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THE INFLUENCE OF PHYSICAL ACTIVITY IN RESILIENCE AND COPING STRATEGIES IN ADULTHOOD

L'INFLUENZA DELL'ATTIVITÀ FISICA SULLA RESILIENZA E LE STRATEGIE DI COPING NELL'ETÀ ADULTA

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Abstract

The purpose of the study is to investigate the relationship between the physical activity, linked to energy expenditure, and the development of resilience and adaptive coping strategies. Therefore, one more aim is to confirm the positive correlation between self-esteem and resilience. It is well known that sports and physical activity can play an important role in human health. It is not yet well defined if it is the energy and oxygen expenditure that bring benefits or the complexity of the movement, or a mix of both, in particular for resilience and coping strategies. Our sample is composed by 280 cases, all adults. The data has been collected using the Rosenberg Self-Esteem Scale, the Adult Resilience Measure, the Brief COPE Questionnaire and the IPAQ for physical activity. According to the results, there's no correlation between physical activity / energy expenditure and resilience level and adaptive coping strategies. In this sense, new research are needed, involving different and more complex motor acts and different levels of energy expenditure.

Lo scopo dello studio è quello di indagare la relazione tra l'attività fisica, con riferimento al dispendio energetico, e lo sviluppo della resilienza e di strategie di coping adattive. Inoltre, un altro obiettivo è confermare la correlazione positiva tra autostima e resilienza. È noto che lo sport e l'attività fisica possono svolgere un ruolo importante nella salute umana. Non è ancora ben definito se siano il dispendio di energia e il consumo di ossigeno a portare benefici alla salute o la complessità del movimento motorio, o un mix di entrambi, in particolare per la resilienza e le strategie di coping. Il nostro campione è composto da 280 casi, tutti adulti. I dati sono stati raccolti utilizzando la Self-Esteem Scale di Rosenberg, la Adult Resilience Measure (ARM-R), il Brief COPE Questionnaire e l'IPAQ per l'attività fisica. I risultati mostrano che non vi è correlazione tra attività fisica / dispendio energetico e livello di resilienza e strategie di adattamento adattivo. In questo senso, sono necessarie nuove ricerche, che coinvolgano atti motori diversi e più complessi e diversi livelli di dispendio energetico.

Keywords

physical activity, resilience, coping strategy, self-esteem, met
attività fisica, resilienza, strategia di coping, autostima, met

1. Introduction[1]

The regular exercise and physical activity has a great importance in human life. It has been always acknowledged as a factor of health and wellness. Even in ancient Chinese and Greek civilizations it was an important part of everyday life (Berryman, 2010), although its importance has been fluctuating over the centuries, specially after industrialization period when relaxation and enjoyment were most important (Dallek & Kravits, 2002). The recent statistical surveys say that, worldwide, 1 in 4 adults and 3 in 4 adolescents (aged 11 to 17) do not respect the recommendations of the World Health Organization (Ministero della Salute, 2017) about physical activity. The increased use of technology, the urbanization and the changing transport behaviour lead to a more sedentary lifestyle, up to 70% of inactivity levels in some countries. The latest scientific evidences show as physical activity can provide considerable benefits to both physical and mental health. At all ages, the benefits of being physically active outweigh potential harm, for example through accidents. Several studies have consistently demonstrated that physical activity decreases the rates for all-cause mortality and cardiovascular death (McKinney et al., 2016). It has been documented that the recommandations by World Health Organization of at least 150 minutes of moderate-to-vigorous aerobic physical activity per week is related to a 20% to 30% lower risk for premature mortality and incidence of many chronic diseases (Taylor, Huffman, & Macedo, 2013). Exercise represents an essential element in the therapeutic management of diabetes, both in terms of primary and secondary and tertiary prevention (Colberg et al, 2016). PA promotes cardiometabolic and cardiovascular wellness and other disorders of metabolism, neurological diseases, sarcopenia, osteoporosis, and cancer (Neufer et al., 2015). In the WHO European Region, physical inactivity is responsible every year for one million deaths (about 10% of the total) and 8.3 million years lost after disability (Disability-adjusted life years, DALY). It is estimated that 5% of coronary heart disease, 7% of cases of type 2 diabetes, 9% of breast cancer and 10% of colon cancer are attributable to inactivity. Furthermore, many countries in the region have seen an increase in the number of overweight and obese people: in 46 countries (87% of the Region), over half of the adults are overweight or obese (Ministero della Salute, 2017). Physical activity does not play a central role only in the prevention and treatment of some medical pathologies but it's an important factor in achieving and maintaining the psychological well-being of people, in all ages. Unfortunately, the evidence in this area are less documented. Some scientific literature indicates that adults with an active lifestyle get better results in tests that measure verbal memory, psicomotorial speed, executive functions (Zhu et al., 2014). Tests on school-age children, undergoing structured physical activity programs, showed an improvement in working memory that is crucial for academic achievement (Kamijo et al., 2011), as already stated by Castelli and collegues (2007). Lots of studies demonstrated that physical activity and exercise reduce stress and its related sympotms (van der Zwan, De Vente, Huizink, Bögels, & De Bruin, 2015; Koschel, Young & Navalta, 2017; Peluso Cassese, Impara & Mariani, 2016). In particular, the stress reduction seems to be linked to more adaptive coping strategies developed thanks to a planned, structured and repetitive physical activity (Garber, 2017; Firth et. al., 2016). In addition, a wide variety of psychological outcomes have been studied, including effects on mood, self-esteem and resilience. Our study wants to investigate the relationship among an active lifestyle and the increase in self esteem, resilience and the development of more adaptive copying strategies.

1 Il manoscritto è il risultato di un lavoro collettivo degli autori i cui specifici contributi sono da afferire come segue: Anna Maria Mariani paragrafo 1, 2, 4, 5, 7; Francesco Melchiori paragrafo 6; Federica Marcolongo paragrafo 3; le conclusioni sono state realizzate da Anna Maria Mariani.

2. Physical Activity and Energy expenditure

According to the WHO, it can be considered physical activity any movement determined by the musculoskeletal system which results in an energy expenditure greater than that of rest conditions. This definition includes not only sports activities, but also simple movements such as walking, cycling, dancing, playing, gardening and housework, which are part of the "spontaneous motor activity". The expression motor activity is essentially synonymous with physical activity. On the contrary, "physical exercise" is a structured, planned, ripetitive and regularly performed form and aims to improve or maintain one or more components of physical fitness. Both, moderate and vigorous intensity physical activity brings health benefits (WHO, 2017). Furthermore, the European Sport Charter defines sport as "any form of physical activity which, through an organized or non-organized participation, aims at the expression or improvement of the physical and mental condition, the development of social relations or the obtaining of results in competitions of all levels". It's a meaning that is not to the competitive aspect, as usually is, but also, more directly, to the aspects of free time, socialization and well-being (Carta Europea dello Sport, 1992). Any movement require an energy expenditure, that is the amount of energy made available by the metabolism and necessary to perform a given muscular work. It varies depending on the characteristics of physical, sporting or working activities and therefore depends on the type and intensity of exercise. Conventionally, in order to measure the energy expenditure, MET (Metabolic Equivalent of Task) is used. Metabolic Equivalent, is a physiological measure that expresses the energies spent (or calories) in physical activity. 1 MET is the energy equivalent spent by an individual sitting at rest. During the exercise, the MET equivalent is the energy spent compared with rest, so that the MET values indicate the intensity. An activity with a MET value of 5 means that the person is spending five times the energy (or number of calories) he would spend while remaining at rest. According to the intensity (the rate at which the activity is being performed), we can distinguish moderate physical activity the 3 to 6 times more intense activity than the resting state. Levels above 6 times (7 for children and young people), the state of rest defines vigorous exercise. Moderate activities such as walking fast or dancing can reach 5 - 6 MET, while more vigorous activities such as climbing stairs or jogging require about 7-8 METs. Most sporting activities have intensities above 10 MET.

In order to have the physical and psychological benefits from phyisical activiy, WHO recommend different levels of intensity and time according to age group:

- - for children and teenagers (5 - 17 years): at least 60 minutes a day of moderate-vigorous activity, including strength exercises that can consist of movement games or sports activities
- - for adults (18 - 64 years): at least 150 minutes a week of moderate activity or 75 of vigorous activity (or equivalent combinations of the two) in sessions of at least 10 minutes at a time, strengthening the major muscle groups to play at least 2 times per week;
- - for the elderly (aged 65 and over): the indications are the same as for adults, with the recommendation to carry out also balance-oriented activities to prevent falls (WHO, 2010).

3. Resilience, Coping Strategies and Self Esteem

Resilience, coping strategies and self esteem are variables that are often studied together in order to investigate their relationship with reference to human well being and stress impact. Many studies put into relation resilience with adaptive and non adaptive coping strategies but also with self esteem that seems to be one of the most important elements to build a personality favorable to resilience and adaptive coping. The most part of the research are focused on adolescence where young people are looking to construct their personality and where the experiences and environment could have an important role in helping resilience and adaptive

coping strategies.

Psychological resilience is the ability to stay strong against the existence of adverse life experiences (Şahin & Hepsogutlu, 2018). The American Psychological Association (2014) defines resilience as "the process of adapting well in the face of adversity, trauma, tragedy, threats or even significant sources of stress" (para. 4). Resilience is the result of an interaction of biological, psychological, social and cultural factors and it determines how an individual responds to stressful experiences. It can be shown as a continuum that has different degrees across different domains of life (Southwick, Bonanno, Masten-Panter, Brick & Yehuda, 2014). Furthermore, according to Kim-Cohen & Turkewitz (2012), resilience is not stable over time, it may change depending on one's interaction with the environment and development. Our response to stress and trauma takes place interacting with other peoples, in a context with specific resources, culture, religion, organization and community (Sherrieb, Norris, & Galea, 2010). As stated by Lazarus and Folkman (1984), when a stress event occurs, people face three processes: primary appraisal, when perceiving a threat, secondary appraisal, when they begin to think about a potential response to the threat and the coping that is the process of executing that response. Furthermore, Richardson (2002) postulated a model of resilience based on innate qualities that can be reinforced all life long. He said that people are always looking for an homeostasis in terms of biological, spiritual and psychological conditions. During life, people face adversities and opportunities, pleasent and unpleasent events. In front of these events, after a moment of "suspension" and emotional appraisal, people work in order to reintegration that can lead to 4 different results: complete reintegration with personal development, coping without development, inability to cope with loss of self esteem and disfuntional coping with self destructive behaviours. Some research indicate that resilience plays an important protective role against psychopathology and and that positive and negative coping strategies can affect both resilience and mental health (Chen, Yang & Chiang, 2018). Furthermore, it is suggested to be an important protective factor against internet addiction (Berman & Rizzo, 2019; Piceci L., 2019).

The coping strategies can be divided into two general categories: problem-solving strategies that consist in doing something pro-actively to alleviate stressful circumstances such as looking for information or reducing the impacts of the problem (for example seeking a counselor to find an advice), and emotion-focused coping strategies that concern efforts to regulate emotions in stressful events or altering expectation (Carver & Connor-Smith, 2010). Kim and McKenzie (2014). According to other studies, effective emotion-focused coping can lead to better problem-focused coping, thanks to a state of calm through positive emotion. Furthermore, people use both types of strategies to cope with the most stressful events (Folkman & Lazarus, 1980). Ungar, Ghazinour & Ricther (2012) support a socio-ecological approach to resilience, where while contemplating the characteristic traits of the person, gives great attention to environmental processes and conditions. The individual is the most important manager of his development, mediated by his own personal characteristics, family / caregiver and context. Several authors consider self-esteem to be part of resilience on the individual level (Kumpfer, 1999; Masten & Coatsworth, 1998), together with self-efficacy, empathy, motivation, critical and creative thinking, (Wagnild & Young, 1993; Benard, 1991; Cramer, 2000). Karatas (2011) found out that the factors that influence the development of resilience in adolescence are self-esteem, self efficacy, adaptation capacity and flexibility. It is important to underline that high levels of self-esteem are linked to satisfactory interpersonal relationships, such as security and closeness (Murray, 2005), appropriate coping strategies (Birndorf, Ryan, Auinger & Aten, 2005). Conversely, low levels of self-esteem are associated with depression and anxiety disorders (Liu, Wang & Zhou, 2014; Michalak, Teismann, Heidenreich, Strohle & Vocks, 2011; Trzesniewski, Donnellan & Robins, 2003), a sense of solitude (Vanhalst, Luyck, Scholte, Engels & Goossens, 2013) and disorders food (De la Rie, Noordenbos, Donker & Van Furth, 2007). Recent studies determined that positive self-respect affects psychological resilience. Furthermore, also self-sufficiency, happiness, emotional intelligence, general wellbeing, satisfaction with life and social support are linked to resilience (Sahin & Hepsogutly, 2018).

4. The role of physical activity on resilience and coping strategies

As mentioned before, we can distinguish physical activity according to the energy expenditure. In this sense, physical activity is a continuum from no movement, as resting or sitting time, through light physical activity, as ambulation, to moderate-to-vigorous physical activity like playing sports, cycling to work, etc. (Biddle, 2016). In the most part of the studies moderate-to-vigorous physical activity and sport are token into account to be associated with better mental health. It can be useful to rule out the positive changes that can occur from the lower part of the continuum, except for resting time. Existing literature states that practice of physical activity is positively correlated, as well as physical resilience, with psychological resilience (Deuster, & Silverman, 2013), and also that adults with a regular physical activity showed higher resilience level to emotional stress than sedentary or irregular exercised people (Childs & de Wit, 2014; Dogan, 2015; Ho, Louie, Chow, Wong & Ip, 2015; Matzka et al., 2016, Yoshikawa, Nishi, & Matsuoka, 2016). It has been demonstrated that resilient characteristics are associated with more potentially adaptive coping strategies, in particular in athletes (Secades et al., 2016). In addition, some researchers identified exercise and sport as a very beneficial coping mechanism. It has been showed that it has a positive decreasing effect on depression and anxiety and improves self-esteem and body image; going further they suggest that physical activity can be a coping mechanism (Thome & Espelage, 2004; Bland, Melton, Bigham & Welle, 2014). An interesting research by Welle & Graf (2011), analysing the relation between coping strategies and lifestyle habits of 429 students, found out that the ones who have a more healthy lifestyle (such as getting regular exercise, having a balanced diet and being involved in an extracurricular sport) had more effective coping mechanisms. Dinger, Brittain & Hutchinson (2014), studing a group of 18-20-year old students, highlighted that participants who met the recommendation of a moderate to vigorous physical activity showed less perceived depression. Ozkara, Kalkavan, Alemdag & Alemdag (2016), in a research on prospective teachers, highligthed that there was a significant and positive relationship between the practice of physical activity and the psychological resilience level. Wermelinger Ávila, Corrêa & Lucchetti (2018) made a study about the influence of physical activity on the relationship between resilience and mental health on older adults. They carried out a cross-sectional study with 312 older adults, assessing the active of sedentary behaviour by the IPAQ and they found out that active and sedentary people use different components of resilience. As we have seen before, self esteem has an important role in resilience and adaptive coping strategies. Research evaluating the relationship between resilience and self-esteem indicates that the two may share a significant, positive relationship. With this focus it is important to mention that physical activity has a positive influence on self esteem. For instance Dumont and Provost (1999) showed that adolescents with a lower level in vulnerability had a significantly higher level in self esteem, than those scoring high on vulnerability measures. Koyuncu, Tok, Canpolat & Catikkas (2010) found an increase in self esteem in women that regularly practiced physical activity in comparison to sedentary women. These results are confirmed also in children and adolescents (Liu, Wu & Ming, 2015; Goldfield et al., 2015).

5. Method

Given the previously reported positive relationships between physical activity and resilience, (Childs & de Wit, 2014), and self-esteem (Liu et al., 2015) and self-esteem and resilience (Dumont et al., 1999), our study has the following hypothesis:

- (H1) Regular physical activity has a positive correlation with the level of resilience and with adaptive coping strategies in adulthood;
- (H2) The higher level of self-esteem has a positive correlation with resilience level and a negative correlation with non-adaptive coping strategies.

5.1 Sample and procedure

The participants were 336 but the sample was reduced to 280 cases after DATA cleaning/ screening for uncompleted questionnaire and outliers (Age M = 38.5years, females 66.7%, qualification MODE = university degree, occupation MODE =worker). Participants have been collected via networking, with spontaneous adhesion. Researchers collected the questionnaires between May and August 2019. The set of questionnaires was administrated online, via a google form. All the respondents provided their consent to participate to the research after being informed about the purpose, the privacy policy and the limited data set.

5.2 Measures

5.2.1 Self Esteem

Self-esteem was assessed using the Rosenberg Self-esteem scale RSES (Rosenberg, 1965). It's a 10 item Likert scale with a 4-point range answer (from strongly disagree to strongly agree). It measures a person's overall evaluation of his/her worthiness as a human being (Rosenberg, 1979). The items are equally distributed in positively and negatively worded, measuring positive and negative self-esteem (Sarkova et al., 2006). A higher score indicates higher self-esteem. The RSE demonstrates a Guttman scale coefficient of reproducibility of .92, indicating excellent internal consistency. Test-retest reliability over a period of 2 weeks.

Reveals correlations of .85 and .88, indicating excellent stability. The RSE correlates significantly with other measures of self-esteem, including the Coopersmith Self-Esteem Inventory. In addition, the RSE correlates in the predicted direction with measures of depression and anxiety (Boyle, Saklofske & Matthews, 2015).

5.2.2 Resilience

We used Adult Resilience Measure (ARM-R) (Resilience Research Centre, 2018) to assess resilience. It is a self-report measure of social-ecological resilience (Ungar et al., 2012). The revised version consists of 17-items and can be scored on 3- or 5-point Likert scales. The items are all positively worded; the scoring is the summing of responses. In addition to an overall score of resilience, it is possible to score two subscales, one for personal resilience and one for relational resilience. The relational resilience relates to characteristics associated with the important relationships shared with either a primary caregiver or a partner or family. Personal resilience includes intrapersonal and interpersonal items. Internal reliability is given with Cronbach's alpha = .82 (personal resilience subscale), .82 (caregiver/relational resilience subscale), .87 (overall resilience). Person-separation index = .74 (personal resilience), .71 (caregiver/relational resilience), (Jefferies, McGarrigle, Ungar, 2018).

5.2.3 Coping Strategies

In order to assess the coping behavior, the Brief COPE Questionnaire (Carver, 1997) has been used. It is one of the most frequently used self-report measures of coping responses. It is a 28 item self-report questionnaire, with a 4-point range answer, that measure adaptive and non-adaptive coping behavior in front of a stressful event. The scale can define someone's primary coping strategy (Approach Coping, or Avoidance Coping). In addition, it provides 14 subscales as follows: Self-distraction, Active coping, Denial, Substance use, Use of emotional support, Use of instrumental support, Behavioral disengagement, Venting, Positive reframing,

Planning, Humor, Acceptance, Religion, & Self-blame. Each strategy can have a value between2 and 8. The interpretation of the score varies depending on the coping strategy faced, adaptive or dysfunctional. If the coping strategy is adaptive then 8 is the best score that the respondent can have, but if the strategy is maladaptive 2 is the best score he can have.

5.2.4 Physical activity

The short form of the international questionnaire on physical activity has been used (IPAQ), validated for Italian population (Mannocci, 2010). The questionnaire detects physical activity in all areas of a person's life (physical activity in leisure time, housework, gardening and caring for family members, physical activity performed during work, shifts, time spent sitting), the type of physical commitment and its average daily duration, considering the last seven days. The level of physical activity is expressed in MET-minutes per week, providing specific scores for walking, moderate and intense activities through to the following formula: MET level x minutes of activity per day x days per week. Once the MET-minutes have been defined for each area, the total MET-minutes of Physical Activity per week will be obtained by adding Total MET-minutes / week. There are three levels of physical activity that can be obtained from the results of the questionnaire:

- low: no physical activity is reported, or a certain physical activity is highlighted, but not sufficient to fit into the next two categories;
- moderate: one of the following three criteria
- 3 or more days of vigorous activity for at least 20 minutes a day, or
- 5 or more days of moderate activity and / or walking for at least 30 minutes a day or
- 5 or more days of any combination of walking, moderate or vigorous activity, which reaches a minimum of at least 600 MET-minutes per week;
- high: one of the following two criteria:
- vigorous activity for at least 3 days, accumulating at least 1,500 MET-minutes a week, or
- 7 or more days of any combination of walking, moderate or vigorous activity, accumulating at least 3,000 MET-minutes per week.

6. Results

First, in order to confirm hypothesis (H1) about the linear relationship among physical activity, resilience and adaptive coping styles a Pearson Correlation Matrix (Tab. 1) was analyzed. Differently from what was predicted, no statistically significant correlations were detected between physical activity/energy expenditure (MET) and resilience or aggregated variable of coping strategies, neither adaptive nor non adaptive. In addition, data showed correlation of scarce entity between adulthood and resilience and/or coping strategies.

Further analyzing relationships among subscales (Tab. 1), our results confirm what already mentioned in literature: there's a statistically significant positive correlation, ranging from low to moderate magnitude, between Total Resilience and Adaptive Coping Strategies, and a moderate negative correlation between Total Resilience and Non Adaptive Coping Strategies.

Table 1 – Correlation Matrix

					Pearson's r	
Age	-		Total Resilience		-0.030	
Age	-		Personal Resilience		-0.082	
Age	-		Relational Resilience		0.018	

Table 1 – Correlation Matrix

				Pearson's r	
Age	-	MET		0.004	
Age	-	Adaptive Strategies		0.218	***
Age	-	Non Adaptive Strategies		-0.235	***
Total Resilience	-	Personal Resilience		0.876	***
Total Resilience	-	Relational Resilience		0.918	***
Total Resilience	-	MET		0.038	
Total Resilience	-	Adaptive Strategies		0.332	***
Total Resilience	-	Non Adaptive Strategies		-0.332	***
Personal Resilience	-	Relational Resilience		0.613	***
Personal Resilience	-	MET		0.033	
Personal Resilience	-	Adaptive Strategies		0.243	***
Personal Resilience	-	Non Adaptive Strategies		-0.300	***
Relational Resilience	-	MET		0.035	
Relational Resilience	-	Adaptive Strategies		0.343	***
Relational Resilience	-	Non Adaptive Strategies		-0.297	***
MET	-	Adaptive Strategies		0.045	
MET	-	Non Adaptive Strategies		-0.032	
Adaptive Strategies	-	Non Adaptive Strategies		0.092	

* p < .05, ** p < .01, *** p < .001

Also the matrix between energy expenditure and different coping strategies (Tab. 2) shows no statistically significant correlations.

Table 2 – Pairwise correlation MET - Coping Strategies

	MET	
MET		
Positive reframing	0.086	
Self-distraction	-0.038	
Venting	-0.004	
Use of instrumental support	-0.096	
Active coping	0.101	
Denial	-0.039	
Religion	-0.016	
Humor	0.129	*
Behavioral disengagement	-0.028	
Use of emotional support	-0.060	
Substance use	0.012	
Acceptance	0.012	
Planning	0.082	
Self-blame	0.006	

*p<.05, ** p<.01, ***p <.001

As concern the second hypothesis (H2), the data analysis highlights a statistically significant positive correlation between self-esteem and total resilience, specifically stronger for the subscale of Relational Resilience (Tab. 3).

Table 3 – Correlation Matrix Self-Esteem – Resilience – Coping Strategies

	Rosenberg Test (Self-Esteem)		Total Resilience		Personal Resilience		Relational Resilience	
Rosenberg Test (Self-Esteem)	—							
Total Resilience	0.358	***	—					
Personal Resilience	0.266	***	0.876	***	—			
Relational Resilience	0.367	***	0.918	***	0.613	***	—	

* p < .05, ** p < .01, *** p < .001

Furthermore, results show a negative correlation between self-esteem and dysfunctional strategies and no correlation with adaptive strategies that, as seen before, are correlated with total resilience (more in relational subscale) (Tab. 4).

Table 4 – Correlation Matrix Self-Esteem – Resilience – Coping Strategies

	Rosenberg Test (Self-Esteem)		Total Resilience		Personal Resilience		Relational Resilience		Adaptive Strategies	Non Adaptive Strategies
Rosenberg Test (Self-Esteem)	—									
Total Resilience	0.358	***	—							
Personal Resilience	0.266	***	0.876	***	—					
Relational Resilience	0.367	***	0.918	***	0.613	***	—			
Adaptive Strategies	0.108		0.332	***	0.243	***	0.343	***	—	
Non Adaptive Strategies	-0.387	***	-0.332	***	-0.300	***	-0.297	***	0.092	—

* p < .05, ** p < .01, *** p < .001

We made also an analysis to investigate the correlation of Self Esteem with the subscales of Resilience and the different coping strategies, but the results are no significant. There's only a significant negative correlation (moderate) between Behavioral Disengagement and Self Esteem, and Total Resilience. No variation in gender and age have been found.

7. Discussion

This study evaluated the relationship between physical activity/energy expenditure, resilience and coping strategies in adulthood. The results do not support the hypotesis that physical activity and energy expenditure plays an important role in increasing resilience level and in adopting adaptive coping strategies or avoiding non adaptive ones. In regards to the resilience scores, they seems to be congruent with study by Ávila, Corrêa, Lucchetti & Lucchetti (2018) that found no differences between the levels of resilience in active and sedentary groups.

The positive correlation, even if moderate, between Total Resilience and Adaptive Coping Strategies and the moderate negative correlation between Total Resilience and Non Adaptive Coping Strategies, confirm what already present in literature (Chen et al., 2018).

Considering that our first hypothesis has not been confirmed, we have to re-think about the variable "physical exercise" and "energy expenditure" and, according to what Pesce (2012) highlighted in her research, a new element should be taken into account, not only the metabolic or neuromuscular demands, but also the complexity of the movement task. The literature on this theme has opposite positions. Gallotta et al., (2011) argued that the complex coordinative exercise could elicit excessive activation of arousal that lead to poorer cognition performance. Other studies, on the other hand, stated that a simple exercise where oxygen consumption is involved (as treadmill running) facilitates cognitive functions (Mariani, Piceci & Melchiori, 2019; O'Leary, Pontifex, Scudder, Brown & Hillman, 2011). Several researchers have already pointed out that the mental costs of exercise can influence the cognition (Zanone, Kostrubiec, Albaret, & Temprado, 2010; Pesce, 2009). As said by Hill et al. (2010), it's important to explore the effect of the coordination and complexity of the movement tasks on cognition and personality. We can speculate that the energy expenditure or the oxygen consumption have null or weak effect on resilience and adaptive coping strategy and that is the complexity of the movement required that solicits the two variables.

8. Conclusion

Previous literature results combined with findings of this study suggest more research on the topic is needed, involving different and more complex motor acts and different levels of energy expenditure. It is interesting the observation of a non-statistically significant influence of gender and age variables, which can open new research perspectives. Resilience and coping strategies are fundamental resources for a high quality of life and wellness. According to the socio-ecological approach to resilience (Ungar, Ghazinour & Richter, 2012) and to the vision that resilience and coping strategies play an important protective role against psychopathology and to foster mental health (Chen, Yang & Chiang (2018), it is important to find out new ways to increase or support the two variables, also in adulthood. If we will be able to fix which the best approach from a physical point of view (energy expenditure, complex movement, mix of both), we could reach a double objective, the physical and psychological wellness and health of individuals.

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