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## Proprioception And Self-Awareness For Psychophysical Integration

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### Abstract

Due to massive overuse of technology, teenagers nowadays have less opportunities to become familiar with their body (Kurzweil, 2008; Combi, 2000) and to control internal and external proprioceptive stimuli (Rose, 2010, Cuomo, 2007; Ivanenko et al., 1999, 2000; Allum, 1998; Massion, 1992; Goodwin et. al., 1972). This can cause difficulties in the processing and integration of information at a physical, cognitive and emotional level (Macdonald, 1992; Livingstone, 2008; Coklar & Sahin, 2011). International research confirms that today more than ever educators have the fundamental task to help each child to regain the perception of his or her body, its spatial orientation and the perception of its single parts, in order to be able to integrate in a whole concept both physic and psychic dimensions. To this end, a pilot study has been conducted with a group of Italian students in the final year of secondary school in Florence. The pilot study spanned six physical education sessions and involved participants between 18 and 19 years of age. The purpose of the test was to study how a protocol of basic static and dynamic balance exercises, along with breath exercises and proprioceptive awareness stimulated through meditative practices, could influence the moods and wellbeing of the students.

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**Keywords:** Proprioceptive Awareness; Breathing Techniques; Meditative Practices; Body Spatial Orientation and Positioning; States of Mood.

### 1. Introduction

Virtualization of everyday life entails a progressive and worrisome distance from self-perception and from body contact seen as a means of expression of identity as well as a privileged channel of communication and relationships. Excessive use of new technologies among the new generations



causes the decrease in empathetic capacity at different levels: from sharing real experiences with true friends to the movement and the perception of the body in space. As a result, young people often experience an increased difficulty in feeling comfortable with themselves and with others.

Italian Ministry of Education guidelines have highlighted since 1982 the importance of self-consciousness through physical activities, as they provide each student with personal management tools (Miur, 2009; D.P.R. no. 908, 1982).

## **2. Problem Statement**

It is a well-recognised fact that teenagers nowadays have less opportunities to become familiar with their body due to their massive overuse of technology (Kurzweil, 2008; Combi, 2000) and control internal and external proprioceptive stimuli (Rose, 2010, Cuomo, 2007; Ivanenko et al., 1999, 2000; Allum, 1998; Massion, 1992; Goodwin et. al., 1972). The detachment induced by virtual realities can cause difficulties in the processing and integration of information at a physical, cognitive and emotional level (Macdonald,1992; Livingstone, 2008; Coklar & Sahin, 2011).

## **3. Research question**

Can a protocol of static and dynamic balance exercises, combined with breath and proprioceptive awareness have a positive influence on teenagers' mood states?

## **4. Purpose of the study**

The purpose of this study is to reflect on the necessity of leading students back to their own corporeality in order to help them regain possession of both neuromotor signals that come from within the body and control of the stimuli coming from external sources. The objective is to reinforce body-awareness, a fundamental skill which is at risk in our contemporary and evermore virtual society.

## **5. Research methods**

For our pilot study two separate groups of young adults aged between 18 and 19 years of age were created. The experimental group was composed by 14 students of a final year class in secondary school. The control group was composed by 12 students of the same age and from the same school. The experimental group was administered the following tests:

- Pre- and post-balance tests (Fukuda Unterberger test) (experimental group);
- Pre- and post-tests on mood states (POMS) (experimental and control group);
- Written feedback from the participants (as a qualitative assessment of the experimental group).

The control group only participated in the POMS.

The pilot study comprised six sessions, each lasting two hours, and it took place from January 12, 2016 to March 1, 2016.

Each session was divided into three phases: I phase - static and dynamic balance exercises with eyes open and with eyes closed; II phase - breathing exercises (Van Lysebeth,1978; Middendorf, 2005; Ferraro, 2008); III phase - making a connection with parts of the body and acquiring awareness of the positioning of the body in space (Ivanenko, Grasso, & Lacquaniti, 1999, 2000; Berthoz, A., & Viaud-Delmon, I. 1999) (Table 1) through an experimental meditative practice based on the Model of Ethic of the Human Relations (ERH – Etique des Relations Humaines®). This meditative technique develops through three steps: 1- consciousness of the different parts of the body, of the space orientation and of unity of the body as first channel of communication, 2- consciousness of self-identity trough name and gender, 3- consciousness of those interior resources (Franca,2014) conducive to psychophysical integration.

**Table 1.** Training sessions of the sperimental group

<b>Session</b>	<b>Test</b>	<b>Phase 1: Balance exercises</b>	<b>Phase 2: Breathing exercises</b>	<b>Phase 3: Self awareness and Connection with body in space</b>
I	POMS F. Unterberger	- Awareness of different body segments - Awareness of whole body in different positions	Nose breathing technique	- Body scan - Body Spatial Orientation and Positioning - Self Identity awareness
II		Mono-podalic balance exercises with open and closed eyes over stable and unstable surfaces	- Nose breathing technique - Abdominal breathing technique in different static and dynamic body positions	- Body scan - Body Spatial Orientation and Positioning - Identity awareness - Gender awareness
III		Mono and bi-podalic balance exercises jumping on stable and unstable surfaces with and without a 180° body rotation	- Abdominal breathing technique - Awareness of the difference between thoracic and abdominal breathing	- Body scan - Body Spatial Orientation and Positioning - Identity awareness - Gender awareness - Interior resources
IV		Mono-podalic balance exercises throwing a tennis ball with and without a 180° body rotation	- Abdominal breathing technique - Square breathing technique	- Body scan - Body Spatial Orientation and Positioning - Identity awareness - Gender awareness - Interior resources
V		Mono-podalic balance exercises throwing a volley ball with and without a 180° body rotation	- Abdominal breathing technique - Triangular breathing technique	- Body scan - Body Spatial Orientation and Positioning - Identity awareness - Gender awareness - Interior resources
VI	POMS F. Unterberger Written feedback		Alternate nostril breathing	- Body scan - Body Spatial Orientation and Positioning - Identity awareness - Gender awareness - Interior resources

During the training many videos and images were shared on a Whatsapp experimental chat group created specifically for this project (Appendix 1).

## 6. Findings

FUKUDA UNTERBERGER - The hypothesis was that kids would improve their perception of their body in space while working on proprioception. The test required that they kept a central position in the circle and axis  $0^\circ$ .

The students were asked to march on the spot, eyes closed, and to remain in centre of the circle while counting 40 steps and trying not to move ahead or behind from the centre of the circle drawn on the ground (with angles marked  $0^\circ, \pm 45^\circ, \pm 90^\circ, \pm 135^\circ$  e  $180^\circ$ ). They were also asked not to rotate from the axis at  $0^\circ$ .

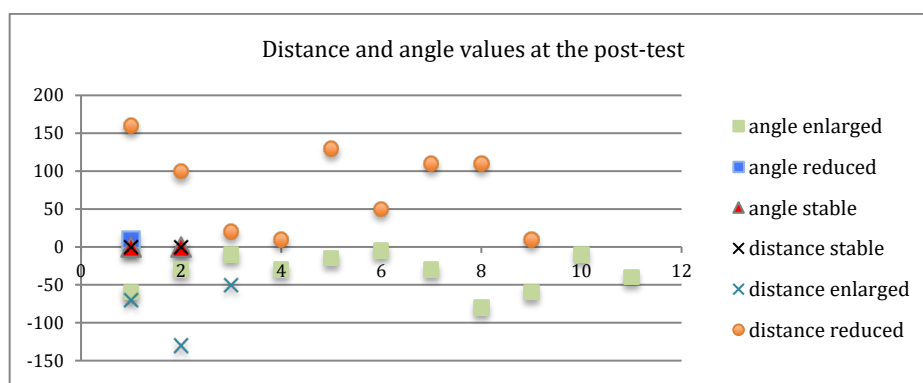


Fig. 1. Fukuda Unterberger test results

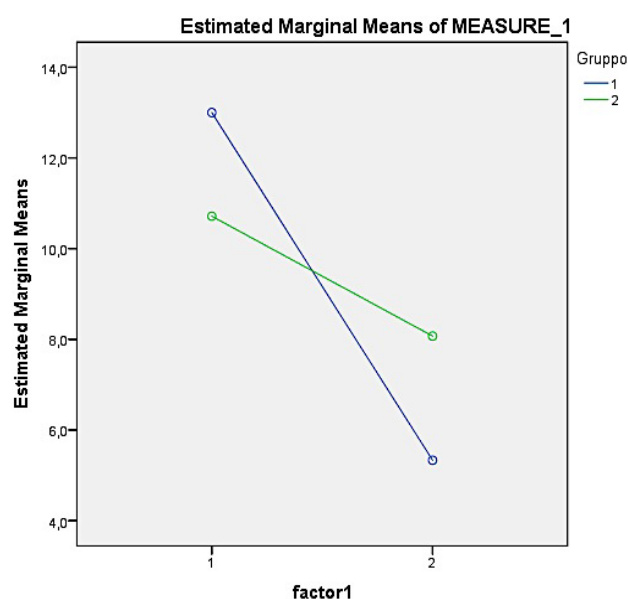
Concerning the values of the angle of rotation to the right or to the left in the post-test 1/14 students, about 7% of the total, reported a decrease, 2/14 students or about 14% of the total, reported stable data, 11/14 students, about 79% of the total, reported an increase.

The results indicate that the training facilitated an improvement of the awareness of linear movements away from the center of the circle, but not of angular movements compared with  $0^\circ$  (Fig.1).

POMS test – The Analysis of variance (ANOVA) with repeated measures was adopted to investigate the differences between the pre and post-training points for both groups (experimental and control). All the sub-scales dealing with the experimental group were analysed with Test Within Subject and Test Between Subject, showing significant results related to the factor Tension-Anxiety only.

In this case, the average of points was significantly different between the first and the second phase  $F(1,27)=28,21, p=.000$ . Data showed both a significant interaction between the phases and the belonging to one of the two groups  $F(1,27)=6,70, p=.015$ . Groups showed points that changed significantly, different in terms of intensity between the pre and post-test phase and this was attributed to the type/nature of the group.

The experimental project detailed above showed how the training had a significant impact in decreasing Tension-Anxiety in the experimental group (Fig. 2) and its results, through the average scores, confirmed a significant decrease in the pre and post experiment T factor.



**Fig. 2.** Lower levels of tension-anxiety in the test group after six sessions of training

WRITTEN FEEDBACK - Virtually all of the students reported that the activities on offer allowed them to acquire many new techniques for understanding their own bodies in a hands-on way which they didn't know before (Appendix 2).

## 7. Conclusions

We observed that breathing techniques and proprioceptive awareness acquired through meditative practices, together with static and dynamic balance activities for the body, enabled the students in the test group to lower levels of anxiety and tension that were not lowered in the control group that participated in regular physical activities concerning balance, without access to breathing and meditation exercises.

## 8. Limitations of the study

Due to organizational reasons of the school involved in the test, the study did not have a regular weekly continuity and the number of meetings was greatly reduced from the original plan. Equally, organizational issues prevented the administration of the Fukuda Unterberger test to the control group.

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## Appendix n° 1

### WhatsApp

After each session a WhatsApp chat was activated for students to communicate and share videos and images. The purpose was to stimulate an in-depth learning through correct use of ICT. Students were asked to comment on what they experienced during each sessions. (Table 2).

**Table 2.** Some Contents shared on Whatsapp

Contents shared on WhatsApp	Links
One moment meditation - video	<a href="https://www.youtube.com/watch?v=FzPQMg8zKWs">https://www.youtube.com/watch?v=FzPQMg8zKWs</a>
Mindfulness revolution - article	<a href="http://www.huffingtonpost.it/2014/10/31/meditazione-mindfulness-revolution_n_6082230.html">http://www.huffingtonpost.it/2014/10/31/meditazione-mindfulness-revolution_n_6082230.html</a>
3D diaphragm and breathing - animation	<a href="https://www.youtube.com/watch?v=WXIoL5nCFjM">https://www.youtube.com/watch?v=WXIoL5nCFjM</a>
Forced inspiration- video	<a href="https://www.youtube.com/watch?v=O3nLJgRO-d8">https://www.youtube.com/watch?v=O3nLJgRO-d8</a>
Mirror neurons - video	<a href="https://www.youtube.com/watch?v=LEwIdh-eC74">https://www.youtube.com/watch?v=LEwIdh-eC74</a>
Square breathing - video	<a href="https://www.youtube.com/watch?v=LEwIdh-eC74">https://www.youtube.com/watch?v=LEwIdh-eC74</a>

## Appendix 2

### Written students' feedbacks

At the end of the workshop students were asked to provide a written feedback on their experience. The students reported on how they came to know their body better and acquired a greater awareness of themselves - *"I personally believe that this experience was very useful and instructive not only for what concerns my body but also for my becoming conscious of myself"* – as well as better self-perception - *"I experienced a better perception of myself and learned some new relaxation techniques"*.

Some of them stated that they had acquired new techniques to relax and to manage anxiety through breathing - *"I'm anxious and I never express my feelings, so knowing how to better manage my breath, helped me to better conduct my days and my feelings"* – as well as that they had learned techniques to manage anger through meditation - *"I learned to meditate when I'm angry, even if it requires an effort"*. Some claimed to have reached a deeper self-understanding, whereas others recognised that they became progressively more appreciative of the training as it went on - *"At first I was very hesitant about the effectiveness of the project, especially on meditation... Week by week I found the method we have been taught more and more useful in order to distinguish what we really are, to ignore our bad thoughts and to let flow my authentic emotions"*.

For a student the training had an impact both on herself and on the class relationships: *"The educational activities improved my self-esteem and the cohesiveness of the class"*.

A student claimed to have acquired a technique to keep calm with annoying people, while another considered the proposed activities as *"a therapy that, if carried out with care and with the suitable duration, may also solve very big problems"*.

Some of the students pointed out the usefulness of the training, suggesting *"... that in the future the training should be presented to other classes, with longer meetings, more than once a week"*; one of

them proposed *“to repeat the training in the middle school, since at that age kids have great difficulties in accepting their own bodies”*.

Only one student was not very happy about the experience: *“We shouldn’t always accept ourselves as we are, otherwise how can we move towards self change? Definitely nobody is entitled to tell me if I’m OK... we can’t accept ourselves all the time, sometimes we should really change those things that make us feel uncomfortable”*.

This comment is an useful feedback to improve on our experiment as it encourages us to carry on with our project.