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PRAXEOLOGY, INCLUSION, AND TEACHING: A FIELD STUDY

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Abstract: This study examines the effect of Centering in physical education on adolescents, investigating its impact on balance and psychological parameters such as stress perception and the inclination to share with peers. Centering, according to the Synchrony Method of movement education, affects intra-abdominal pressure (IAP) and bodily experience. We compared a control group, which followed a traditional exercise program, with an experimental group, which incorporated Centering into their physical education program for 6 weeks. To evaluate the effects, we used the Stork Balance Test to measure physical balance and the Perceived Stress Scale (PSS-10), enriched by a qualitative question on the willingness to socialize, to assess perceived stress. The results showed that the experimental group recorded significant improvements in balance. Furthermore, we observed a reduction in perceived stress levels and an increase in the propensity to socialize among participants. The conclusions of our study suggest that integrating Centering into physical education can have beneficial effects not only on the physical balance of adolescents but also on their psychological well-being and social interaction capabilities.

Keywords: Centering; Physical Education; Stability; Psychosocial Health; Adolescence.

1. Introduction

UNESCO, in the international document Quality Physical Education (McLennan and Thompson, 2015), highlights the fundamental role of physical education, especially in the school context, emphasizing within the curriculum a broad spectrum of contents that play a decisive role in the global well-being of the individual from a biopsycho-social perspective. "The objectives, in fact, do not concern only the practical-motor sphere but also involve the intellectual-cognitive, expressive-communicative, and socio-relational ones" (Casolo, 2011). In this sense, the current international scientific debate on motor praxeology has initiated, on an in-

[1] Ambretti, Scientific Coordinator and Curator of the Titled Section and Introduction. Desideri, Co-author and Curator of the Concluding Part. Fogliata, Author of the Work, Curator of Materials, Methods, Data Analysis, and Discussion.

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ternational scale, an interdisciplinary and multidisciplinary reflection on physical education, highlighting a serious identity crisis accompanied by great confusion at the level of intervention practices. In short, physical education must face two types of difficulties:

- Theoretical difficulties: related to defining a precise theoretical framework, albeit in the spirit of interdisciplinarity
- Practical difficulties: related to the modes of organization and teaching of curricular and extracurricular physical education activities

According to Lavega, the study of motor behaviors could direct schools to pay attention to motor manifestations, observable or not, carried out by students, offering an interesting individual and collective insight into the educability potential of physical education from the perspective of the ecology of the person (Ambretti, 2018).

This invitation from various scientific fields has introduced a new interpretation of motor actions in a biopsychosocial key to the international scientific scene, referring to the analysis of motor behaviors. Every motor activity, whether of a playful or motor nature, is seen as a comprehensive system where the components, logically ordered, are the manifestation of fundamental acts/movements combined from the interconnection of anatomical-physiological, cognitive, historical-social structural conditions, materializing and expressing themselves through a praxic motor repertoire functional to the valorial transmission of culture in a playful-social key. The starting point of praxeology is not a choice of axioms and procedural methods, but a reflection on the essence of action. It goes without saying that, according to Parlebas (2016), the surrounding context plays a determining role in the overall knowledge structure, types of interactions, essential characteristics, decision-making processes underlying a motor behavior whose components vary interactively. Hence, if every motor action is an adaptation of motor behaviors, a possible study and analysis could open interesting didactic reflections on the interpretation of the relationship between inclusion and movement, revealing the diffusion of a new socio-cultural field of investigation that interprets popular tradition through play, corporeality, and movement. Starting from the praxeological assumption, every motor behavior is the result of objective and observable manifestations of movement and the subjective meaning associated with it, consequently, motor behaviors are the manifestation of the motor experience defined by the interdependence of five personality dimensions:

- cognitive,
- socio-relational,
- biological,
- expressive,
- affective.

Consequently, for Lagardera and Lavega (2003), motor behaviors are sociopsycho-motor expressions of the individual's personality components: namely, the cognitive, affective, relational, expressive, and decisional dimensions (Ferretti, 2008). In particular, the reference to the praxeological approach could be functional to a lon-

gitudinal study on the relationship between adolescents, motor activities. Adolescence, a phase of rapid physical growth and neuromuscular maturation, offers an invaluable opportunity for the development of advanced motor skills (Malwanage et al., 2022).

Thi transition period is full of physical and neurological changes that directly influence individuals' motor skills, including balance and body stability, essential for injury prevention and sports performance.

According to the praxeological view of Parlebas (1999) cited by Lavega, each subject creates a true kinetic melody interpreted by a gestural script guided by a kinesiological grammar through individualized movements that inevitably orient and are oriented by the relationship with the other. It follows that the propensity for socialization as a natural adaptive response to the context manifests primarily in posture, balance, and stability. These skills can be developed and enhanced through the adoption of innovative teaching methods, like the Centering technique (Paoli et al., 2010). Centering is an innovative approach that emphasizes the importance of intra-abdominal pressure (IAP) in providing support to the spine, particularly in the lumbar region, during physical activities (Morris et al., 1961; Stock et al., 2010; Madle et al., 2022). Regulating IAP in response to the acceleration needs of a sports movement brings significant benefits in learning and performing technical gestures (De Bernardi, 2008). Besides this, the physical stability it generates, the indirect change it brings about at the respiratory level, favoring diaphragmatic rhythms, seems to reflect on a wider, almost systemic level, promoting processes of anxiety reduction (Ibidem). Although the effectiveness of Centering in the sports context is well documented, its use in adolescent physical education, especially as a tool for well-being, is still an underexplored field (Fogliata, 2022).

Therefore, our study aims to investigate the impact of introducing Centering in adolescent physical education, focusing specifically on these aspects and how they can help adolescents feel better and have more affinity for socialization. It is an important tool in the Synchrony methodology, as it values the interconnection between mind and body, promoting self-awareness, coordination, and concentration (Vo, 2020; Keng et al., 2011; Donnelly, 2011). These aspects are fundamental in the current educational landscape, aiming to promote the overall development of students, combining cognitive training with physical formation. Integrating Centering into the physical education curriculum can not only lead to improvements in balance and stability but can also promote a more holistic and integrated educational approach according to the authors that could better predispose young people towards socializing and inclusive behaviors. This type of learning meets the needs of new generations for an education that goes beyond the mere transmission of theoretical knowledge, focusing on integrating cognitive, physical, and socio-emotional aspects to promote the overall development of students for the well-being of all (Anderson, 2018; Sallis, 1991).

2. Materials and Methods

This study involved a total of 38 competitive female athletes aged between 15 and 17 years (average age 16.5 years) who practice a competitive sport (Oldfield, 1971).

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The subjects were all naive regarding the use of Centering. Those selected for the Centering work protocol underwent a pre-training session for learning and verifying the correct use of Centering. It was measured outside of the session with the help of a tape measure by a double experimenter.

All subjects were right-handed according to the Edinburgh Handedness Inventory (Lynch, 1994) and symmetrical in terms of circumference between the right and left thigh and leg (Hewett et al., 2005). All subjects were right-lateralized both in rotation and as the lower limb. Subjects with a history of previous traumas (exceeding the established six months) were excluded unless they presented an evaluation of fitness and symmetry provided by a physiotherapist (Hreljac, 2005).

The adolescents were then randomly but homogeneously divided into two groups: Group 1 (Trained Centering, n=16) and Group 2 (Core Training without Centering, n=16), using a simple randomization method: heads for Group 1 and tails for Group 2. The average age of the two groups was similar (average age Group 1= 16.50; average age Group 2 = 16.40). Both groups followed a 6-week training regime, with two 30-minute sessions each week (Plisky et al., 2006). For Group 1, the training focused on Centering and Core Training, while for Group 2, the focus was only on Core. Balance was measured before and after the training period using the Stork Stand Test (Johnson and Nelson, 1979). The tests were performed in the follicular period and re-administered at the same time of day. The tests were conducted on a flat Linoleum surface, with the subject positioned to keep the head along the sagittal axis and the gaze fixed on a reference point marked on a wall (Winter, 1995). Balance was measured with the subject in a stork stand position, with one leg bent and the foot placed on the inner side of the knee, while the heel of the pivot foot was raised (Bressel et al., 2007). The time in which the subject managed to maintain the position was measured using two control stopwatches (Kalenji model kick and run Base).

Each group performed the exercises listed in the table twice a week, with Group 1 incorporating guided use of Centering in the execution; Group 2 performed the exercises without any instructions regarding Centering.

Table 1. Exercise

Exercise	Series	Time
Plank	3	30 sec
Bird-dog	3	30 sec
Russian Twist	3	30 sec
Leg Raises	3	30 sec
Dead Bug	3	30 sec
Side Plank	3	30 sec
Bridge	3	30 sec

These exercises were selected because they are considered the most used to promote core stability (McGill, 2010) and involve the abdominal, lumbar, and hip muscles. Both groups were advised to perform these exercises with attention to correct posture and body alignment, always maintaining core activation and controlling breathing during execution. Only Group 1 was asked for voluntary activation of Centering. Data were collected during the academic year in the period between September and October. During this time, both groups followed an equivalent number of

technical trainings under the guidance of the same instructor. It was ensured that these trainings did not use specific exercises for Centering, in order to isolate the effect of the specific training (Centering and Core Training for Group 1, Core Training only for Group 2) on the Stork Stand Test performance.

Additionally, both groups were administered the Perceived Stress Scale (PSS), a questionnaire developed by Sheldon Cohen, Tom Kamarck, and Robin Mermelstein in 1983 and later revised in 1994. This psychometric tool measures stress perception in individuals, focusing on aspects of control, unpredictability, and overload. Participants rate their degree of agreement with each statement using a 5-point rating scale, from "Not at all" to "Extremely" (Cohen, 1983).

Table 2. PSS-10.

Question	Responses
In the last few months, how often have you felt that things were slipping out of your control?	1. Never 2. Rarely 3. Sometimes 4. Often 5. Very often
In the last few months, how often have you felt unable to cope with stressful sit- uations?	1. Never 2. Rarely 3. Sometimes 4. Often 5. Very often
In the last few months, how often have you felt that things were going wrong?	1. Never 2. Rarely 3. Sometimes 4. Often 5. Very often
In the last few months, how often have you felt that you couldn't control the important events in your life?	1. Never 2. Rarely 3. Sometimes 4. Often 5. Very often
In the last few months, how often have you felt that difficulties were piling up so high that you could not overcome them?	1. Never 2. Rarely 3. Sometimes 4. Often 5. Very often
In the last few months, how often have you felt that things were not going the way you wanted?	1. Never 2. Rarely 3. Sometimes 4. Often 5. Very often
In the last few months, how often have you felt that your life is out of control?	1. Never 2. Rarely 3. Sometimes 4. Often 5. Very often
In the last few months, how often have you felt that things are not going as you had planned?	1. Never 2. Rarely 3. Sometimes 4. Often 5. Very often
In the last few months, how often have you felt that you have too many com- mitments and responsibilities?	1. Never 2. Rarely 3. Sometimes 4. Often 5. Very often
In the last few months, how often have you felt that you just can't make it?	1. Never 2. Rarely 3. Sometimes 4. Often 5. Very often

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The groups were separated for the work and were unaware of the differences between them, thus ensuring a blind setup for the Stork Stand Test. The guidelines used for the Stork Stand Test were those established by Johnson and Nelson (1979), and the time was calculated following these guidelines. The training protocol, as indicated in the table, involved repeating each exercise 10 times. At the end of the training period and after administering the questionnaire, the students were asked an additional question by the teacher regarding their willingness to cooperate with classmates. The response from the experimental group was unanimously positive: all participants expressed a greater sense of well-being and a higher inclination towards collaboration, reflecting a 168 favorable impact of the training on their disposition to socialize, which was not found in the control group.

3. Results

The analysis of the results from the Stork Stand Test and the Perceived Stress Scale (PSS) Test between Group 1 (Trained with both Centering and Core) and Group 2 (Trained with Core only). An asterisk (*) will indicate a significant difference ($p<0.05$).

Table 3. Results of the Student's t-test for comparing differences between T1 and T2. Results of the Stork Stand Test

	Group 1	**Group 2**
Left Leg (T1)	Average 3.5 (SD: 2.761)	Average: 4.38 (SD: 2.854)
Left Leg (T2)	Average: 8.19 (SD: 4.312)	Average 6.25 (SD: 2.653)
Right Leg (T1)	Average: 2.94 (SD: 2.388)	Average: 4.13 (SD: 3.209)
Right Leg (T2)	Average: 6.88 (SD: 4.161)	Average: 5.63 (SD: 3.141)

Table 4 . Comparisons Between Groups for t-Values

	Group 1 vs Group 2
Left Leg	t-value: 2.081 (p=0.045*)
Right Leg	t-value: 3.469 (p=0.002*)

Table 5. Results of the Student's t-test for the comparison of differences between T1 and T2 in the PSS Test.

	Group 1	**Group 2**
T1	Average: 7.94	Average: 6.75
T2	Average: 6.31	Average: 6.19

Table 6. Student's t Values & Degrees of Freedom (Df)

	Value
t-value	2.038
Degrees of freedom	62
p value	0.046

The data analysis showed significant differences between T1 and T2 for both limbs in the Stork Stand Test for Group 1 (trained with both Centering and Core). We then examine the possible differences between the combined groups.

Table 7. Results of the Student's t-test for the comparison between Group 1 and Group 2 in the Stork Stand Test

Values
Left limb Value t: 2.058 (p=0.048*)
Right limb Value t: 2.547 (p=0.016*)

The results of the Student's t-test indicate that there are statistically significant differences between Group 1 (Centering + Core) and Group 2 (Core Only) for both the left and right limbs in the Stork Stand Test. This suggests that Group 1 showed a significantly greater improvement compared to Group 2. Regarding the PSS Test, both groups showed a decrease in scores between T1 and T2, suggesting a possible reduction in the level of perceived stress.

4. Discussion

This research investigated the effectiveness of a training program that incorporates both the Centering technique and Core training in promoting balance and stability improvements and the possible reduction of stress in a population of adolescents. The results of the study highlighted that Group 1 (trained with both Centering and Core) showed significant improvements compared to Group 2 (trained with Core only), for both the left and right limbs, as measured by the Stork Stand Test and in terms of stress reduction and reporting of positive feelings related to sociability.

In detail, for the left limb, Group 1 showed a significantly greater average difference between the pre-test (T1) and the post-test (T2), equal to 4.69, compared to Group 2, whose average improvement was 1.88. This difference was underscored by the statistical significance emerged from the Student's t-test (p=0.045). A similar trend was found for the right limb, with Group 1 showing an average increase of 3.94 between T1 and T2, higher than that of Group 2 (1.5), with a significant p-value of 0.002.

These results suggest that training integrating the Centering technique can have a significant impact on adolescents' balance and stability. Centering, which seems to favor the acquisition of specific motor skills and stimulate self-awareness, coordination, and concentration (De Bernardi, 2008), could therefore also be favorable for stress reduction. The inclusion of such technique in physical education programs

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could represent a valuable opportunity to enhance overall learning, personal development, and students' well-being.

Therefore, the analysis obtained with the PSS-10 Test is interesting, as it shows a decrease in the level of perceived stress, suggesting a further positive effect of the combined physical education-health approach. Maintaining better physical balance could, in fact, facilitate a more balanced postural stance, less presence of peripheral muscle tensions, respiratory improvement, and consequently a greater availability to socialize. This observation deserves further investigation, as better stress management among adolescents could have a significant impact on their overall health and academic performance. The results obtained in this study contribute to the emerging literature on the importance of the Centering approach in physical education and provide further concrete evidence of its positive effects. However, it is important to remember that, despite the promising results, the sample size was limited and further research on larger population groups and with more robust study designs is necessary to confirm and expand the results of this study.

5. Conclusions

This study provides valuable, albeit preliminary, information on the importance of integrating the Centering technique into the physical education of adolescents.

The obtained results indicate that it can lead to significant improvements in balance, thus making a significant contribution to the pedagogical approach in the field of physical education. Balance is a key skill not only in the sports context but in everyday life. Good balance allows for the safe and efficient execution of a wide range of physical activities, from walking or running to jumping, climbing, and even simple everyday movements such as standing or sitting correctly. Balance also affects overall posture and motor coordination.

Good balance can promote the creation of a more effective learning environment, where students can actively engage in proposed activities and develop greater self-awareness and motor skills. The observation of a trend towards decreased perceived stress following the experimental group's training indicates the need to implement physical interventions of this type to improve the overall well-being of students. The originality of Parlebas's vision (2003) lies in the attention to the motor biography of each subject, a parameter for the localization and selection of motor practices within a catalog of motor behaviors to be adapted to psychomotor and sociomotor situations. In this light and key, we could perhaps stimulate through innovative educational tools the creation of a more relaxed physical state conducive to sharing.

In this context, the need to promote playful motor activity calls for the programming of a flexible and, above all, accessible curriculum to ensure the individuality of everyone. Corporeality, not only physically given but cognitively experienced, plays a priority role in helping the student, especially adolescents, to fully express all basic capabilities. (Hyndman, 2022).

In the educational field, the intent should be to guide teachers' methodological and project choices starting from corporeality, whether playful or in motion, to foster socialization thanks to the social vicariousness enacted by the body, which acts and manifests freely as both an individual and social self. In this sense, the integrated

reading of motor behaviors paves the way for a revisitation of the ways of using corporeality in motion in terms of well-being, bringing together seemingly distant scientific research sectors for a reevaluation of pedagogical approaches to adolescence and a possible relationship between praxeology and didactics as a synthesis between egalitarian and complementary visions. (Koka, 2019; Kulaksız,, 2022).

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