additionally, it is recommended that future studies increase the sample size and include amateur or elite athletes in the research group.

Ethics Committee Permission Information

Ethics review board: Ankara Yıldırım Beyazit University Ethics Committee

Date of ethics assessment document: 30.07.2021

Issue number of the ethics evaluation document: 25

Statement of Researchers' Contribution Rates

Design of Research: MCÇ, BY

Data Collection: MCÇ

Data Analysis: MCÇ, SÇ

Discussion: MCÇ, SÇ, BY

Manuscript Writing: MCÇ, SÇ

Literature Review: MCÇ, SÇ, BY

Conflicts of Interest

The authors declare that there is no conflict of interest with any financial organization regarding the material discussed in the manuscript.

References

Ames, C. (1992). Classrooms gods, structures, and student motivation. *Journal of Educational Psychology*, *84*(3), 261-71. doi: 10.1037/0022-0663.84.3.261

Ames, C., & Archer, J. (1988). Achievement goals in the classroom: Students' learning strategies and motivation processes. *Journal of Educational Psychology*, *80*(3), 260-67. doi: 10.1037/0022-0663.80.3.260

Attrey, P., Yadav, M., & Singh, S. (2017). Relationship between passive straight leg raising test and v -sıt and reach test in measuring the hamstring flexibility. *Indian Journal of Physical Education, Sports and Applied Science*, *7*(2), 23-30.

Arı, Ç., Ulun, C., Yarayan, Y. E., Dursun, M., Mutlu, T., & Üstün, Ü. D. (2020). Mindfulness, healthy life skills and life satisfaction in varsity athletes and university students. *Progress in Nutrition*, *22*(2), 1-8.

Barbosa, A. R., Santarem, J. M., Filho, W. J., & Marucci, M. F. (2002). Effects of resistance training on the sit-and-reach test in elderly women. *The Journal of Strength and Conditioning Research*, *16*(1), 14-18.

Barkouskis, V., Tsorbatzoudis, H., & Grouios, G. (2008). Manipulation of motivational climate in physical education: Effects of a seven-month intervention. *European Physical Education Review*, *14*(3), 367-87. doi: 10/1177/1356336X08095671

Blair, S. N., Kohl, H. W., Paffenbarger, R. S., Clark, D. G., Cooper, K. H., & Gibbons, L. W. (1989). Physical fitness and all-cause mortality. A prospective study of healthy men and women. *JAMA*, *262*(17), 2395-401. doi: 10.1001/jama.262.17.2395

Braithwaite, R., Spray, C. M., & Warburton, W. E., (2011). Motivational climate interventions in physical education: A meta-analysis. *Psychology of Sport and Exercise*, *12*(6), 628-38. doi: 10.1016/j.psychsport.2011.06.005

Brown, R. D., & Harrison, J. M., (1986). The effects of a strength training program on the strength and self-concept of two female age groups. *Research Quarterly for Exercise and Sport*, *57*(4), 315-20. doi: 10.1080/02701367.1986.10608092

Brown, T. C., Fry, M. D., and Moore, E. W. (2017). A motivational climate intervention and exercise-related outcomes: A longitudinal perspective. *Motivation Science*, *3*(4), 337-53. doi: /10.1037/mot0000059

Byrne, D. J., Browne, D. T., Byrne, P. J., & Richardson, N. (2017). Interday reliability of the reactive strength index and optimal drop height. *Journal of Strength and Conditioning Research*, *31*(3), 721-26. doi: 10.1519/jsc.0000000000001534

Chamberlin, J. M., Fry, M. D., & Iwasaki. S. (2017). High school athletes' perceptions of the motivational climate in their off-season training programs. *Journal of Strength and Conditioning Research*, *31*(3), 736-42. doi: 10.1519/JSC.0000000000001533

Cohen, J. (1962). The statistical power of abnormal-social psychological research: A review. *Journal of Abnormal Psychology*, *65*, 145-53. doi: 10.1037/h0045186.

Cureton, K. J., Collins, M. A., Hill, D. W., & McElhannon, F. M. (1988). Muscle hypertrophy in men and women. *Medicine* and *Science in Sports* and *Exercise*, *20*(4), 338-44. doi: 10.1249/00005768-198808000-00003

Deci, E. L., & Ryan, R. M, (2002). Self-determination research: Reflections and future directions. In E. L. Deci and R. M. Ryan (Eds.), *Handbook of self-determination research (pp. 431–441)*, University of Rochester Press.

Department of Health and Human Services (2000). *Healthy People 2010: Understanding and Improving Health* (2nd ed,). Washington: DHHS.

Digelidis, N., Papaioannou, A., Laparidis, K., & Christodoulidis, T. (2003). A one-year intervention in 7th grade physical education classes aiming to change motivational climate and attitudes towards exercise. *Psychology of Sport and Exercise*, *4*(3), 195-210. doi: 10.1016/s1469-0292(02)00002-x

Dohrn, M., Kwak, L., Oja, P., Sjöström, M., & Hagströmer, M. (2018). Replacing sedentary time with physical activity: A 15-year follow-up of mortality in a national cohort. *Clinical Epidemiology*, *10*, 179-86. doi: 10.2147/CLEP.S151613

Duda, J. L. (1989). Goal perspectives, participation and persistence in sport. *International Journal of Sport Psychology, 20*(1), 42-56.

Duda, J. L. (1992). Motivation in sport setting: A goal perspective approach. In Roberts, G. C. (Ed.), *Motivation in Sport and Exercise (pp. 57-91),* Human Kinetics.

Duda J. L., & Nicholls, J. G. (1992). Dimensions of achievement motivation in schoolwork and sport. *Journal of Educational Psychology*, *84*(3), 290-299. doi: 10.1037/0022-0663.84.3.290

Dursun, M., Yarayan, Y. E., Ari, Ç., Ulun, C., & Adas, S. K. (2020). COVID-19 in Turkey: Leisure boredom, psychological resilience, physical activity and emotional state. *International Journal of Educational Research and Innovation*, *15*, 460-486

Whitehead, J., & Duda, J. (1998). Measurement of goal perspectives in the physical domain. In J. L. Duda (Ed.), *Advances in Sport and Exercise Psychology Measurement (pp. 21-48),* Fitness Information Technology.

Epstein, J. L. (1988). Effective schools or effective students? Dealing with diversity. In R. Hawkins, ve B. Macrae (Eds.), *Policies for America's public schools: Teachers, equity, and indicators (pp. 89-126),* Ablex Publishing.

Epstein, J. L. (1989). Family structure and students motivation: a development perspective. In C. Ames and R. Ames (Eds.), *Research on motivation in education (ss.259-295),* Academic Press.

Ersöz, G., Mitat, K. O. Z., Sunay, H., ve Gündüz, N. (1996). Erkek voleybol oyuncularının sezon öncesi, sezon ortası ve sezon sonu fiziksel uygunluk düzeyi parametrelerindeki değişmeler. *Gazi Beden Eğitimi ve Spor Bilimleri Dergisi*, *1*(4), 1-7.

Flatt, A. A., Allen, J., Bragg, A., Keith, C., Earley, R., & Esco, M. E. (2020). Heart rate variability in college football players throughout preseason camp in the heat. *International Journal of Sports Medicine*, *41*(09), 589-95. doi: 10.1055/a-1145-3754

Garber, C. E., Blissmer, B., Deschenes, M. R., Franklin, B. A., Lamonte, M. J., Lee, I. M., Nieman, D. C., Swain, D. P., & American College of Sports Medicine. (2011). Quantity and quality of exercise for developing and maintaining cardiorespiratory, musculoskeletal, and neuromotor fitness in apparently healthy adults: Guidance for prescribing exercise. *Medicine and Science in Sports and Exercise*, *43*(7), 1334-59. doi: 10.1249/MSS.0b013e318213fefb

Gelecek, N., Pınar, L., Özdirenç, M., Bediz, C., Akan, P., Kozan, Ö., & Altun, S. Z. (2006). Effect of brisk walking program on plasma homocysteine level and lipid profile in sedentary young subject. *Turkish Journal of Physiotherapy Rehabilitation*, *17*(1), 42-46.

Gencer, E. (2021). Hedef yöneliminin yordayıcısı olarak algılanan motivasyonel iklim: Güreşçiler üzerine bir araştırma. *SPORMETRE Beden Eğitimi ve Spor Bilimleri Dergisi*, *19*(3), 71-80. doi: 10.33689/spormetre.858167

Gökalp, H. A., & Tepeköylü Öztürk, Ö., (2021). Relationship of Physical Activity with Anger and Anger Expression Styles in High School Students. *Journal Of Research In Medical and Dental Science* , *9*(4), 202-213.

Glatthorn, J. F., Gouge, S., Nussbaumer, S., Stauffacher, S., Impellizzeri, F. M., & Maffiuletti, N. A. (2011). Validity and reliability of optojump photoelectric cells for estimating vertical jump height. *Journal of Strength and Conditioning Research*, *25*(2), 556-60. doi: 10.1519/jsc.0b013e3181ccb18d

Hassan, M. F. H., & Morgan, K. (2015). Effects of a mastery intervention programme on the motivational climate and achievement goals in sport coaching. A pilot study. *International Journal of Sports Science and Coaching*, *10*(2-3), 487-503. doi: 10.1260/1747-9541.10.2-3.487

Hernandez-Alvarez, E. D., Guzman-David, C. A., Ruiz-Gonzalez, J. C., Ortega-Hernandez, A. M., & Ortiz-Gonzalez, D. C. (2018). Effect of a respiratory muscle training program on lung function, respiratory muscle strength and resting oxygen consumption in sedentary young people. *Revista de la Facultad de Medicina*, *66*(4), 605-10. doi: 10.15446/revfacmed.v66n4.60252

Ivey, F. M., Roth, S. M., Ferrell, R. E., Tracy, B. L., Lemmer, J. T., Hurlbut, D. E., Martel, G. F., Siegel, E. L., Fozard, J. L., Jeffrey, M. E., Fleg, J. L., & Hurley, B. F. (2000). Effects of age, gender, and myostatin genotype on the hypertrophic response to heavy resistance strength training. *The Journals of Gerontology Series A Biological Sciences and Medical Sciences*, *55*(11), M641-M648. doi: 10.1093/gerona/55.11.m641

Johnson, J. L., Rudisill, M. E., Hastie, P., Wadsworth, D., Strunk, K., Venezia, A., Sassi, J., Morris, M., & Merritt, M. (2019). Changes in fundamental motor-skill performance following a nine-month mastery motivational climate intervention. *Research Quarterly for Exercise and Sport*, *90*(4), 517-26. doi: 10.1080/02701367.2019.1628909

Keeler, L. K., Finkelstein, L. H., Miller, W., & Fernhall, B. (2001). Early-phase adaptations of traditional-speed vs, superslow resistance training on strength and aerobic capacity in sedentary individuals. *Journal of Strength and Conditioning Research*, *15*(3), 309-14.

Koo, T. K., & Li, M. Y. (2016). A guideline of selecting and reporting intraclass correlation coefficients for reliability research. *Journal of Chiropractic Medicine*, *15*(2), 155-63. doi: 10.1016/j.jcm.2016.02.012

Kraemer, W. J., & Ratamess, N. A. (2004). Fundamentals of resistance training: Progression and exercise prescription. *Medicine and Science in Sports and Exercise*, *36*(4), 674-88. doi: 10.1249/01.MSS.0000121945.36635.61

Kyrölainen, H., Hackney, A. C., Salminen, R., Repola, J., Häkkinen, K., & Haimi, J. (2018). Effects of combined strength and endurance training on physical performance and biomarkers of healthy young women. *Journal of Strength and Conditioning Research*, *32*(6), 1554-561. doi: 10.1519/JSC.0000000000002034

Lloyd, R. S., Oliver, J. L., Hughes, M. G., & Williams, C. A. (2009). Reliability and validity of field-based measures of leg stiffness and reactive strength index in youths. *Journal of Sports Sciences*, *27*(14), 1565-1573. doi:10.1080/02640410903311572

Mazini, F. M. L., Aidar, F. J., Gama de, M. D., Costa, M. O., Patrocınio de, O. C. E., Rezende de, O. V. G., Magalhaes, C. V., Menezes, T. H., & Caputo, F. M. E. (2018). Circuit strength training improves muscle strength, functional performance and anthropometric indicators in sedentary elderly women. *The Journal of Sports Medicine and Physical Fitness*, *58*(7-8), 1029-036. doi: 10.23736/S0022-4707.17.06903-1

Monteiro, W. D., Simao, R., Polito, M. D., Santana, C. A., Chaves, R. B., Bezerra, E., & Fleck, S. J. (2008). Influence of strength training on adult women's flexibility. *Journal of Strength and Conditioning Research*, *22*(3), 672-77. doi: 10.1519/jsc.0b013e31816a5d45

Morgan, K., & Carpenter, P. (2002). Effects of manipulating the motivational climate in physical education lessons. *European Physical Education Review*, *8*(3), 207-29. doi: 10.1177/1356336X020083003

Öktem, U., & Akın, M. (2022). Sedanter kadınlarda elektriksel kas uyarımı (EMS) ve geleneksel antrenmanın kuvvet kazanımı ve antropometrik özellikler üzerine etkisinin incelenmesi. *CBÜ Beden Eğitimi ve Spor Bilimleri Dergisi*, *17*(1), 70-9. doi: 10.33459/cbubesbd.1114526

Passer M. (2020). *Research methods: Concepts and connections*, Macmillan Higher Education.

Roberts, G. C., Treasure, D. C., & Conroy, D. E. (2012). Understanding the dynamics of motivation in sport and physical activity: An achievement goal interpretation. *Handbook of Sport Psychology*, 1-30. doi: 10.1002/9781118270011.ch1

Samuel, M., Gonzalez, M. P., Dietze-Hermosa, M. S., Eggleston, J. D., & Dorgo. S. (2021). Common vertical jump and reactive strength index measuring devices: A validity and reliability analysis. *Journal of Strength and Conditioning Research*, *35*(5), 1234-243. doi: 10.1519/JSC.0000000000003988

Santos, E., Rhea, M. R., Simao, R., Dias I., Freitas de, S. B., Novaes, J., Leite, T., Blair, J. C., & Bunker, D. J. (2010). Influence of moderately intense strength training on flexibility in sedentary young women. *Journal of Strength and Conditioning Research*, *24*(11), 3144-149. doi: 10.1519/JSC.0b013e3181e38027

Seo, M. W., Jung, S. W., Kim, S. W., Lee J. M., Jung H. C., and Song J. K. (2021). Effects of 16 weeks of resistance training on muscle quality and muscle growth factors in older adult women with sarcopenia: A randomized controlled trial. *International Journal of Environmental Research and Public Health*, *18*(13), 6762. doi: 10.3390/ijerph18136762

Smith, R. E., Smoll, F. L., & Cumming, S. P. (2007). Effects of a motivational climate intervention for coaches on young athletes' sport performance anxiety. *Journal of Sport and Exercise Psychology*, *29*(1), 39-59. doi: 10.1123/jsep.29.1.39

Theeboom, M., De-Knop, P., & Weiss, M. R. (1995). Motivational climate, psychological responses, and motor skill development in children’s sport: A field-based intervention study. *Journal of Sport and Exercise Psychology*, *17*(3), 294-311. doi: 10.1123/jsep.17.3.294

Thompson, W. R., Gordon, N. F., & Pescatello, L. S. (2009). *ACSM's guidelines for exercise testing and prescription (*8th ed.). Wolters Kluwer Health/Lippincott Williams and Wilkins. ThePoint.

Toros, T. (2004). Sporda görev ve ego yönelim ölçeği -SGEYÖ-"nın türk sporcular için güvenirlik ve geçerlik çalışması. *Hacettepe Journal of Sport Sciences*, *15*(3), 155-66.

Torres-Banduc, M. A., Ramirez-Campillo, R., Garcia-Pinillos, F., Garcia-Hermoso, A., Moran, J., & Jerez-Mayorga, D. (2020). Effects of traditional strength training versus jump training on muscular fitness among physically inactive and sedentary young adults. *The Open Sports Sciences Journal*, *13*(1), 12-9. doi: 10.2174/1875399X02013010012

Van de Pol, P. K. C., & Kavussanu, M. (2011). Achievement motivation across training and competition in individual and team sports. *Sport, Exercise and Performance Psychology*, *1*(2), 91-105. doi: 10.1037/a0025967

Yıldız, A., Tarakcı, D., & Mutluay, F. K. (2015). Genç erişkinlerde fiziksel aktivite düzeyi ile vücut kompozisyonu ilişkisi: Pilot çalışma. *Sağlık Bilimleri ve Meslekleri Dergisi*, *2*(3), 297-305. doi: 10.17681/hsp.15450

Yildiz, A. B., Arı, Ç., & Yilmaz, B. (2017). Üniversite öğrencilerinin spora yönelik tutumlarinin incelenmesi (Ankara Yildirim Beyazit Üniversitesi Örneği). *Muş Alparslan Üniversitesi Uluslararası Spor Bilimleri Dergisi*, *1*(1), 35-45.

Yoo, J. (1999). Motivational-behavioral correlates of goal orientation and perceived motivational climate in physical education contexts. *Perceptual and Motor Skills*, *89*(1), 262-74. doi: 10.2466/pms.1999.89.1.262

Yoo, J. (2003). Motivational climate and perceived competence in anxiety and tennis performance. *Perceptual and Motor Skills*, *96*(2), 403-13. doi: 10.2466/pms.2003.96.2.403

Zorlu, E., Doğu, G., Yıldız, A. B., & Yılmaz, B. (2020). Atletizm branşındaki sporcuların kişilik özelliklerinin başarı motivasyonuna etkisinin incelenmesi. *Akdeniz Spor Bilimleri Dergisi*, *3*(1), 24-35.