
Body Percussion in the Physical Education and Sports Sciences. An Approach to its Systematization According to the BAPNE Method

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Abstract – In this article we present the necessary foundations on the use of body percussion in the physical education and sports sciences with the aim of classifying the fields of action into ten typologies according to the BAPNE Method. Four main areas which can affect their employment are subsequently proposed, as well as a brief contribution regarding motor coordination in the physical education and sports sciences. To conclude, a proposal on the analysis and evaluation of body percussion in educational contexts is offered.

Keywords – Body Percussion, BAPNE Method, Motor Control, Cognitive Functions, Executive Functions.

I. INTRODUCTION

Body percussion is an excellent interdisciplinary resource that can be used both in the training of athletes, actors, musicians, teachers in general, as well as in the business environment (Romero-Naranjo, 2013). Currently, motor activity and the stimulation of cognitive functions have been widely studied (Voss et al., 2011) along with music and movement in relation to their cognitive repercussions (Rauscher, 1999; Bilhartz, Bruhn & Olsan, 2000; Altenmuller & Gruhn, 2002; Pascual-Leone, 2005; Crncec, Wilson & Prior, 2006). These research studies show that there are specific improvements in cognitive functions, even with children's coordination games (Brodsky & Sulkin, 2007; Sulkin, 2009).

Regarding executive functions (cognitive flexibility, working memory, planning, etc.) and its relationship with musical practice and motor coordination, various studies stand out, clearly highlighting an improvement in Executive Functions (Piek, et al., 2004; Brodsky & Sulkin, 2005; Crncec, Wilson & Prior, 2006; Kubesch et al., 2009; Cameron et al., 2012; Gómez Pinilla, 2013).

In the physical education and sports sciences, the use of activities to improve motor coordination, dissociation and laterality, among other aspects, is one of the areas that are worked on not only at an educational level, but also among elite athletes (Chang et al, 2015). That is why body percussion is an excellent tool linked to training as it combines the aforementioned aspects while allowing work on rhythm, motor precision, body expression, and on the sense of community among other aspects (Diaz-Perez, 2016).

Concerning body percussion, despite some academic production, more research studies of a quantitative and longitudinal nature are lacking to demonstrate its possible benefits (Serna-Domínguez et al., 2018). The terminology used in relation to search engines is a bit chaotic, since certain sectors (mainly linked to entertainment) denominate it “Bodymusic”, a confusing term in academic search since it is associated with disco music and other technological criteria. The disparity of terms in which it is usually referenced (*Bodypercussion*, *Body music*, *Danza percusiva*, *Percussao Corporal*, *Percusion corporal*, *Percussion corporelle*, *Percusio Corporal*, etc) does not help to centralize it.

It must be highlighted that the perception of body percussion is varied since the areas of origin of each profes-

-sional are quite diverse. For instance, its perception and even the way of writing it change radically depending on whether the professional comes from dance, physical education, psychology, percussion, circus arts, foreign language teaching, or they are a generalist teacher, etc. This implies that each professional profile grants it a specific function.

Once having reviewed all the existing bibliography, both academic and informative, we raise the issue of the following reflections: Are there variants of body percussion? Is it a whole or are we referring to specific techniques or models? Are there well differentiated schools? What is the teacher's perception of body percussion and how do they implement it? Various authors call their pedagogical proposal "Method", but does it really meet all the requirements to be termed "method" or is it a "marketing" strategy? Can the performance of a continuous choreography be called a method? What role do social networks as "Youtube", "Instagram", "Twitter"... play in the enhancement and dissemination of body percussion? The resources offered, are they entertainment or actual training? Has body percussion been degraded to another artefact of the "civilization of the spectacle" as Vargas Llosa argues? Does the visibility that body percussion has acquired through social networks introduce it into "World Music"?

In the first place, we can mainly observe two large typologies:

A. *Recreational Body Percussion:*

It is the one that focuses on performing choreographies as well as on coordinating under a musical basis. They consist mainly in minor entertainment activities, of no further significance, with the sole purpose of having fun. Various academic sectors, such as speech therapists in which language is vital, as well as neuropsychologists and movement specialists, do not share this way of proceeding. In a dance conservatory, an accompanying pianist is normally hired (pre-recorded music is not usually played); the same occurs with dance conservatories where flamenco is taught, as a flamenco guitarist is a must.

B. *Academic Body Percussion:*

They are those activities that have as a precise and well-founded objective the possible improvement not only of motor coordination, but also of cognitive and executive functions. 90% of academic publications are in this line (Serna-Dominguez et al., 2018).

1. *Spheres of Action of Body Percussion*

From a theoretical-practical point of view, body percussion can be classified according to the BAPNE Method in the following broad areas of action:

1.1. *Didactic*

It is the one that produces books for later application in the classroom in addition to setting forth the finding in writing with its own music notations (Yamada, 2000; Terry, 2002, 2015; Wohrlin, 2008; Filz, 2011; Paduano, 2011; Romero-Naranjo, 2010 – 2020).

1.2. *Ethnographic - Ethno Musicological*

They are publications that deal with the use of the body in other cultures in relation to its use, meanings and functions (Babatunde, 1965; Kubik, 1972, 1988; Kartomi, 1980, 2017; Romero-Naranjo, 2008).

1.3. *Neuropsychological*

Quantitative-like publications with a control group and an experimental group in which aspects such as executive functions are measured.

1.4. *Kinaesthetic*

Publications that provide information on the improvement of motor coordination (Carretero et al, 2014; Perez-Diaz, 2016).

1.5. *Socio-Emotional*

Research that provide both, proposals as well as measurements, of improvement in the socio-emotional environment (Moreno-Cebrian, et al. 2017; Moral-Bofill, et al. 2020).

1.6. *Space and Architecture*

Educational proposal of adequate architectural spaces for the implementation of this type of activities (Bango-Melcon, P. et al 2017).

1.7. *Team Building*

Studies that propose and systematize the use of body percussion in the business environment (Romero-Naranjo et al, 2017).

1.8. *Historical*

Publications on the antecedents and precursors of body percussion (Trives-Martinez et al, 2018; Sanchez-Gonzalez et al, 2018).

1.9. *Rationale – Justification*

Publications that justify precisely how to move the body with its purpose and objective while classifying the types of activities through laterality, hand-eye coordination and foot-eye coordination or dissociation (Romero-Naranjo, 2008; Seilet et al, 2020).

1.10. *Cross Learning*

It is the one that has body percussion not as its main object but uses it as a tool for learning another subject such as solfege or musical language (cognitive music theory), a foreign language, mathematics, geography, body language, performing arts, etc. (Fernandez-Molina, J. et al, 2020).

1.11. *Entertainment*

It is the contribution that is made through the performing arts in which body percussion is the central axis of the show. We highlight companies such as Stomp or Barbatuques among others (Garcia Sala et al. 2018).

1. *Areas that Affect the use of Body Percussion*

Once we have seen the great spheres of action of body percussion, we will proceed to appreciate in a comprehensive manner which specific areas within physical education may be affected by the use of body percussion and its possible benefits according to the BAPNE Method. The classification is as follows:

A. It Affects Motor Coordination

Body percussion helps in hand-eye and foot-eye coordination and dissociation, laterality, biomechanics and movement in space.

B. It Affects Social Cohesion

It is a vehicle to unite and create bonds through cooperative and inclusive work.

C. It Affects Cognitive Functions

It helps with social cognition, memory, praxis, attention, language, spatial orientation, etc.

D. It Affects Executive Functions

It can benefit cognitive flexibility, working memory, planning, processing speed, etc.

E. It Affects Body Language

It is an excellent resource to work on awareness of the body, posture, gesture, gaze, proprioception, spatial and time awareness, etc.

2. A. Motor Coordination

Psychomotricity has as its main purpose the development of motor, cognitive and socio-affective skills (Rigalt, 2016). That is why body percussion (depending on how it is used) can be an excellent instrument for the development of those skills since it has many features that help to enhance motor coordination.

By means of the BAPNE Method we provide a wide battery of activities for the dissociation of hands and feet together with the use of the voice independently. The methodology proposes activities from six months of age onwards for various educational and professional fields.

By means of the BAPNE Method we provide a wide battery of activities for the dissociation of hands and feet together with the use of the voice independently. The methodology proposes activities from six months of age onwards for various educational and professional fields. The proposed exercises are divided into three large blocks divided into Initiation Rite (activities to start a session), Cognitive Stimulation (activities focused on the possible stimulation of executive functions) and Closing Rite (activities to close the session and the return to calm).

All this is managed through its own glossary of activities or specific terminology (*Clap Change, Handball Change, Polivalent Movement, Speaking Dissociation, Bodylinguistics, Cognitive Solfege, Bappediddle, etc*). The purpose of the Glossary is to structure an index of basic concepts of the method. The objective of all the activities is the possible stimulation of the executive functions, with particular emphasis on the “double task”.

From this, we can work laterality (Romero, 2008) and even other cognitive aspects as a result of the psychomotor movement. As body percussion is a physical activity (for as long as it is not recreational), serotonin increases and therefore acts as an antidepressant.

There exist data that have proven that musical learning together with physical activity makes various parts of the brain larger, such as the corpus callosum, the cerebellum, areas of the hippocampus as well as motor and pr-

-emotor areas (Voss et al, 2011; Erikson et al., 2011).

2. B. *Social Cohesion*

Body percussion is an excellent instrument for group cohesion as well as for the creation of bonds between the participants. The ability to move and strike to the same beat in an orchestrated way has a very positive impact on our brain. The performance of a changing physical activity, in which the voice is always present through words or songs, increases well-being and pleasure at a neurochemical level. Similarly, the pain threshold increases due to the increase of the levels of endogenous opioid peptides and therefore of endorphins and beta-endorphins.

There are indications that body percussion increases well-being (Moral-Bofill et al., 2020), which is why an increase in dopamine, serotonin, prolactin and of course, the molecule brain-derived neurotrophic factor (BDNF) is generated. The continuous feeling of well-being when performing body percussion is due to the stimulation of the limbic system creating a constant connection between the amygdala, the tonsil and the anterior cingulate gyrus. This circuit of well-being and pleasure is the one that is linked to emotions, being the reason why certain episodes of our lives are best remembered.

2. C. *Cognitive Functions*

When a motor activity is carried out, it must be borne in mind that it must go beyond one's own coordination (Raiola, 2015; Lopez-Cano, 2005). That is why the activities must have a broader and well-justified background, so that they can provide further advantages when used in a transversal way (Chi-Hung Chang et al, 2017). Our proposal is that body percussion activities are linked to a possible stimulation of cognitive functions. These functions are:

1. Memory
2. Spatial orientation
3. Language
4. Attentional network
5. Praxis
6. Gnosis
7. Executive functions
8. Visual and spatial skills
9. Social cognition

2. D. *Executive Functions*

The world around us requires us to continually solve unexpected problems in the face of any type of adversity or setback. Our way of acting is regulated by many important aspects, but executive functions play a fundamental role in knowing how to solve these novelties. An athlete is required cognitive flexibility, fast and effective decision-making skills, etc. That is the reason why their prefrontal cortex is like a Swiss army knife, always ready to solve any adversity. The BAPNE Method as a method of cognitive, socio-emotional and

psychomotor stimulation as well a promoter of neurorehabilitation, specifically focuses its psychomotor activities in relation to executive functions.

The 9 processes of Executive Intelligence elucidated by factor analysis according to Javier Tirapu are the following:

1. *Processing Speed*

It is the amount of information units that the brain handles in a given unit of time. This is the reason why we say that a person is mentally agile or thinks quickly. In sports, in musical improvisation, in group management, it is a very important aspect since it requires a quick response to continuous demands.

2. *Working Memory*

It is the capacity of the brain to register, maintain and manipulate information in intervals of 20 seconds.

3. *Inhibition Processes*

The control of interference. There are 2 types of inhibition: a verbal one and a motor one.

4. *Verbal Fluency*

It is the ability to speak fluently without excessive mistakes or pauses. Tests of a semantic nature (looking for animals, for example) or of a phonological nature (words that begin with "p" or "f") can be carried out for a specified time.

5. *Dual Performance*

It is the ability for the brain to work in parallel with two cognitive processes belonging to two different domains, for example drawing and talking. That makes of the brain a more efficient one. Dual performance is not divided attention. Divided attention is the ability to perform two activities of the same domain simultaneously.

1. *Cognitive Flexibility*

The ability of a subject to generate different hypotheses to solve a problem.

2. *Planning*

It is the capacity to plan an action, a complex task, a learning process.

3. *Branching*

They are multitasking processes. The subject performs three tasks and jumps from one to another and returns to the first and continues jumping from one to another.

4. *Decision Making*

It is the process by which a choice is made between various options in several contexts.

2. E. *Body Expression*

Body expression is a discipline that connects perfectly with body percussion as it is the perfect link for raising

awareness of the body through very precise activities. Thanks to rhythm and motor coordination aspects as important as non-verbal communication, the body, space, time, disinhibition, creativity and socialization can be worked on among many other aspects.

By means of specific rhythmic structures three basic principles can be applied, such as:

- A. Body awareness.
- B. Spatial awareness.
- C. Temporary awareness.

At this stage, muscle tone, breathing, posture, gesture and gaze connect with symbolic movement, dramatic movement and scenic movement. In our case, the didactic intervention has a special role, since the objective is to provide teachers with resources in which they know how to unite corporal expression with corporal percussion through practical activities in a serious and rigorous way.

3. Basic Coordination in the Didactics of Body Percussion in Physical Education

In this section we propose what the basic patterns of motor coordination related to body percussion should be according to the BAPNE method. It is important to note that all coordination exercises can be carried out either individually, as a couple or in a group, having as a common link the use or not of the voice, as well as movement in space. The proposal for coordination is structured by coordinating the upper lower limb (horizontal plane), right and left (sagittal plane) and front and back (frontal plane):

A. Horizontal plane (with voice / without voice; with / without movement):

- Homogeneous limb coordination between the upper and lower limbs.
- Coordination of dissociation between the upper and lower limb.

B. Sagittal plane (with voice / without voice; with / without movement):

- Right/left coordination upper limb.
- Right/left coordination lower limb.
- Right/left coordination dissociating both limbs.

C. Horizontal plane (with voice / without voice; with / without movement):

- Front/back coordination upper limb.
- Front/back coordination lower limb.
- Front/back coordination dissociating both limbs.

D. Combined planes (with voice / without voice; with / without movement):

- Combination of limbs and all biomechanical planes.

Body Percussion and Praxias:

It is one in which body percussion is used alongside an object such as a ball or mace. In the BAPNE Method we have a whole list of activities in this line called *Handball Change*. These activities can be worked on indivi-

-dually, as a couple or in a group (Romero-Naranjo, 2019). They are an excellent sample to stimulate praxis in the handling of objects linked to laterality, coordination and dissociation.

Learning Positions

The way to learn body percussion in space can be achieved in multiple ways, mainly highlighting:

- Couples
- Quartets
- Sextets
- Octets
- Circle
- Semicircle
- Concentric circles (two, three or four)
- Facing rows
- Free movement

From the BAPNE Method we do not suggest mirror learning but mainly in a circle.

4. Analysis of Body Percussion

In the in the Physical Education and Sports Sciences the analysis of human movement is very important and has its own methodology of analysis, however, when talking about body percussion, various parameters change. In body percussion not only the type of movement (individual or in group) intervenes, but also body expression, meter, pulse, rhythmic subdivision, timbre (deaf or bright), posture and balance, muscle tone, biomechanics aspects of movement and many other parameters. Whether it is performed with or without a musical base must be added to the other features. According to the BAPNE Method, body percussion can be precisely classified and evaluated in five large blocks:

- Kinetics: Coordination, dissociation, laterality, etc.
- Musical: Tempo, pulse, metric division and subdivision, musical form, texture, etc.
- Body Expression: Posture, balance, muscle tone, expression of emotions, disinhibition, creativity, etc.
- Collaborative group work: values, group cohesion, perception of error, responsibility for a job well done, reflection on the way of learning and group interaction, etc.).
- Movement in space: The quality of movement in the displacement is of crucial importance since it must be conducted according to the criteria of each specific activity.

II. CONCLUSION

Body percussion in the physical education and sports- sciences is an excellent work tool for the improvement of many aspects related to motor coordination and many other areas. The objective of the BAPNE Method is the

academization of body percussion and to provide rigorous scientific analysis through research in this discipline.

That is the reason why when linking body percussion to other disciplines, a formal academic systematization is required so that the relevant rigour is provided. Social networks cause quite serious damage to this discipline as they display a completely incorrect and not rigorous vision. Besides, the public exposure of certain trainers whose visibility showing themselves performing excessively difficult rhythms, boasting banally and with a projection linked to their ego, do not help to make this discipline visible in the correct way. Body percussion should not be shown as random disconnected games, like isolated islands, with an almost sociocultural animation function and varying the activities according to what is in fashion at the time. On the contrary, well thought out and correctly concatenated activities for their correct application in the classroom in the various professional sectors must be provided.

When we learn a specific sport or how to play a musical instrument, a specific learning technique and protocol is always required. In body percussion it must be exactly the same. If I want to learn to play the violin or piano, there is a rigorous academic programme for me to acquire the relevant skills, both technically and artistically.

Something very similar occurs with dance, classical percussion, soccer, basketball, circus arts, drama, etc. If I want to learn to play basketball properly, I cannot just shoot the basket anyway I wish; if I want to be a good pianist, I must place my hands correctly and acquire skills through specific studies; the same if I want to be a violinist, where I cannot grip the bow in any way I deem suit, or a percussionist where the drumsticks must be held precisely.

Rhythmic games or melodic games are often confused with serious ways of learning musical language. If we review the literature, it is very difficult to find profuse publications such as “violin games”, or “piano games”. Similarly, in other subjects we do not find “literature games” or “biology games”, “games of equations of second grade” either. The lack of this sort of publishing may be due to the fact that a rigorous, well-sequenced process is expected, instead of single ideas or activities with little or none didactic connection. New activities and tools are constantly created, but many times they are flashes that are embedded within the contents to be taught.

Quite often, we make the reflection that there are three types of teachers who can symbolically be illustrated as the zombie, the tourist and the walker. The first has taught the same content and in the same way for many years. The second grabs material from YouTube, randomly from some books here and there, from another teacher, etc. The purpose for this sort of teacher is to have their students entertained. As these students pass the course, the teacher of the following year despairs when they realize the blurry background the students possess and the lack of basic content. This is typical of the “civilization of the spectacle”. The third one, to whom I symbolically refer to as the walker of the “St. James Way”, encounters many and varied difficulties, sun, rain, wind, cold, heat,..., but the objective is clear and above all there exists the responsibility for a job well done: proper teaching.

Possibly, what is lacking is a new learning model that preserves the old, while bringing fresh air to today's society. For this reason, we cannot continue to think about education with methodologies inspired on the 19th century, taught by teachers of the 20th century, for students of the 21st century.

That is why the BAPNE method proposes a systematization that not only serves a 12-hour course (which is the classic length of most body percussion courses), but offers an academic projection of a university nature whose teaching lasts five years. Our proposal is based on the fact that “education is not an event, it is a process”.

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