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Psychometric evaluation of the Italian Revised Exercise Addiction Inventory (EAI-R) among Italian speaking exercisers: Confirmatory factor analysis

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Abstract

Background: The Exercise Addiction Inventory (EAI) is a valid and reliable instrument and has been used in numerous contexts and research studies. The EAI was recently revised (EAI-R), but the psychometric properties of the EAI-R have yet to be examined in an Italian context. Therefore, the present study aimed to validate the EAI-R among Italian-speaking exercisers. Methods: The sample comprised 200 Italian-speaking exercisers (62% females, 38% male; mean age = 35 years, SD±11.42), who completed a survey including the EAI-R, Depression Anxiety and Stress Scale-21 (DASS-21), Rosenberg's Self-Esteem Scale (RSES), and Exercise Dependence Scale-Revised (EDS-R). Results: Confirmatory factor analysis (CFA) showed the EAI-R had good psychometric characteristics (Cronbach's $\alpha = 0.90$) and confirmed the scale's unidimensional properties. Scores on the EAI-R were positively correlated with EDS-R scores, the number of weekly hours of exercise, and DASS-21 scores. Conversely, EAI-R scores were negatively correlated with the RSES scores and age. Conclusion: The EAI-R is a psychometrically reliable and valid measure for assessing the risk of exercise addiction among Italian adults. The study expands the literature on exercise addiction and demonstrates important associational factors in the Italian context.

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Introduction

Exercise is universally recognized as a healthy habit (World Health Organization, 2020). It has several benefits for the human body at physical, psychological, and social levels: better sleep, improved heart function, reduced anxiety, stress and depression, improved blood circulation, cognitive functions, and prevention of various diseases (with consequent reduction of costs for the national health system), improved sociability, increased inclusion, and improved academic performance (e.g. Bailey, 2006; Bantjes & Swartz, 2018; Eigenschenk et al., 2019; Holt et al, 2011; Wankel & Berger, 1990).

However, in a minority of cases, exercise has also been recognized as having the potential to become an unhealthy obsession. It can lead to maladaptive behaviors as a consequence of physical exercise. Among various terms that have been used to define this maladaptive behavior, the most used term to describe this phenomenon is 'exercise addiction' (e.g., de La Vega et al., 2016; Hausenblas & Downs, 2002a, b), comprising symptoms similar to substance addiction and other behavioral addictions (Griffiths, 2005).

Researchers have stated that exercise addiction is a psychological dysfunction in which individuals lose control over their behavior during exercise (e.g., Szabo, 2010). The affected individual behaves compulsively, shows withdrawal symptoms when exercise is not possible, and experiences conflict and negative life consequences due to extreme volume of exercise (Szaboet al., 2016). Exercise addiction has been reported to be associated with health problems, anxiety, depression, stress, low self-esteem, skeletal and muscular problems, and eating disorders (Simon-Grima et al., 2019; Wågan, et al., 2021; Weinstein et al., 2015). Therefore, exercise addiction can be classified as a behavioral addiction (e.g., Szabo, 2010).

The prevalence of exercise addiction has been studied mainly among leisure athletes such as runners, cyclists, and fitness center-goers. One literature review (Di Lodovico et al., 2019) reported that there is a higher percentage of individuals at risk of exercise addiction among endurance athletes, ball sports players (e.g., football), gym-goers, and strength disciplines (10.4%) compared to approximately 3.0% in other types of sport and exercise (Di Lodovico et al., 2019; Mónok et al., 2012), but may vary depending on the type of exercise and the assessment instrument used (Marques et al., 2019).

Despite increased interest by researchers, there are currently no officially diagnosed cases of exercise addiction because there are no official diagnostic criteria. While some authors classify problematic exercise as a behavioral addiction (Egorov & Szabo, 2013), exercise addiction is not included in the latest (fifth) edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5) subsection of 'non-substance-related disorders' (American Psychiatric Association, 2013). Researchers working in the area of exercise addiction have usually adapted the DSM criteria for substance dependence (Hausenblas & Downs, 2002a, b), or used the addiction components model (Griffiths, 2005) as the theoretical underpinning for their research.

The addiction component model comprises six criteria, which are claimed to be present in all addictions regardless of whether they are substance-based or behavior-based (i.e., salience, conflict, withdrawal, mood modification, tolerance, and relapse, Griffiths, 2005). The characteristics of these six components, referring to exercise, can be described as follows: (i) *salience*: indicating that exercise becomes the most important activity in a person's life, influencing their thinking and behavior; (ii) *mood modification*: indicating a change mood as a result of exercise (e.g., using exercise to feel euphoric); (iii) *tolerance*: indicating the need to increase the amount and frequency of physical exercise to achieve the initial mood-modifying effects; (iv) *withdrawal symptoms*: indicating the unpleasant effects that occur when physical activity is suddenly stopped or reduced; (v) *conflict*: indicating the educational, occupational, social and intrapsychic conflicts with other activities and individuals (e.g., family members) due to excessive exercise activity; and (vi) *relapse*: indicating the tendency to revert to previous maladaptive exercise patterns after times of abstinence or control. Consequently, the Exercise Addiction Inventory (EAI; Griffiths et al., 2005) was developed to assess the risk of developing an exercise addiction using these six criteria (Griffiths, 2005).

The EAI has become a popular instrument used to assess the risk of exercise addiction and has been validated in several languages, including Danish (Lichtenstein et al., 2014), German (Ziemainz et al., 2013), French (Ferreira, 2017), Hungarian (Demetrovics & Kurimay, 2008), Italian (Gori, Topino & Griffiths, 2021), Spanish (Sicilia et al., 2013), Arabic (Syed et al., 2023) and Chinese (Wang et al., 2022). A conceptual problem with the original EAI, overlooked by the original developers and others, was that the rating was not necessarily incremental with an intermediate response of 'neither agree nor disagree', a neutral response that could artificially increase the total EAI score. Therefore, a revised version was validated changing the scoring to overcome this problem – the Exercise Addiction Inventory Revised (EAI-R; Szabo et al., 2019).

More specifically, Szabo et al. (2019) removed the middle neutral response by increasing the number of response options from five to six. Consequently, three 'agree' and three 'disagree' responses can be obtained: 1 = strongly disagree, 2 = disagree, 3 = slightly disagree, 4 = slightly agree, 5 = agree, and 6 = strongly agree. These responses facilitate the interpretation regarding the presence of the six addiction symptoms in the components model by having three approval (agree) and three non-approval (disagree) responses that could be grouped into two categories (yes/no) if necessary (e.g., to perform chi-square tests that favor fewer categories; Allen & Seaman, 2007). In the revised version of the EAI-R) the content and meaning of the items remain the same, but the scoring (as aforementioned) changed. Using this new scoring system, the EIA-R is better at intercepting the presence of symptoms of exercise addiction (Szabo et al., 2019; Wang et al., 2022). More recently, the EAI-R has been validated in other countries, such as China (Wang et al., 2022), and demonstrating excellent psychometric properties.

The present authors believe that using the more recent version of the EAI-R is important for research regarding exercise addiction and may also be useful in clinical practice. In fact, in psychology, many tools have been updated over time to make them more efficient, for example, in terms of scoring, validity, and reliability (e.g., Wang et al., 2022; Costa

et al., 2012). Therefore, the aim of the present study was, to (i) psychometrically evaluate the Italian version of the EAI (Gori et al., 2021) but incorporate the new scoring system of the EAI-R among a population of Italian exercisers, (ii) investigate the relationship between the EAI-R, exercise frequency (hypothesizing a positive relationship; H1), self-esteem (hypothesizing a negative relationship; H2), anxiety, stress and depression (hypothesizing a positive relationship, H3).

Methods

Participants and procedure

Participants were recruited by posting links to the survey in different Italian online forums and social media communities (e.g., *Facebook, WhatsApp, Instagram*) via a link that advertised a survey to be completed on the *Google Forms* platform. The research team distributed the link, inviting individuals to participate voluntarily, anonymously, and without any reward. During a 30-day period (from 20 November to 20 December), 200 voluntary participants responded to the online survey, which took around 10-15 minutes to complete. The inclusion criteria were that participants had to (i) at least 18 years old and (ii) Italian-speaking exercisers. All the participants completed the survey anonymously after providing their informed consent. All participants completed all parts of the survey, so there were no missing data. To reduce the effects of order and sequence, the psychometric scales within the survey were administered randomly (Schuman & Duncan, 1997).

Measures

Socio-demographics, life habits, and general questions related to exercise. The survey included questions concerning the socio-demographic aspects of the participants (e.g., sex, age, educational level), and exercise frequency (e.g., how many hours they exercised during the week).

Exercise Dependence Scale-Revised (EDS-R). The 21-item EDS-R (Hausenblas & Downs, 2002a; Italian version: Costa et al., 2012) was used to assess exercise dependence. Items (e.g., *"I exercise despite recurring physical problems I exercise despite recurring physical problems"*) are rated on a six-point scale from 1 (*Never*) to 6 (*Always*). Scores range from 21 to 126, and higher scores indicate greater exercise dependence. The scale was included to test for convergent validity. Cronbach's alpha in the present study was excellent (α = 0.95).

Exercise Addiction Inventory Revisited (EAI-R). The six-item EAI-R (Szabo et al., 2019; Italian version of the EAI: Gori et al., 2021. The only difference between the Italian EAI and Italian EAI-R is the scoring) Items (e.g., "*If I have to miss an exercise session, I feel moody and irritable*") are rated on a six-point scale from 1 (*strongly disagree*) to 6 (*strongly agree*). Scores range between 6 and 36; the higher the score, the greater the risk of exercise addiction. The prevalence of risk of exercise addiction was estimated by summing the six-item scores on the EAI-R. As Szabo et al. (2019) suggested, an individual with a total score of ≥29 can be assessed as at risk of developing an exercise addiction. Cronbach's alpha in the present study was very good (α = 0.89).

Rosenberg's Self-Esteem Scale (RSES). The 10-item RSES (Rosenberg, 1965; Italian version: Prezza et al., 1997) was used to assess self-esteem. Items (e.g., *"On the whole, I am satisfied with myself"*) are rated on a four-point scale from 0 (*strongly disagree*) to 3 (*strongly agree*). Scores range between 0 and 30, and higher scores indicate greater self-esteem. Cronbach's alpha in the present study was very good (α = 0.85). This scale was used because an association between exercise addiction and low self-esteem was recently shown (e.g., Wågan, et al., 2021).

Depression Anxiety Stress Scale-21 (DASS-21). The 21-item DASS-21 (DASS-21, Henry & Crawford, 2005, Italian version: Bottesi et al., 2015) was used to assess depression, anxiety, and stress (and psychological distress more generally). Participants indicate how much they agree with the items in reference to the previous week on a four-point scale from 0 (*not at all*) to 3 (*very much*) on the three constructs: depression (e.g., *"I felt like I had nothing to look forward to"*), anxiety (e.g., *"I felt close to a panic attack"*), and stress (e.g., *"I found it difficult to relax"*). Scores on each subscale range from 0 to 21, and the total score ranges from 0 to 63 (indicating general distress, given by the sum of the three subscales). A higher score on each subscale indicates greater anxiety, stress, and depression. Cronbach's alpha in the present study was excellent (α=0.96). This scale was used because anxiety, stress and depression are negatively associated with exercise addiction (e.g., Wågan, et al., 2021; Szabo, Griffiths & Demetrovics, 2016).

Data analysis

The univariate normality of the data was investigated using the guidelines proposed by Muthén and Kaplan (1985), which indicate skewness and kurtosis in the range -1 to +1 as the ideal item range. In addition, the Shapiro-Wilk normality test was used, which was expected to be non-significant for $p<0.01$ (Mishra et al., 2019). Subsequently, other statistical analyses were performed including (i) descriptive statistics of the EAI-R items (i.e., means, standard deviations); (ii) convergent/concurrent validity of the Exercise Addiction Inventory Revisited (EAI-R); and (iii) the reliability of the scale, examined by composite reliability (CR) (CR values > 0.7 are associated with a strong test reliability; Fornell & Larcker 1981; Raykov, 1997) and internal consistency (i.e., Cronbachs 'alpha > 0.70 for sufficient internal consistency).

As a third and last step, factorial structure of the Italian version of the EAI-R was examined through confirmatory factor analysis (CFA). To calculate and evaluate the one-dimensionality of the EAI-R, specific indices were used (Kline, 2011, 2016): NNFI (Non-Normed Fit Index ≥ 0.95), CFI (Comparative Fit Index ≥ 0.95), GFI (Goodness Fit Index ≥ 0.95), AGFI (Adjusted Goodness Fit Index ≥ 0.95), RMSEA (Root Mean Square Error of Approximation ≤ 0.08), and RMSR (Root Mean Square of Residuals ≤ 0.8) and with an acceptable saturation on all items (λij ≥ 0.50, Ferguson & Cox, 1993).

The Pearson product-moment coefficient of correlation (*r*) was employed to establish the relationship between the EAI-R and the other measures with the following effect sizes (in absolute value): from 0.1 to 0.3 small effect, from 0.3 to 0.5 medium effect and from 0.5 to 1.0 large effect size (Nunnally, 1978). In addition, *t*-tests were used to examine differences in means between groups (for example, the t-test was used to test for the difference between the means in the gender group [males vs. females]. As regards the effect size, Cohen's *d* was used, with the following thresholds: very small effect <0.01, small effect <0.20, medium effect <0.50, and large effect >0.80 (i.e., Cohen, 1988).

In addition, other psychometric indices were examined for more in-depth analysis (Ferrando & Lorenzo-Seva, 2017): including UNIQUE (one-dimensional congruence > 0.95), ECV (explained common variance > 0.80), H index (evaluates how well a set of items represents a factor >0.80), and MIREAL (average of absolute loads residues of the object < 0.30).

The chosen significance level was $p<0.05$. The optimum sample size for a factor analysis varies between 30 and 500 participants (Kadam & Bhalerao, 2010; Roscoe, 1975; Soper, 2022). Furthermore, Mundfrom et al. (2005) suggested the minimum sample size should be 3 to 20 times the number of variables for a confirmatory factor analysis (CFA). In the present study, given that there are six items in the EAI-R, a sample size of 200 participants was therefore adequate (Cohen, 1988; Soper, 2022; Westland, 2010). The analyses were performed using FACTOR v.10.10.3 (Lorenzo-Seva & Ferrando, 2017), SPSS Statistics v.26 (IBM Corp. 2011), and JASP version 0.14.0 (JASP Team, 2020).

Results

Descriptive analysis of the sample

The sample (n = 200) comprised 62% females and 48% males, with 56.5% having a university-level degree, 40% having a high-school degree, and 3.5% having a lower-level educational degree. Regarding to marital status, 59.5% were single, 31.5% were married, 3.5% divorced, and 5.5% separated. Regarding employment status, 78% were workers and 22% were students. The average age of the participants was 35 years (*range* 18 to 69 years; *SD* ±11.42). On average, participants exercised for 5.56 hours per week (SD ±4.05). In relation to the most preferred type of exercise engaged in, the sample reported athletics (e.g., running, 26.5%), training in the gym (14%), and football (13.5%), with the remaining 46% engaging other sports (e.g., tennis, martial arts, dance, etc.). The descriptive statistical results of the main psychometric tests used are summarized in Table 1.

Confirmatory factor analysis (CFA)

Before proceeding with confirmatory factor analysis, the items of the EAI-R were analyzed to check whether they were normally distributed. All items of the EAI-R fell within the skewness and kurtosis range of ±1 (see Table 2), Consequently, it was assumed that the items of the EAI-R were approximately normally distributed (e.g., Muthén & Kaplan, 1985). As far as confirmatory factor analysis (CFA) is concerned, as there is no unambiguous academic consensus on indicators to assess the reliability of a model (see: Bollen & Long, 1993; Boomsma, 2000; Hoyle & Panter, 1995), various indices were used. Furthermore, since the items of the EAI-R were normally distributed, maximum likelihood estimation was used (e.g., Mishra et al., 2019).

The results indicated that: $\chi^2 = 23.90$ ($df = 9$, $n = 200$), $p = 0.05$ with $\chi^2/df = 2.65$ (the ratio of χ^2 to degrees of freedom [df] < 3 to consider the data-model fit as acceptable, Kline, 2011), *CFI* = 0.97, *NNFI* = 0.96, *RMSEA* = 0.09 (*90% C.I.*: 0.04; 0.13, p = 0.06), *RMSR* = 0.03, *AGFI* = 0.99, *UNIQUE* = 0.97, *H index* = 0.90, and *MIREAL* = 0.24. The explained common variance (*ECV*) was 0.87. Moreover, all factor loadings (standardized) were high on all six items (*min* = 0.71, *max* = 0.86; i.e., $\lambda ij \geq 0.50$, see Figure 1). These results indicate that the EAI-R presented a good fit to the data and therefore the one-dimensional structure and factorial validity of the EAI-R were supported by the results.

Tab. 1. Descriptive statistics of psychometric scale scores (N=200)

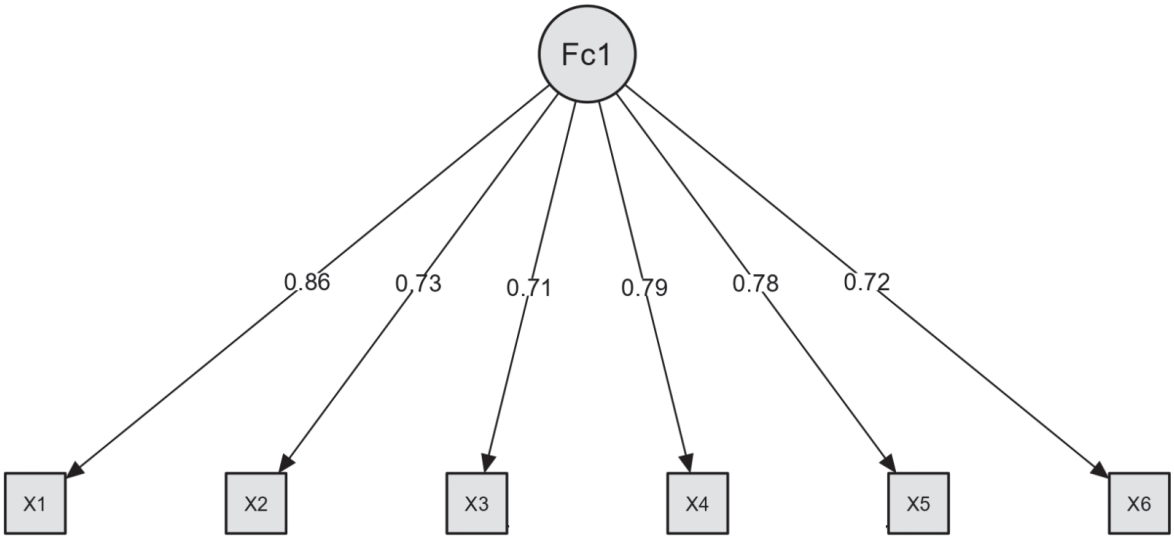
	EAI-R	EDS-R	GDISTRESS	STR	ANX	DEP	SES
Mean	16.60	55.94	33.02	11.93	10.34	10.75	20.75
Standard deviation	7.83	23.18	12.51	4.68	4.18	4.43	6.20
Skewness	0.80	0.70	1.02	0.62	1.31	1.08	-0.36
Kurtosis	-0.11	-0.29	0.12	-0.86	0.78	-0.02	-0.78

Note: GDISTRESS=General distress DASS-21, DEP=Depression DASS-21, ANX=Anxiety DASS-21, STR=Stress DASS-21, SES=Self-Esteem Scale, EAI-R= Exercise Addiction Inventory Revised, EDS-R= Exercise Dependence Scale-Revised

Tab. 2. Descriptive Statistics of EAI-R items (N=200)

	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6
Mean	2.70	2.16	3.42	2.72	2.79	2.80
Standard deviation	1.54	1.58	1.59	1.55	1.64	1.74
Skewness	0.63	1.00	0.06	0.59	0.65	0.56
Kurtosis	-0.60	0.19	-1.00	-0.77	-0.75	-1.00

Fig. 1. CFA – Factor structure of the EAI-R



Correlation analysis

The correlations between the EAI-R scores and the main variables were analyzed. Direction and strength of the coefficients were assessed following Cohen's (1988) interpretation (see Table 3 for details). Exercise addiction correlated positively and significantly with exercise dependence (EDS-R, r=0.80, p<0.01) demonstrating convergent validity. Exercise addiction was also significantly and positively associated with the number of weekly hours of exercise (r = 0.60, p < 0.01), general distress (r = 0.63, p < 0.01), anxiety (r = 0.58, p < 0.01), depression (r = 0.63, p < 0.01) and stress (r = 0.56, p < 0.01). Conversely, exercise addiction was negatively correlated with self-esteem (r = -0.45, p < 0.01) and with age (r = -0.27, p < 0.01). Finally, all items in the EAI-R positively and significantly correlated with each other (*min* = 0.45, *max* = 0.67, p < 0.01, see Table 4).

Tab. 3. Correlations between the EAI-R and the main scales used (N=200)

	EAI-R	EDS-R	GDISTRESS	STR	ANX	DEP	SES
EAI-R	1						
EDS-R	0.80**	1					
GDISTRESS	0.63**	0.63**	1				
STR	0.56**	0.53**	0.93**	1			
ANX	0.58**	0.63**	0.93**	0.80**	1		
DEP	0.63**	0.62**	0.94**	0.82**	0.85**	1	
SES	-0.45**	-0,51**	-0.63**	-0.50**	-0.59**	-0.68**	1

*Note: ** Correlation is significant at the p <0.01 level (two-tailed). GDISTRESS=General distress DASS-21, DEP=Depression DASS-21, ANX=Anxiety DASS-21, STR=Stress DASS-21, SES=Self-Esteem Scale, EAI-R= Exercise Addiction Inventory Revised, EDS-R= Exercise Dependence Scale-Revised*

Tab. 4. Pearson's correlation between items of the EAI-R (N=200)

	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6
Item 1	1					
Item 2	0.63**	1				
Item 3	0.64**	0.47**	1			
Item 4	0.67**	0.57**	0.58**	1		
Item 5	0.64**	0.58**	0.65**	0.59**	1	
Item 6	0.62**	0.51**	0.45**	0.58**	0,60**	1

*Note: **Statistically significant at p<0.01.*

Reliability

Cronbach's alpha in the present study was 0.90 and could not be improved by removing any items. The CR was 0.89 (> 0.80; Netemeyer et al., 2003). These results indicate very good reliability of the Italian EAI-R. In addition, gender differences on the EAI-R were examined but there were no significant differences: t = 0.185 (df = 199), p = 0.85, Cohen's d = 0.027 (very small effect).

Prevalence of exercise addiction risk

In the present study, the percentage of scores that had a total of ≥29 on the EAI-R was 22/200 (11%) with a prevalence rate of 12% for females and 9.2% males. However, this difference was not significantly different (χ^2 = 0.40, df = 1, p = 0.526). See Table 5 for details.

Tab. 5. Risk of developing exercise addiction – Yes/No and Male/Female

		EAI-R		
Gender		**No**	**Yes**	**Total**
Female	Count	109	**15**	124
	% of total	54.50%	7.50%	62.00%
Male	Count	69	7	76
	% of total	34.50%	3.50%	38.00%
Total	Count	178	**22**	200
	% of total	89.00%	11.00%	100.00%

Note: No=not at risk of developing exercise addiction, Yes= at risk of developing exercise addiction

Discussion

The aim of the present study was to examine the psychometric properties of the Italian version of the Exercise Addiction Inventory-Revised (EAI-R). The results of the confirmatory factor analysis (CFA) indicated a robust and stable one-

dimensional structure, reflecting the results obtained from the original validation (Szabo et al., 2019) and other studies (e.g., Wang et al., 2022, Szabó, 2021). Furthermore, the validity and reliability analyses were satisfactory. All the initial hypotheses of the present study (H1-H3) were supported. In fact, as shown in previous research (e.g., Szabo et al., 2019; Weinstein et al., 2015), in the present study, exercise addiction (like other behavioral addictions such as sex addiction or internet addiction, Andreassen et al., 2018; Soraci et al., 2022; Szabo et al., 2019) was associated with depression, anxiety, and stress (and consequently higher general psychological distress), and with lower self-esteem (reflecting and confirming the results of other previous studies; e.g. Wågan et al., 2021).

In addition, and as expected, the EAI-R was positively associated with the EDS-R (which assesses exercise dependence). This not only provides evidence of convergent validity (i.e., they assess a highly similar construct; Sackett et al., 2007), but also demonstrates the effectiveness of a much shorter scale in assessing the risk of exercise addiction. The results obtained reflect what has been found in previous validations of the EAI-R (e.g., the English version by Szabo et al., 2019, and the Hungarian version by Szabo, 2021). Furthermore, in the present study, no significant difference was found between males and females in total EAI-R scores (comparing the mean EAI-R scores). The prevalence of the risk of exercise addiction in the present study was 11%. This reflects what has been found in previous research (e.g., Szabo et al., 2019) but is higher than others (e.g., Lichtenstein et al., 2014, 2021). The prevalence rate reported in the literature depends on several factors, such as the representativeness of the sample, the type of exercise or sports, and the size of the sample.

Limitations

While the results obtained are more than satisfactory, the present study is not without limitations. First, the study was conducted with only a small sample of healthy individuals who engaged in exercise (although the number of participants was more than adequate for the psychometric testing, given that there were only six items in the EAI-R). Second, the type of sampling was non-probabilistic (with anonymous and voluntary participation and self-report data), which may have affected the generalizability of the results. Third, the sample was imbalanced concerning gender, with a large proportion of females. Fourth, there is the possibility that the participants in the study answered in a socially desirable way. Finally, measurement invariance by gender and age was not tested. This was not possible to do, given the imbalance in the sample concerning these two variables. Future research, with a more representative sample, would address the issue of measurement invariance.

Conclusion

The revised Italian Exercise Addiction Inventory was found to be a valid, reliable, and robust psychometric instrument to assess the risk of exercise addiction among the Italian adult population. The change in the scoring in the EAI-R (from five to six items), compared to the original Exercise Addiction Inventory, does not alter the stability and validity of the instrument and be useful in the field of research and clinical practice. Furthermore, network analysis provided the groundwork for a more in-depth study of the Italian EAI-R's six items. Future studies, with larger and more representative samples, should investigate the structure of the E.AI-R in more detail and its relationship with other constructs associated with it (e.g., stress, anxiety, depression, and self-esteem) using the latest and most innovative psychometric techniques (e.g., network analysis with indices of stability, gender measurement invariance, etc.).

Ethical approval:
The research was conducted according to the Declaration of Helsinki for medical research involving human participants and was approved by University Niccolò Cusano in Rome Ethic Committee, Italy. All participants gave their online consent to participate in the study. The identity of the participants was anonymous, and the data were stored in an encrypted online archive, accessible only to the authors of the present study.

Informed Consent Statement:
Informed consent was obtained from all participants involved in the study.

Data Availability Statement:
Research data are available upon reasonable request to the corresponding author.

Conflict of interest statement:
This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors. The authors declare that there are no conflicts of interest.

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All authors contributed the study.

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Appendix:

Italian version of the Exercise Addiction Inventory Revised (EAI-R, Gori, Topino & Griffiths, 2021)

Scoring: 1 = fortemente in disaccordo, 2 = in disaccordo, 3 = leggermente in disaccordo, 4 = leggermente d'accordo, 5 = d'accordo e 6 = fortemente d'accordo

Per favore, legga attentamente le seguenti affermazioni ed indichi il suo grado di accordo con esse, considerando la seguente scala:

L'esercizio fisico è la cosa più importante nella mia vita.

Sono sorti confitti tra me ed i miei familiari e/o il/la mio/a partner riguardo la quantità di esercizio fisico che faccio.

Uso l'esercizio fisico per cambiare il mio stato d'animo (ad esempio per sentirmi euforico, evadere momentaneamente dalla realtà ecc…).

Nel corso del tempo ho aumentato la quantità di esercizio fisico che faccio nell'arco di una giornata.

Se sono costretto a saltare una sessione di esercizi mi sento di malumore ed irritabile.

Se riduco la quantità di esercizio fisico che faccio e successivamente ricomincio di nuovo, finisco sempre per tornare alla quantità di esercizio fisico che facevo prima.

Supplementary Materials:

None