Journal of Physical Education and Sport ® (JPES), 17(4), Art 266, pp. 2405 - 2411, 2017
online ISSN: 2247 - 806X; p-ISSN: 2247 – 8051; ISSN - L = 2247 - 8051 © JPES

Original Article

Can motives lead athletes to suffer from exercise dependence? Risk of exercise dependence according to motives for practice

MARÍA DEL PILAR VÍLCHEZ CONESA[1]; FRANCISCO JOSÉ PARRA PLAZA[2]; CRISTINA DE FRANCISCO PALACIOS[3]
[1,2,3]Department of Education, Catholic University of Murcia, SPAIN

Published online: December 30, 2017
(Accepted for publication November 19, 2017
DOI:10.7752/jpes.2017.04266

Abstract:
Although there is a clear association between physical activity, sport and good health, there are motives for practicing that can have, at the same time, a positive and negative connotation. This paper seeks to discover what motives can lead athletes to suffer exercise dependence and the levels of risk of exercise dependence according to each motive in a sample of 414 athletes. Spanish version of Exercise Dependence Scale-Revised was used for the measurement of exercise dependence. The motives of practice were measured through Spanish reduced version of Participation Motivation Questionnaire. A stepwise linear regression analysis was performed in order to investigate motives for practice that predict dependence. Kruskall-Wallis test was run with the groups of dependency risk to determine differences between the scores acquired from the scale and motives for practice. Data indicated that the model with greater explanatory power integrates release energy and status. Significant differences were found in motive of health/fitness ($p = .003$), status ($p = .007$), release energy ($p = .012$) and competition ($p = 0.43$). These results offer interesting practical applications. Practice grounds that do not predict dependency such as health, family/peers, or skill development could guide the promotion of sports participation without the risk of suffering exercise dependence. Therefore, this study responds to needs previously recommended to help better understanding of the nature of exercise dependence in general.
Key words: addiction, health, sports participation, skills development, status.

Introduction

Low levels of physical activity during adolescence contribute to obesity and to a detriment in health during adulthood (Kopcakova et al., 2015). Therefore, there is a concern to promote physical activity and to develop habits of sport practice in the population, as it is known that regular physical exercise, if not excessive, results in physical and mental benefits (Matsudo, 2012). For the programs for the promotion of physical activity, among other variables, it has been researched that those reasons of practice lead to regular participation in physical exercise. For example, Moreno-Collados and Cruz-Bermudez (2015) affirm that it is necessary to continue studying the motivational aspects of a specific population to promote sport participation, in order to associate the promotion with motives that lead to regular practice. Another variable that should be considered in these programs is exercise dependence, since Allegre et al. (2007) concluded that after studying the prevalence and intensity of this variable, exercise dependence should be a behavior to take into account for the promotion of sport participation.

Exercise dependence is associated with excessive exercise, which takes priority over other areas of life (Lichtenstein et al., 2013). Possible causes of exercise dependence are psychological rewards, such as improved mood and/or health or more possibilities for socialising (Adams and Kirkby, 2003). However, these same variables are also motives for the practice of physical exercise, which are positively related to a higher prevalence of practice (Butt et al., 2011; Sindik et al., 2013). Therefore, there are reasons for practicing physical and sports activity that can have, at the same time, a positive and negative connotation.

According to Hannus (2012), little is known about the motivational antecedents that lead to excessive practice of physical exercise and exercise dependence. Therefore, other studies such as Cook et al. (2014) emphasise the importance of continuing to investigate psychological aspects and pathological motivations that lead to exercise dependence, worsening health and negatively influencing quality of life.

Therefore, although there is a clear association between physical activity, sport and good health (Nsengiyumva et al., 2014), this paper seeks to discover what motives can lead athletes to suffer exercise dependence. In addition, the different levels of risk of exercise dependence are analysed according to each motive for practice.

Corresponding Author: MARÍA DEL PILAR VÍLCHEZ CONESA, E-mail: mdpvilchez@ucam.edu

Material & methods

Participants

The sample consisted of a total of 414 athletes (Mage = 19.28, SD = 0.31), of whom 68.6% (n = 284) were males and 31.4% (n = 130) females. According to type of sport, 26.8% (n = 111) of the participants competed in some individual sport modality and the remaining 73.2% (n = 303) did it in collective sports. Referring to the level of competition, 72% (n = 298) competed at amateur level and 28% (n = 116) at the professional level. In addition, they had been practicing their sport for a mean of 3.93 years (± 1.123), with a mean of 3.87 (± 2.056) sessions per week in the last season and with a duration of almost 8 hours a week of training (7.98 ± 6.01).

Procedure/Test protocol/Skill test trial/Measure/Instruments

A management booklet was developed which began with a series of questions in order to collect socio-sport data (age, sex, type of sport practiced by the participant, years of practice, competitive level achieved, weekly training sessions and duration of each session). Afterwards, two measuring instruments of the study variables were used.

For the evaluation of exercise dependence, the Spanish version of the "Exercise Dependence Scale-Revised" (EDS-R; Symons Downs et al., 2004) adapted by Sicilia and González-Cutre (2011) was used, which has shown adequate psychometric properties. For reliability testing, this tool presents global Cronbach Alpha values of .92, in abstinence.85, in continuation .81, in tolerance .73, for lack of control .78, in time .84, for desired effects .83, and finally, in reducing other activities.68 (although the authors consider it a valid value for its proximity to .70). It was composed of 21 items with a Likert type response format from 1 (never) to 6 (always), from which a global score on dependency levels and a score of the seven dimensions that define it were obtained. Each one was formed by three items.

In addition, this scale makes it possible to classify respondents into three groups (González-Cutre and Sicilia, 2012): risk of dependence (5-6 in at least three criteria), symptomatic non-dependent (3-4 in at least three criteria or combined with scores of 5-6, not belonging to the previous group) and non-dependent asymptomatic (1-2 in at least three criteria, without meeting the conditions of the previous groups).

The motives of practice were measured through the Spanish reduced version of the "Questionnaire of Sports Participation Reasons" (CMDP; Martínez et al., 2008) developed by Vílchez and De Francisco (in press) which requires a shorter application and presents good psychometric properties. It shows Cronbach's alpha values ranging from .72 to .88 and factorial analyses indicate that the seven dimensions it contains explain 57.60% of the variance, presenting a good fit of the data ($\chi 2 = 1.29$, RMSEA = 0.34, NNFI = .950, CFI = .959) The questionnaire consists of 22 items: four for competition, three for status, three for teamwork, four for energy release, two for family/peers, four for health, and two for skill development. Each item has a Likert type response format ranging from 1 (not important) to 5 (very important). The numerical results obtained for each dimension show the motive for practice and the degree to which each identified subject feels.

Data collection was performed in the clubs' environment, with the participants all working together in a group. We contacted the person leading the athletes or the coordinator of the different categories of each club, then explained how the data would be collected during a weekly training session. After obtaining their approval, the informed consent of the athletes was requested and for those who were under age, consent was requested from their tutors, guaranteeing the anonymity of their answers. Next, a standardized application of the questionnaire was done, not mentioning the term burnout at any time in order not to generate biases in the responses.

Data collection and analysis / Statistical analysis

First, a preliminary analysis of the data was carried out with the objective of detecting and eliminating lost and /or out-of-range data and outliers using frequency analysis and cash charts. Pearson's descriptive statistics and correlations were then calculated to analyze the possible relationship between the dependency variable and the different motives of practice. In order to find the motives of practice that predict dependence, a stepwise linear regression analysis was performed taking as the different motives of practice as independent variables that showed significant correlations with dependence, and the dependent variable as the latter. In order to include such variables, non-collinearity was also verified through the tolerance values (.900) and the inflation factor of the variance (FIV; 1,111) to avoid any variable being a linear combination of another. Finally, a Kruskall-Wallis test was run with the groups of dependency risk as a grouping variable and the subjects as dependent variables. This test was used because of the non-normality of the motives of practice.

Results

Descriptive analysis and bivariate correlations

Table 1 shows the descriptive (means and deviations) and correlations of the study variables. The highest score was skill development (M = 4.60), followed by competition (M = 4.47). The least influential motive was status (M = 3.12).

In order to analyse the possible relationship between the different motives of practice and the exercise dependence, Pearson's correlations were carried out whose results are also offered in Table 1. No significant statistical results were found between dependence and motives of teamwork and skill development, however, positive correlations were found between dependence and the rest of the dimensions belonging to the motives of practice with a confidence level of 99%: competition (Rxy = .148), status (Rxy = .199), energy release (Rxy = .223), family/peers (Rxy = .147) and health/fitness (Rxy = .155).

Table 1. Descriptive statistics and correlations between variables.

Variables	M	SD	Min	Max	1	2	3	4	5	6	7	8
1. Exercise dependence	3.33	.78	1.3	5.5		.148**	.199**	.008	.223**	.147**	.155**	-.029
2. Competition	4.47	.56	2.5	5.0			.119**	.467**	.295**	.182**	.441**	.599**
3. Status	3.12	1.1	1.0	5.0				-.020	.316**	.260**	.255**	-.034
4. Teamwork	4.37	.62	2.7	5.0					.172**	.145**	.292**	.490**
5. Energy release	3.87	.67	2.0	5.0						.431**	.343**	.195**
6. Family/peers	3.82	1.0	1.0	5.0							.203**	.140**
7. Health/fitness	4.34	.63	2.8	5.0								.413**
8. Skill development	4.60	.57	2.5	5.0								

*Note. **p<.0.01;; M = Mean; SD = Standart Desviation; Min = Minimum, Max = Maximum*

Regression Analysis

The model with greater explanatory power integrates with the dimension's release energy and status. As shown in Table 2, in the prediction of exercise dependence, this equation explains little more than 6% (R2 = 0.063; F2, 411 = 14,990, p <.001), the energy release dimension having a value of B = .178 (t = 3.538, p = 0.0001) and the status of β = .143 (t = 2,846, p = 0.005). Finally, the constant A was 2.23 with a typical error of .22 (p <.001).

Table 2. *Coefficients of the stepwise regression analysis considering as dependent variable the exercise dependence.*

Variables	*β*	R^2	*t*	*p*
Step 1				
Energy release	.223	.050	4.638	.001
Step 2				
Energy release	.178	.068	3.538	.001
Status	.143		2.846	.005

Motives of practice according to the risk group of exercise dependence

Table 3 shows the mean range and significance of each motive of practice in relation to the different risk groups for exercise dependence. Significant differences were found in the motive of health/fitness (p = .003), where those with the highest risk of exercise dependence scored higher (Range M = 248.24) than those with symptoms only (Range M = 210.42) and those who are asymptomatic (Range M = 191.22). The motive of status also showed significant differences (p = .007), with the highest score being the group with risk of exercise dependence (Range M = 250.63) than the symptomatic ones (Range M = 201.73) and the asymptomatic ones (Range M = 197.81). The motive of release energy had statistically significant differences (p = .012), the highest risk group being the highest (Range M = 243.43), the symptomatic (Range M = 210.55), and followed by the asymptomatic ones (Range M = 192.73). Finally, significant differences were found in the motive of competition (p = 0.43), where the risk group scored higher (Range M = 240.91), then symptomatic (Range M = 202.91) and asymptomatic (Range M = 200.10).

The motives of team work, family/peers and skill development did not obtain statistically significant differences.

Table 3. *Motives of practice according to risk groups of exercise dependence.*

	Asymptomatic (n=189) *Range Mean*	Symptomatic (n=161) *Range Mean*	Risk (n=64) *Range Mean*	*p*
Competition	200.10	202.91	240.91	.043*
Status	197.81	201.73	250.63	.007**
Teamwork	212.49	204.22	201.02	.715
Energy release	192.73	210.55	243.43	.012*
Family/peers	206.96	199.48	229.27	.228
Health/fitness	191.22	210.42	248.24	.003**
Skill development	210.97	203.38	207.93	.800

*Note. *p<.0.05; **p<.0.01*

Dicussion

The first objective of the present study was to establish which motives of practice were predictors of exercise dependence. The model with greater explanatory power integrates the motives for release energy and status. Although Hannus (2012), also through a regression analysis, found that exercise dependence was significantly predicted by the motive of competition. There may be a relationship between the motives of status and competition, since those subjects with more competitive success can achieve a certain status within the club / team (Samardžija et al., 2014).

Although the predictive power of motives is small and exercise dependence only seems to be explained by the motives of release energy and status, the literature throws data from a greater prediction with the motives of exercise dependence. For example, Lichtenstein et al. (2013) affirmed that exercise dependence in individual sports seems to be associated with motives such as fitness, health and weight loss, while in collective sports it is associated more with competition and enjoyment. Therefore, it is necessary to continue researching which prediction of exercise dependence have the motives of practice, specifically some populations as could be the type of sport.

It should be noted that motives of practice may help to explain other variables that predict dependence to a greater extent. For example, mastery orientation, since it refers to when the subject focuses on the process rather than the outcome, and can relate to the motive of skill development, Hannus (2012) found that mastery significantly predicts exercise dependence in reverse. That is, those subjects who are more masters oriented or who practice more physical exercise to improve their abilities, can avoid to a greater extent having dependence on physical exercise.

The secondary objective of this study was to discover the different levels of risk of exercise dependence according to each motive of practice. Positive correlations were found between exercise dependence and the motives for practice to release energy, status, health/fitness, competition and family/peers.

The motive of health/fitness presents significant differences between athletes with risk of exercise dependence, above those who have only symptoms and those who are asymptomatic, with the first group presenting the highest scores. It would be interesting to continue investigating it in different sports or sports contexts because there are authors who find this motive as the most important for young people for sport participation (Guedes and Netto, 2013). Regarding health/fitness, Hannus (2012) showed that it had great value in predicting avoidance of dependence, explaining that subjects with health reasons seem more aware of the balance between training and recovery time. However, the perception of athletes' health not only refers to physical health or physical condition (to which this motive refers). In the youth stage, health perception is also influenced by body image and social relationships (Gonçalvez and Bedín, 2015), so further research should be done to clarify the nature of the prediction of dependence on status as well as health/fitness motives.

The motive of status also had significant differences, with the group in risk of dependence being higher than the symptomatic and asymptomatic ones. Social status is a variable that influences the practice of physical activity. In higher socioeconomic contexts, a higher social status is obtained thanks to sports practice (Miklánková et al., 2016) and, therefore, it is a reason to take into account to avoid exercise dependence in these contexts.

The motive of release energy presented statistically significant differences being the high risk group which scored higher than the symptomatic, followed by the asymptomatic ones. It seems clear that aerobic exercise of light and moderate intensity prevents stress (Haaren et al., 2016), and this agrees with Hannus (2012) who stated that the motives for energy release and fun had an inverse relationship with exercise dependence. However, what type of exercise would have to be researched, because if subjects who engage in physical activity by releasing energy do so at high intensities and high exercise frequencies, they may be at increased risk of exercise dependence, as seen in other populations (Phelan et al., 2011; Shin and You, 2015) where those who perform a greater amount and intensity of exercise have greater exercise dependence.

Finally, significant differences were also found in the motive of competition, where the risk group scored higher than the symptomatic and asymptomatic ones. These results are in agreement with Hannus (2012), who found that those subjects who exercised for the competition reason had less control of their behavior towards the practice of physical exercise. It seems that the competition motive has a clear correlation with exercise dependence, since other authors (Smith et al., 2010) have found that competing athletes have more symptoms of exercise dependence than those who do not compete and who practice the same type of sport. Therefore, Hannus (2012) concluded that people with signs of exercise dependence who practice for competition reasons should receive clear instructions on the training by professionals to prevent this pathology.

In the teamwork, family/peers and skill development, no statistically significant differences were obtained, but the means in the motives of family/peers followed the same trend as the previous motives. However, in the motives of teamwork and skill development, it was the asymptomatic ones that scored higher. These results offer interesting practical applications, because when promoting sports among young people, the motive for skill development seems to be one of the most influential with health (Guedes and Netto, 2013). Together with Hannus's (2012) reported results of the predictive power of orientation to mastery of exercise dependence avoidance, it would be a good promotion strategy for healthy sports participation for this population, since the importance of healthy exercise is to be constant and regular, as a key issue in maintaining health (Shin and You, 2015).

Conclusions

Cook et al. (2013) made a comprehensive review of the prevalence of exercise dependence in several populations, and athletes always showed the highest percentages. However, it is important to differentiate the exercise dependence from those practices with relatively high frequencies and durations, but which do not imply health risks or involve addictive behavior (Márquez and De La Vega, 2015). In fact, there are treatment programs for relieving addiction that take into account adherence to the practice of physical activity (Moore et al., 2011). Given that there is no amount or frequency of practice that delimits suffering exercise dependency, practice grounds that do not predict dependency such as health, family/peers, or skill development could guide the promotion of sports participation without the risk of suffering it. Therefore, this study responds to needs that other authors have previously recommended (Allegre et al., 2006) to help better understanding of the nature of exercise dependence in general.

Another important variable where motives can help to explain their predictive power of exercise dependence is motivation and its different regulations. For example, the literature consulted agrees that introjected regulation is the strongest predictor of exercise dependence, followed by the identified regulation (González-Cutre and Sicilia, 2012; Hamer et al., 2002; Latorre et al., 2016). It would be necessary to investigate whether the regulation identified could be related to motive of health/fitness to explain this prediction, since it is when physical activity and its benefits are considered important. In the same way, if the introjected regulation could be related to motives like release energy, since it happens when physical activity is practiced by not feeling guilty. Also with the other regulations there are possible explanations thanks to the motives of practice, although there are more discrepancies between different authors. González-Cutre and Sicilia (2012) showed that the integrated regulation and the external regulation were predictors of exercise dependence. However, Hamer et al. (2002) found that external regulation was not predictive of exercise dependence. It might be that, seeing the practice of exercise as an obligation, an exercise dependency is not felt. Therefore, although the motives of practice have a low predictive level, they could help to explain other variables that are more predictive of exercise dependence.

References

Adams, J. & Kirkby, R. J. (2003). El exceso de ejercicio como adicción: una revisión. *Revista de Toxicomanías, 34*, 10-22.

Ahmed, D. (2012). Participation motivation and will to win among non-contact game players - an analytical study. *International Journal of Sport Science & Fitness, 2*(2), 308-314.

Akehurst, D., & Oliver, E. J. (2014). Obsessive passion: a dependency associated with injury-related risky behaviour in dancers. *Journal of Sports Sciences, 32*(3), 259–267. http://dx.doi.org/10.1080/02640414.2013.823223

Allegre, B., Souville, M., Therme, P., & Griffiths, M. (2006). Definitions and measures of exercise dependence. *Addiction Research and Theory, 14*(6), 631–646. http://dx.doi.org/10.1080/16066350600903302

Allegre, B., Therme, P., & Griffiths, M. (2007). Individual Factors and the Context of Physical Activity in Exercise Dependence: A Prospective Study of 'Ultra-Marathoners'. *International Journal of Mental Health and Addiction, 5*, 233–243. http://dx.doi.org/10.1007/s11469-007-9081-9

Arbinaga, F., & Caracuel, J. C. (2007). Dependencia del ejercicio en fisicoculturistas competidores evaluada mediante la escala de adicción general Ramón y Cajal. *Universitas Psychologica, 6*(3), 549-557.

Butt, J., Weinberg, R. S., Breckon, J. D., & Claytor, R. P. (2011). Adolescent Physical Activity Participation and Motivational Determinants Across Gender, Age, and Race. *Journal of Physical Activity & Health, 8*, 1074-083.

Castañeda, C., & Campos, M. C. (2012). Motivation of Students of Faculty of Education (University of Seville) to physical activity practice. *Retos, 22*, 57-61.

Chiu, L. K., Yusof, M. M., Fauzee, M. S. O., Othman, A. T., Aman, M. S., Elumalai, G., & Ali, E. M. (2016). Examining Sport and Physical Activity Participation, Motivations and Barriers among Young Malaysians. *Asian Social Science, 12*(1), 159-171. http://dx.doi.org/10.5539/ass.v12n1p159

Cook, B., Engel, S., Crosby, R., Hausenblas, H., Wonderlich, S., & Mitchell, J. (2014). Pathological Motivations for Exercise and Eating Disorder Specific Health-Related Quality of Life. *International Journal of Eating Disorders, 47*, 268–272. http://dx.doi.org/10.1002/eat.22198

Cook, B., Karr, T. M., Zunker, C., Mitchell, J. E., Thompson, R., Sherman, R., Crosby, R. D., Cao, L., Erickson, A., & Wonderlich, S. A. (2013). Primary and Secondary Exercise Dependence in a Community-Based Sample of Road Race Runners. *Journal of Sport & Exercise Psychology, 35*, 464-469.

Deci, E. & Ryan, R. (1985). *Intrinsic Motivation and Self-Determintion in Human Behavior*. Nueva York: Plenum Press.

Deci, E. & Ryan, R. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behaviour. *Psychological Inquiry, 11*(4), 227– 268.

Gonçalvez, S. & Bedín, L. M. (2015). Bienestar, salud e imagen corporal de adolescentes brasileros: la importancia de los contextos familiar, de amistad y escolar. *Universitas Psychologica, 14*(4), 1399-1410. http://dx.doi.org/10.11144/Javeriana.up14-4.bsica

González-Cutre, D. & Sicilia, A. (2012). Dependencia del ejercicio físico en usuarios españoles de centros de acondicionamiento físico (fitness): diferencias según el sexo, la edad y las actividades practicadas. *Behavioral Psychology, 20*(2), 349-364.

González-Cutre, D., Sicilia, A., & Moreno, J. A. (2011). Un estudio cuasiexperimental de los efectos del clima motivador tarea en las clases de Educación Física. *Revista de Educación, 356*, 677-700.

Guedes, D. P. & Netto, J. P. (2013). Sport participation motives of young brazilian athletes. *Perceptual and Motor Skills, 117*(3), 742-759. https://doi.org/10.2466/06.30.PMS.117x33z2

Haaren, B. V., Ottenbacher, J., Muenz, J., & Neumann, R. (2016). Does a 20‐week aerobic exercise training programme increase our capabilities to buffer real‐life stressors? A randomized, controlled trial using ambulatory assessment. *European Journal of Applied Physiology, 116*, 383–394. http://dx.doi.org/10.1007/s00421-015-3284-8

Hamer, M., Karageorghis, C. I., & Vlachopoulos, S. P. (2002). Motives for exercise participation as predictors of exercise dependence among endurance athletes. *The Journal of Sports Medicine and Physical Fitness, 42*, 233–238.

Hannus, A. (2012). Preliminary evidence for relations between motivation and beliefs related to exercise dependence. *Acta Kinesiologiae Universitatis Tartuensis, 18*, 68–83.

Kopcakova, J., Dankulincova, Z., Madarasova, A., Kalman, M., Van Dijk, J. P., & Reijneveld, S. A. (2015). Do Motives to Undertake Physical Activity Relate to Physical Activity in Adolescent Boys and Girls? *International Journal of Environmental Research and Public Health, 12*, 7656-7666. http://dx.doi.org/10.3390/ijerph120707656

Latorre, P. A., Jiménez, A., Párraga, J., & García, F. (2016). Dependencia al ejercicio físico e insatisfacción corporal en diferentes deportes de resistencia y su relación con la motivación al deporte. *Revista de Psicología del Deporte, 25*(1), 113-120.

Lichtenstein, M. B., Larsen, K. S., Christiansen, E., Støving, R. K., & Bredah T. V. (2013). Exercise addiction in team sport and individual sport: Prevalences and validation of the exercise addiction inventory. *Addiction Research and Theory, 22*(5), 431–437. http://dx.doi.org/10.3109/16066359.2013.875537

Márquez, S. & De La Vega, R. (2015). La adicción al ejercicio: un trastorno emergente de la conducta. *Nutrición Hospitalaria, 31*(6), 2384-2391.

Masten, R., Dimec, T., Donko, A. I., & Tušak, M. (2010). Motives for sports participation, attitudes to sport and general health status of the slovenian armed forces employees. *Kinesiology, 42*(2), 153-163.

Matsudo, S. M. (2012). Actividad física: pasaporte para la salud. *Revista Médica de Clínica Las Condes, 23*(3) 209-217. https://doi.org/10.1016/S0716-8640(12)70303-6

Moore, G. F., Moore, L., & Murphy, S. (2011). Facilitating adherence to physical activity: exercise professionals' experiences of the National Exercise Referral Scheme in Wales. a qualitative study. *BMC Public Health, 11*(935), 1-12. https://doi.org/10.1186/1471-2458-11-935

Moreno-Collados, J. E., & Cruz-Bermúdez, H. R. (2015). Association between motives and practice of exercise in participants of a program of physical activity at work. *FACMED-Revista de la facultad de medicina, 63*(4), 609-615.

Nsengiyumva, P., Keim, M., Laattoe, N., & Cabral, F. J. (2014). The influence of physical activity and sport on health status and wellbeing in rural communities: The case of Grabouw. *African Journal for Physical, Health Education, Recreation and Dance (AJPHERD) Supplement 1*(2), 409-418.

Phelan, S., Bond, D. S., Lang, W., Jordan, D., & Wing, R. R. (2011). Exercise Dependence: A Problem or Natural Result of High Activity? *American Journal of Health Behavior, 35*(6), 726-733.

Samardžija, M., Retar, I., Pavletič, P., & Kolar, E. (2014). Comparison of success of slovenian top level athletes at senior and junior competition level. *Annales Kinesiologiae, 5*(1), 23-40.

Shin, K. & You, S. (2015). Factorial validity of the korean version of the exercise dependence scale–revised. *Perceptual & Motor Skills, 121*(3), 889-899. http://dx.doi.org/10.2466/03.08.PMS.121c27x8

Sindik, J., Mandić, G. J., Schiefler, B., & Kondrič, M. (2013). Differences in the structure of motivation for participation in sport activities among sport students in three countries. *Kinesiologia Slovenica,19*(1), 14–31.

Smith, D., Wright, C., & Winrow, D. (2010). Exercise dependence and social physique anxiety in competitive and non-competitive runners. *International Journal of Sport & Exercise Psychology, 8*, 61-69. http://dx.doi.org/10.1080/1612197X.2010.9671934

Tsitskari, E., Vernadakis, N., Foridou, A., & Bebetsos, E. (2015). Assessing adolescents' sport participation motives: psychometric evaluation of BRSQ. *Motricidade, 11*(1), 64-77. https://doi.org/10.6063/motricidade.3194

Vílchez, M. P. & De Francisco, C. (2017). Reduced Spanish Version of Participation Motives Questionnaire for Exercise and Sport: Psychometric Properties, Social/Sport Differences. *Journal of Sports Science and Medicine, 16*, 365-374.