https://doi.org/10.33472/AFJBS.6.6.2024.5988-5996

African Journal of Biological Sciences

Journal homepage: http://www.afjbs.com

Research Paper Open Access

Investigation of Psychological Resilience, Hopelessness and Anxiety in Exercising and Non-exercising Male Healthcare Workers

Rabia Yıldız Öztürk[1], Ayşe Hazal Boyanmış[2], Sermin Ağralı Ermiş[3], Aşina Uslular[4], Aydolu Algın[5*], Mihriay Musa[6], Burhan Başoğlu[7], Turhan Toros[8]

[1]Mersin University, Faculty of Sport Sciences, Mersin/Turkey.
[2]Mersin University, Faculty of Sport Sciences, Mersin/Turkey.
[3]Aydin Adnan Menderes University, Faculty of Sport Sciences, Mersin/Turkey. email:
[4]Kutahya Dumlupinar University, Faculty of Sport Sciences, Kutahya/Turkey.
[5*]Akdeniz University, Antalya/Turkey.
[6]Usak University, Faculty of Sport Sciences, Usak/Turkey.
[7]Nevsehir Haci Bektas Veli University, Faculty of Sport Sciences, Nevsehir/Turkey. email: burhanbasoglu@nevsehir.edu.tr
[8]Mersin University, Faculty of Sport Sciences, Department of Coaching Education, Mersin/Turkey. email:

email: hazalboyanmis@gmail.com[2], s.agrali.ermis@adu.edu.tr[3] a.uslular@gmail.com[4], mihriay.musa@usak.edu.tr[5], turhantoros@yahoo.com[6],
Corresponding Email: [5*]aydolualgin@hotmail.com

Article Info

Volume 6, Issue 6, June 2024

Received: 17 April 2024

Accepted: 28 May 2024

Published: 21 June 2024

doi: 10.33472/AFJBS.6.6.2024.5988-5996

ABSTRACT:

Objective: The aim of this study was to examine the levels of psychological resilience, trait anxiety and hopelessness in male health care workers who do and do not exercise.
Method: Relational research model, which includes comparison between variables and correlation type examinations, was used in the study. Brief Psychological Resilience Scale, Trait Anxiety Inventory and Beck Hopelessness Scale were used as data collection tools. In the analysis of the data, the Kolmogorov Smirnov normality test resulted in a normal distribution ($p>.05$), Independent Samples T-Test was used for pairwise comparisons, and Pearson correlation coefficient was used to reveal the relationship status.
Results: While it was found that trait anxiety scores differed significantly between the exercising and non-exercising groups in the physician occupational group ($p<.01$), no significant difference was found between the groups in terms of psychological resilience and hopelessness scores ($p>0.05$). In the nurse occupational group, no significant difference was found between the groups who exercised and did not exercise in terms of trait anxiety, psychological resilience and hopelessness scores ($p>0.05$). While it was found that psychological resilience and trait anxiety scores differed significantly between the groups who exercised and did not exercise in the health technician occupational group ($p<.01$; $p<.05$), no significant difference was found between the groups in terms of hopelessness scores ($p>0.05$). While a strong negative correlation was found between the hopelessness scores of health care workers who exercised and their ages ($p<.01$), no significant correlation was found between the psychological resilience and trait anxiety scores and their ages ($p>.05$).
Conclusion: It was concluded that the status of exercising made a difference in psychological resilience, trait anxiety and hopelessness in health care workers who did and did not exercise.

Keywords: Exercise, healthcare workers, resilience, hopelessness, anxiety.

1. Introductıon

Over the last few decades, considerable evidence has accumulated showing that regular physical exercise provides a range of psychological benefits. For example, regular exercise is associated with a significant reduction in the risk of psychological disorders (De Moor et al., 2006; Goodwin, 2003; Taylor et al., 2004; Thorsen et al., 2005), and exercise interventions have been used to treat panic disorder (Broocks et al., 1998), posttraumatic stress disorder (Manger & Motta, 2005), obsessive compulsive disorder (Brown et al., 2007), obsessive-compulsive disorder (Brown et al., 2007), and generalized anxiety disorder (Herring et al., 2011), as well as broad measures of anxiety and depression, and significant reductions in disorder-specific symptoms.

Research consistently shows that exercise can have a positive impact on anxiety levels. Araújo (2007) and Kandola (2020) found that physical activity, especially aerobic exercise, can reduce anxiety symptoms. Bahrke (2005) supports this by showing that both exercise and meditation can effectively reduce state anxiety. However, Cameron (1986) notes that some individuals with anxiety disorders may be sensitive to exercise and experience increased levels of anxiety during physical activity. Despite this, overall evidence suggests that exercise can be a valuable tool in the management of anxiety.

Anxiety is an undesirable state of worry that becomes persistent and severe in anxiety disorders (Barlow, 2002). There are several subtypes of anxiety disorders, including phobias, social anxiety disorder, agoraphobia, generalized anxiety disorder and separation anxiety disorder. While anxiety is a central feature of all subtypes, each occurs alongside a range of other symptoms that can have a serious impact on a person's well-being and daily functioning. People with anxiety disorders are at greater risk of other mental health problems such as depression (Kessler et al., 2008). Furthermore, they appear to be co-occur with a variety of chronic physical health problems. For example, the risk of cardiovascular disease increases by 26% to 52% in people with anxiety disorders (Batelaan et al., 2016; Roest et al., 2010).

Data from the World Health Survey, covering 47 countries, show that not meeting the guideline of 150 minutes of moderate to vigorous physical activity increases the likelihood of anxiety disorder by 32% compared to those who meet the guideline (Stubbs et al., 2017). This evidence suggests that high levels of physical activity may be protective against anxiety disorders, while low levels of physical activity are a risk factor for anxiety disorders. It is conceivable that increasing physical activity may help reduce anxiety symptoms in people with anxiety disorders. A growing number of studies have sought to investigate whether exercise-based interventions are effective forms of treatment for anxiety symptoms. Several recent meta-analyses have found that trials of exercise-based interventions have a small or moderate effect on reducing anxiety symptoms in people with anxiety disorders (Bartley et al., 2013; Jayakody, Gunadasa, Hosker, 2014; Stonerock et al., 2015; Stubbs et al., 2017). One of the theories working on coping strategies with anxiety is the positive psychology approach in which resilience is one of its concepts. Resilience is a dynamic process of positive adaptation to adverse experiences (Luthar, Cicchetti, & Becker, 2000; Masten, 2001). Resilience, which is a continuum with different degrees of resistance to psychological pathologies, is compatible with positive development, adaptation, and reaching a level of equilibrium after developing disorder before the state of equilibrium. Current theories define resilience as a multidimensional factor that includes structural variables such as temperament and personality and specific skills such as problem-solving ability. Research shows that resilience has positive and protective effects in successful resilience and in facing adverse situations. Psychological resilience studies seek to understand why some individuals are able to withstand the pressures they face in their lives, and even why they thrive in the face of these pressures. Resilience has been defined as "the role of mental processes and behaviors in supporting personal assets and protecting the individual

from the potential negative effects of stressors" (Fletcher & Sarkar, 2012; 2013). Although numerous definitions of resilience have been proposed (Windle, 2011), the common theme of all of them is to adapt to difficult conditions better than expected. In particular, Best, Garmezy, and Masten (1990) suggested that resilience is "the process, capacity, or outcome of successful adaptation despite challenging or threatening conditions". Regular exercise has been consistently associated with increased psychological resilience, and several studies emphasize the role of physical fitness in supporting mental and physical health (Silverman, 2014; Neumann, 2021). Furthermore, levels of cardiorespiratory fitness have been found to be inversely related to feelings of hopelessness, meaning that fitter individuals have lower feelings of hopelessness. A physically active lifestyle not only improves physical health, but may also increase happiness by helping to maintain a positive attitude and an optimistic outlook on the future (Valtonen et al., 2009).

Hopelessness is defined as the expectation that negative events will occur and/or that positive events will not occur, together with the belief that one cannot do anything to change this bleak scenario (Abramson et al., 1989). Such a negative attitude towards the future is frequently reported in major psychopathological conditions such as depression and schizophrenia (Beck et al., 1993; Lysaker et al., 2004), but is also present at clinical levels in the general population (e.g. ~10%; Haatainen et al., 2003b). Furthermore, high levels of hopelessness have been concurrently and prospectively associated with clinical outcomes such as depression (Mac Giollabhui et al., 2018; Marchetti et al., 2016a,b) and suicidality (Franklin et al., 2017). In sum, hopelessness is a phenomenon that deserves a great deal of clinical and research attention.

2. Materıal And Method

As a method, quantitative method was used in the study. In this study, which was conducted to determine the psychological resilience, anxiety and hopelessness of male healthcare workers who exercise and do not exercise, the relational screening model, which includes comparison and correlation type examinations between variables, was used. The relational survey model is a method that aims to reveal the existence, degree and direction of change between two or more variables from the general survey model types that aim to describe an existing situation as it is. In this study, correlation and comparison type survey models, which are subcategories of relational survey models, were used (Karasar, 2015).

Research Group

The general population of this study consists of all healthcare workers in Mersin province. The research population consists of healthcare workers working in the central districts of Mersin province (Akdeniz, Mezitli, Toroslar, Yenişehir). Ethics committee approval was obtained before the study.

Table 1 Results on age and whether the participants exercise or not according to occupational group

	Age				Exercise Status	
Occupational groups	Min.	Max.	Mean	SD	Yes	No
Doctor	23	47	33,69	6,88	38	26
Nurse	25	61	39,76	4,35	26	44
Health Technician	22	63	38,41	5,67	32	21

When the table is examined, a total of 187 male health care workers, including 64 doctors aged between 23-47 ($\bar{x}$ age=33.69±6.88), 70 nurses aged between 25-61 ($\bar{x}$ age=39.76±4.35), and 53 health technicians aged between 22-63 ($\bar{x}$ age=38.41±5.67), working in the central districts of Mersin province and determined by the convenience sampling method, participated. According to the American College of Sports Medicine (ACSM), the criterion for individuals who exercise

is to exercise for at least 1 year, 3 days a week and one hour a day. In our study, exercising individuals were determined according to this criterion.

Data Collection

Brief Resilience Scale (BRS)

The Brief Resilience Scale (BRS) developed by Smith et al. (2008) was adapted to Turkish culture by Doğan (2015). The BRS is a unidimensional scale and has a 5-point Likert-type response key. The scale consists of 6 items. In the Turkish adaptation of the scale, construct validity was examined using exploratory and confirmatory factor analysis methods and a single-factor structure explaining 54% of the total variance emerged. The factor loadings of the scale items ranged between .63 and .79. Cronbach's alpha internal consistency coefficient was found to be .83. Within the scope of criterion-related validity studies, the relationships between the BRS and the Oxford Happiness Scale, Ego Resilience Scale and Connor-Davidson Psychological Resilience Scale were examined. Accordingly, correlations of .40 ($p<.001$), .61 ($p<.001$) and .66 ($p<.001$) were obtained between BSR and these scales, respectively. Cronbach's alpha internal consistency coefficient of the scale was also calculated in this study and found to be .87.

State-Trait Anxiety Inventory (STAI Form TX-II)

This inventory has two separate scales of 20 items each; State Anxiety (STAI Form TX - I) and Trait Anxiety Scale (STAI Form TX - II). The scales, which were developed by Spielberger et al. (1970) and adapted and edited by Öner and Le Compte (1983) for Turkish culture, are graded on a 4-point Likert scale. Scoring varies between 1-4. For this study, only the Trait Anxiety Scale of the inventory was used. The number of reversed items in the Trait Anxiety Scale is seven and these are items 21, 26, 27, 30, 33, 36 and 39. The maximum score that can be obtained from the scales is 80 and the minimum score is 20. The higher the scores, the higher the level of anxiety. The values for the internal consistency reliability coefficient (Cronbach's alpha) of the Trait Anxiety Scale range between 0.83-0.87. In this study, the Cronbach's alpha value of the Trait Anxiety Scale was found to be 0.89.

Beck Hopelessness Scale

The Beck Hopelessness Scale (BHS) developed by Beck et al. (1974), which aims to determine the level of pessimism and negative expectations of the individual towards the future, was used to collect the data. The validity and reliability studies of the scale were conducted by Seber (1991) and Durak (1994). Cronbach Alpha internal consistency coefficient was found to be .86 by Seber (1991) and .85 by Durak (1994). Consisting of 20 items, this scale includes statements indicating feelings and thoughts about the future and is scored as 0-1. The 'yes' option in 11 of the scale items and the 'no' option in 9 of the scale items receive 1 point. If the answer to questions 2, 4, 7, 9, 11, 12, 14, 16, 17, 18, 20 is yes, 1 point is given; if the answer to questions 3, 3, 5, 6, 8, 10, 13, 15, 19 is no, 1 point is given. On the contrary, 0 points are given. The scores that can be obtained from the scale vary between 0-20. The total score obtained constitutes the hopelessness score and when the scores are high, it is assumed that the hopelessness in the individual is high. In this study, Cronbach Alpha internal consistency coefficient was found to be .81.

Data Analysis

The data were analyzed through SPSS program. Comparison and relationship tests were performed according to whether the normality test measurement tools scores showed normal distribution or not. Descriptive statistics were used to reveal the demographic characteristics of the sample group. Due to the normal distribution of the data, Independent Sample T-Test was

used for pairwise comparisons and Pearson Correlation coefficient was used to examine the relationship status.

3. Results

Table 2. Comparison of psychological resilience, trait anxiety and hopelessness scores of healthcare workers according to their exercise status

Occupational Groups	Tests	Exercise Status	N	Mean	SD	t	p
Doctor	Psychological Resilience	Yes	38	2.995	.574	.778	.439
		No	26	2.884	.539		
	Trait Anxiety	Yes	38	2.030	.220	-3.279	.002**
		No	26	2.273	.371		
	Hopelessness	Yes	38	10.078	1.260	.122	.903
		No	26	10.038	1.370		
Nurse	Psychological Resilience	Yes	26	2.814	.488	-1.410	.163
		No	44	2.977	.455		
	Trait Anxiety	Yes	26	2.101	.174	-1.636	.106
		No	44	2.230	.377		
	Hopelessness	Yes	26	11.500	2.641	-0,038	.970
		No	44	11.522	2.317		
Health Technician	Psychological Resilience	Yes	32	3.134	.541	-2.992	.004**
		No	21	2.703	.467		
	Trait Anxiety	Yes	32	2.103	.228	-2.749	.012*
		No	21	2.297	.283		
	Hopelessness	Yes	32	10.218	1.263	.362	.719
		No	21	10.047	2.178		

**p<.01; *p<.05

When the table was examined, it was found that the trait anxiety scores differed significantly between the groups who exercised and did not exercise in the physician occupational group (p<.01), while no significant difference was found between the groups in terms of psychological resilience and hopelessness scores (p>0.05).

In the nurse occupational group, no significant difference was found between the groups who exercised and did not exercise in terms of trait anxiety, psychological resilience and hopelessness scores (p>0.05).

While it was determined that psychological resilience and trait anxiety scores differed significantly between the groups who exercised and did not exercise in the health technician occupational group (p<.01; p<.05), no significant difference was found between the groups in terms of hopelessness scores (p>0.05).

Table 3. The relationship between age and psychological resilience, trait anxiety and hopelessness scores of health care workers who exercised

Tests	Age	Psychological Resilience	Trait Anxiety	Hopelessness
Psychological Resilience	.071	1	-,077	,051
Trait Anxiety	.022	-,077	1	,181

Hopelessness	-.732**	,051	,181	1

When the table is examined, a strong negative relationship was found between the hopelessness scores of the health workers who exercise and their ages ($p<.01$), while no significant relationship was found between the psychological resilience and trait anxiety scores and their ages ($p>.05$).

4. Dıscussıon And Conclusıon

According to the results obtained, it was determined that the trait anxiety scores differed significantly between the groups who exercised and did not exercise in the doctor occupational group ($p<.01$), while no significant difference was found between the groups in terms of psychological resilience and hopelessness scores ($p>0.05$). Studies consistently show that exercise may have a positive effect on anxiety levels. Araújo (2007) and Kandola (2020) found that physical activity, especially aerobic exercise, can reduce anxiety symptoms. Bahrke (2005) supports this by showing that both exercise and meditation can effectively reduce state anxiety. However, Cameron (1986) notes that some individuals with anxiety disorders may be sensitive to exercise and experience increased levels of anxiety during physical activity. Despite this, overall evidence suggests that exercise can be a valuable tool in the management of anxiety. The results of this study support our findings.

It was found that psychological resilience and trait anxiety scores differed significantly between the groups who exercised and did not exercise in the health technician occupational group ($p<.01$; $p<.05$). Regular exercise has been consistently associated with increased psychological resilience in various age groups and populations (Silverman, 2014; Toth, 2023; Childs, 2014). This is thought to result from the blunting effects of exercise on stress reactivity, promoting neural plasticity (Silverman, 2014). A number of studies have consistently shown a positive relationship between exercise and anxiety reduction. Kandola (2020) and Weinstein (2015) found that physical activity, particularly exercise, can significantly reduce anxiety symptoms. Cameron (1986) and Stubbs (2017) also support this; Cameron stated that exercise may increase anxiety levels in some individuals, while Stubbs concluded that exercise is effective in improving anxiety symptoms in people with anxiety and stress-related disorders. These findings suggest that exercise may be a valuable tool in anxiety management. These study findings are in parallel with our study findings.

While there was a strong negative correlation between the hopelessness scores of health care workers who exercised and their age ($p<.01$), there was no significant correlation between the psychological resilience and trait anxiety scores and their age ($p>.05$). A sedentary lifestyle is associated with the development of hopelessness in middle-aged men (Valtonen, 2010). However, research has consistently shown the benefits of exercise on musculoskeletal health even in the elderly (Twomey, 1989). Exercise is also linked to psychological well-being among older adults and there is a reciprocal relationship between exercise and psychological well-being (Ruuskanen, 1995). These findings underline the importance of promoting physical activity in all age groups to prevent the development of hopelessness.

In conclusion, it was found that the status of exercising made a difference in psychological resilience, trait anxiety and hopelessness in health care workers who did and did not exercise.

5. References

1. Abramson, L. Y., Alloy, L. B., & Metalsky, G. I. (1989). Hopelessness depression—A theory-based subtype of depression. Psychological Review, 96(2), 358–372. https://doi.org/10.1037/0033-295x.96.2.358.

2. Abramson, L. Y., Metalsky, G. I., & Alloy, L. B. (1989). Hopelessness depression: a theory-based subtype of depression. *Psychological review*, *96*(2), 358. https://doi.org/10.1037/0033-295x.96.2.358.
3. Araújo, S. R. C. D., Mello, M. T. D., & Leite, J. R. (2007). Anxiety disorders and physical exercise. *Brazilian Journal of Psychiatry*, *29*, 164-171.
4. Bahrke, M. S., & Morgan, W. P. (1978). Anxiety reduction following exercise and meditation. *Cognitive therapy and research*, *2*, 323-333.
5. Barlow, D. H. (2004). *Anxiety and its disorders: The nature and treatment of anxiety and panic*. Guilford press.
6. Bartley, C. A., Hay, M., & Bloch, M. H. (2013). Meta-analysis: aerobic exercise for the treatment of anxiety disorders. *Progress in Neuro-Psychopharmacology and Biological Psychiatry*, *45*, 34-39.
7. Batelaan, N. M., Seldenrijk, A., Bot, M., van Balkom, A. J., & Penninx, B. W. (2016). Anxiety and new onset of cardiovascular disease: critical review and meta-analysis. *The British journal of psychiatry*, *208*(3), 223-231.
8. Beck, A. T., Steer, R. A., Beck, J. S., & Newman, C. F. (1993). Hopelessness, depression, suicidal ideation, and clinical-diagnosis of depression. Suicide and Life-Threatening Behavior, 23(2), 139–145. https://doi.org/10.1111/j.1943-278X.1993.tb00378.x.
9. Broocks, A., Bandelow, B., Pekrun, G., George, A., Meyer, T., Bartmann, U., ... & Rüther, E. (1998). Comparison of aerobic exercise, clomipramine, and placebo in the treatment of panic disorder. *American Journal of Psychiatry*, *155*(5), 603-609.
10. Brown, R. A., Abrantes, A. M., Strong, D. R., Mancebo, M. C., Menard, J., Rasmussen, S. A., & Greenberg, B. D. (2007). A pilot study of moderate-intensity aerobic exercise for obsessive compulsive disorder. *The Journal of nervous and mental disease*, *195*(6), 514-520.
11. Cameron, O. G., & Hudson, C. J. (1986). Influence of exercise on anxiety level in patients with anxiety disorders. *Psychosomatics*, *27*(10), 720-723.
12. Cashin, A., Potter, E.S., & Butler, T. (2008). The relationship between exercise and hopelessness in prison. *Journal of psychiatric and mental health nursing, 15 1*, 66-71 .
13. De Moor, M. H., Beem, A. L., Stubbe, J. H., Boomsma, D. I., & De Geus, E. J. (2006). Regular exercise, anxiety, depression and personality: a population-based study. *Preventive medicine*, *42*(4), 273-279.
14. Dunn, S. L., Dunn, L. M., Rieth, N. P., Olamijulo, G. B., Swieringa, L. L., Holden, T. P., ... & Tintle, N. L. (2017). Impact of home-and hospital-based exercise in cardiac rehabilitation on hopelessness in patients with coronary heart disease. *Journal of cardiopulmonary rehabilitation and prevention*, *37*(1), 39-48.
15. Dunn, S. L., Olamijulo, G. B., Fuglseth, H. L., Holden, T. P., Swieringa, L. L., Sit, M. J., ... & Tintle, N. L. (2014). The state–trait hopelessness scale: Development and testing. *Western Journal of Nursing Research*, *36*(4), 552-570.
16. Fletcher, D., & Sarkar, M. (2012). A grounded theory of psychological resilience in Olympic champions. *Psychology of sport and exercise*, *13*(5), 669-678.
17. Fletcher, D., & Sarkar, M. (2013). Psychological resilience. *European psychologist*. https://doi.org/10.1027/1016-9040/a000124
18. Franklin, J. C., Ribeiro, J. D., Fox, K. R., Bentley, K. H., Kleiman, E. M., Huang, X. Y. N., et al. (2017). Risk factors for suicidal thoughts and behaviors: A meta-analysis of 50 years of research. Psychological Bulletin, 143(2), 187–232. https://doi.org/10.1037/bul0000084.
19. Goodwin, R. D. (2003). Association between physical activity and mental disorders among adults in the United States. *Preventive medicine*, *36*(6), 698-703.

20. Haatainen, K. M., Tanskanen, A., Kylma, J., Honkalampi, K., Koivumaa-Honkanen, H., Hintikka, J., et al. (2003b). Stable hopelessness and its predictors in a general population: A 2-year follow-up study. Suicide and Life-Threatening Behavior, 33(4), 373–380. https://doi.org/10.1521/suli.33.4.373.25237.
21. Herring, M. P., Jacob, M. L., Suveg, C., Dishman, R. K., & O'Connor, P. J. (2011). Feasibility of exercise training for the short-term treatment of generalized anxiety disorder: a randomized controlled trial. *Psychotherapy and psychosomatics*, *81*(1), 21-28.
22. Jayakody, K., Gunadasa, S., & Hosker, C. (2014). Exercise for anxiety disorders: systematic review. *British journal of sports medicine*, *48*(3), 187-196.
23. Kandola, A., & Stubbs, B. (2020). Exercise and anxiety. *Physical exercise for human health*, 345-352.
24. Karasar, N. (2015). Araştırmalarda rapor hazırlama (19. baskı). *Ankara: Nobel Akademik Yayıncılık*.
25. Kessler, R. C., Gruber, M., Hettema, J. M., Hwang, I., Sampson, N., & Yonkers, K. A. (2008). Co-morbid major depression and generalized anxiety disorders in the National Comorbidity Survey follow-up. *Psychological medicine*, *38*(3), 365-374.
26. Luthar, S. S., Cicchetti, D., & Becker, B. (2000). The construct of resilience: A critical evaluation and guidelines for future work. *Child development*, *71*(3), 543-562.
27. Lysaker, P. H., Davis, L. W., & Hunter, N. L. (2004). Neurocognitive, social and clinical correlates of two domains of hopelessness in schizophrenia. Schizophrenia Research, 70(2–3), 277–285. https ://doi.org/10.1016/j.schres.2004.01.007.
28. Mac Giollabhui, N., Hamilton, J. L., Nielsen, J., Connolly, S. L., Stange, J. P., Varga, S., et al. (2018). Negative Cognitive style interacts with negative life events to predict first onset of a major depressive episode in adolescence via hopelessness. Journal of Abnormal Psychology, 127(1), 1–11. https://doi.org/10.1037/ abn0000301
29. Manger, T. A., & Motta, R. W. (2005). The impact of an exercise program on posttraumatic stress disorder, anxiety, and depression. *International journal of emergency mental health*, *7*(1), 49-57.
30. Marchetti, I., Koster, E. H. W., Klinger, E., & Alloy, L. B. (2016a). Spontaneous thought and vulnerability to mood disorders. Clinical Psychological Science, 4, 835–857. https://doi.org/10.1177/21677 02615622383.
31. Marchetti, I., Loeys, T., Alloy, L. B., & Koster, E. H. W. (2016b). Unveiling the structure of cognitive vulnerability for depression: Specificity and overlap. PLoS ONE. https://doi.org/10.1371/journ al.pone.0168612
32. Masten, A. S. (2001). Ordinary magic: Resilience processes in development. *American psychologist*, *56*(3), 227.
33. Neumann, R. J., Ahrens, K. F., Kollmann, B., Goldbach, N., Chmitorz, A., Weichert, D., ... & Matura, S. (2022). The impact of physical fitness on resilience to modern life stress and the mediating role of general self-efficacy. *European archives of psychiatry and clinical neuroscience*, 1-14.
34. Roest, A. M., Martens, E. J., de Jonge, P., & Denollet, J. (2010). Anxiety and risk of incident coronary heart disease: a meta-analysis. *Journal of the American College of Cardiology*, *56*(1), 38-46.
35. Silverman, M. N., & Deuster, P. A. (2014). Biological mechanisms underlying the role of physical fitness in health and resilience. *Interface focus*, *4*(5), 20140040.
36. Spielberger, C. D., Gorsuch, R. L., & Lushene, R. E. (1970). STAI: Manual for the State-Trait Anxiety Inventory. Palo Alto, CA: Consulting Psychologists Press
37. Stonerock, G. L., Hoffman, B. M., Smith, P. J., & Blumenthal, J. A. (2015). Exercise as treatment for anxiety: systematic review and analysis. *Annals of behavioral medicine*, *49*(4), 542-556.

38. Stubbs, B., Koyanagi, A., Hallgren, M., Firth, J., Richards, J., Schuch, F., ... & Vancampfort, D. (2017). Physical activity and anxiety: A perspective from the World Health Survey. *Journal of affective disorders*, *208*, 545-552.
39. Stubbs, B., Vancampfort, D., Rosenbaum, S., Firth, J., Cosco, T., Veronese, N., ... & Schuch, F. B. (2017). An examination of the anxiolytic effects of exercise for people with anxiety and stress-related disorders: a meta-analysis. *Psychiatry research*, *249*, 102-108.
40. Taylor, M. K., Pietrobon, R., Pan, D., Huff, M., & Higgins, L. D. (2004). Healthy People 2010 physical activity guidelines and psychological symptoms: Evidence from a large nationwide database. *Journal of Physical Activity and Health*, *1*(2), 114-130.
41. Thorsen, L., Nystad, W., Stigum, H., Dahl, O., Klepp, O., Bremnes, R. M., ... & Fosså, S. D. (2005). The association between self-reported physical activity and prevalence of depression and anxiety disorder in long-term survivors of testicular cancer and men in a general population sample. *Supportive Care in Cancer*, *13*, 637-646.
42. Twomey, L.T. (1989). AGE, EXERCISE AND THE MUSCULO-SKELETAL SYSTEM. *Australasian Journal on Ageing*, *8*, 36-41.
43. Valtonen, M., Laaksonen, D. E., Laukkanen, J., Tolmunen, T., Rauramaa, R., Viinamäki, H., ... & Niskanen, L. (2009). Leisure-time physical activity, cardiorespiratory fitness and feelings of hopelessness in men. *BMC Public Health*, *9*, 1-7.
44. Valtonen, M., Laaksonen, D.E., Laukkanen, J.A., Tolmunen, T., Rauramaa, R., Viinamäki, H.T., Mursu, J., Savonen, K., Lakka, T.A., Niskanen, L., & Kauhanen, J. (2010). Sedentary lifestyle and emergence of hopelessness in middle-aged men. *European Journal of Preventive Cardiology, 17*, 524 - 529.
45. Weinstein, A.M., Maayan, G., & Weinstein, Y. (2015). A study on the relationship between compulsive exercise, depression and anxiety. *Journal of Behavioral Addictions, 4*, 315 - 318.
46. Yiğiter, K. (2014). The Effects of Participation in Regular Exercise on Self-Esteem and Hopelessness of Female University Students. *Social Behavior and Personality, 42*, 1233-1244.