

OPIICS 2019**International Conference of Psychology, Sociology, Education, and Social Sciences****QUANTITATIVE STUDY ON SELECTIVE ATTENTION IN
CHILDREN AGED 8-9 YEARS THROUGH BODYPERCUSSION**

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Abstract

The lack of attention and concentration in the classroom is evidence accepted by most teachers. The purpose of this research is to quantify and verify that the BAPNE body percussion method is effective in increasing the selective attention of students in the 3rd grade of Primary Education. This project has been carried out with a group of n=67 children aged between eight and nine years divided into control and experimental groups and coming from two public centers in the Valencian town of Buñol (Spain). We have intervened with the experimental group for 25 weeks twice a week in fifty-minute sessions and applying a protocol of activities called Bodypercussion-Teaching Method. The control group did not carry out the BAPNE neuromotricity program and continued with the same routines without making any change in the development of its teaching programming. A basic quasi-experimental design has been used with measures before and after the application of the method and a mixed statistical analysis (inter-intra subjects) comparing the data obtained in pre-test and post-test between the control and experimental groups and between the students of the experimental group. The 4th edition of the Brickenkamp and Seisdodos "d2" concentration and selective attention test (2012) published by TEA editions were used to measure the attentional performance of students. The results obtained after data analysis revealed a statistically significant improvement in selective attention and concentration.

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1. Introduction

Attention is a very important component in human cognition that facilitates and participates in the performance of other psychological functions. It is a complex system of processing and selection of information as well as the ability to focus the consciousness, which involves control of mental activity. This concentration of consciousness in stimuli relevant to the individual while inhibiting others that are called distractors corresponds to the type of attention that we call selective. In the educational field these mental processes are of utmost importance, not only in instrumental or purely intellectual subjects but also in those that have a motor, artistic, or creative component.

The stage of Primary Education is essential for the attentional development of the students. According to Pérez Hernández (2008) at this stage, attention circuits continue to develop, and children experience a series of maturative changes at the neuronal level and structural connectivity that will allow them to improve qualities and processes already acquired as well as develop new capacities. For this reason, we should carry out a powerful stimulation of the attention in the classrooms.

The BAPNE method is a strategy that is being used in several schools, and that is researching attention to the school population. It is a cognitive, psychomotor, and socio-emotional stimulation method based on neuromotricity and articulated through body percussion to enhance functions such as attention, memory, concentration, impulse control, and executive functions among others. It has several studies that present significant results on selective attention and executive functions in Primary and Secondary Education students, as well as in different groups.

The information has been obtained through search engines such as JSTOR, EBSCO, ERIC, SCOPUS, DIALNET and JCR publications, in which it is evident that except for the BAPNE method there is no research with the improvement of selective attention through body percussion.

This quantitative research aims to demonstrate the possible stimulation of selective attention in children in the 3rd year of Primary Education through the BAPNE method. The study was carried out with a control group and an experimental one through a research protocol with n=67 subjects of similar economic and socio-cultural characteristics in the province of Valencia.

2. Problem Statement

2.1. Attention

The definition of attention has been a complicated subject throughout history, dealing with and evolving through all eras, from the classics such as Plato and Aristotle to the present day. Portellano Pérez and García Alba (2014) defines it as "[...] a functional information filtering system, of a complex, multimodal, hierarchical and dynamic nature, which allows the selection, orientation and control of the most pertinent stimuli to carry out a given senso-perceptive, motor or cognitive task effectively" (p.74).

A large number of existing models of care have contributed to this complication. Since the middle of the 20th century, we find many attentional models that come from experimental, psychometric, and clinical sources (Fernández, 2014; Londoño Ocampo, 2009; Lubrini, Periañez Morales, & Ríos Lago, 2009). Many of these models are influenced by each other or are modern re-elaborations with the introduction of new data and further study due to new neuroimaging techniques.

The development of attention is gradual and different according to the age of the children, the older they are, the greater their attention ability. According to García, 2008 (as cited in Rojas Benjumea, 2015), these would be the skills that younger children have not developed vis-à-vis adults: "less flexibility to orient care adequately; slower changes in care; less capacity to attend to relevant information; greater susceptibility to distraction, difficulties in maintaining care; less attention control" (pp. 29-30).

2.2. Selective Attention

We only process a small part of the stimuli of the environment. The most relevant ones are selected to achieve specific objectives. For Portellano Pérez and García Alba (2014) selective attention "is the ability to maintain a certain response to a stimulus, even though there are other distracting stimuli that simultaneously compete with each other" (p.78). According to Gómez Pérez, Ostrosky Solís, and Próspero García (2003) the ability to choose the relevant stimuli for a task and avoid distraction by irrelevant stimuli improves with the age of the children. On the other hand, Pérez Hernández (2008) determines that selective care is not fully developed until adolescence and that at earlier ages, although they are capable of selective care, they do not process in the same way as adults.

According to Pérez Hernández (2008), it is not known if the development of selective attention is different according to the modality of this (visual or auditory). It determines that the results of the different studies, both in the auditory and visual modality, cannot be compared to each other because they often do not share the same theoretical framework. According to Sánchez López (2011), most models of selective visual attention coincide in the same approach: "The existence of different stages or phases of selective attention within the visual processing of information" (p.11).

Selective attention, inhibition, and working memory share the management of the prefrontal cortex and may be related to each other since to attend to a relevant stimulus while another distractor exists, the latter must be inhibited. In the same way, the working memory component called the central executive is in charge of sending more attentional resources to the relevant stimuli (Gómez et al., 2003).

2.3. Cognitive Development

At this stage the child is able to treat information in various areas of the brain simultaneously due to increased myelination and neurotransmitter production; to automate frequently used actions so that the conscious processing of these actions is not required. This automation is produced by the acceleration of signals between different parts of the brain. This facilitates reading and coarse motor skills while providing an increase in processing speed as it frees up space in the front lobe to handle other tasks simultaneously (Pérez Hernández, 2008).

Between the ages of seven and nine, children experience a sharp increase in the activities of the frontal regions, and long-distance connections are integrated into the right hemisphere. A great capacity of sustained attention is produced, and the speed of processing is increased, an influential aspect in the execution of attention tasks. On the other hand, between the ages of nine and twelve, there is a maturation that improves selective attention. From here, there are few differences between children and adults regarding the control of selective attention (Pérez Hernández, 2008).

2.4. BAPNE

Body percussion is as old as the human being. The most widespread definition is that presented by Romero Naranjo (2013) who defines it as "the art of striking the body producing various types of sounds with a didactic, therapeutic, anthropological and social purpose" (p. 443).

The use of body percussion in education is nothing new and is used by a multitude of teachers, although without any intention of cognitive stimulation. In contrast, the BAPNE method has designed a series of specific cognitive, psychomotor and socio-emotional stimulation activities to improve aspects of attention and executive functions in the school population. These are published in Romero's works (2017) under the title *Bodypercussion-Teaching Methods-Volume 1 and 2*. According to the same author, the objective of these activities is for children to maintain a high level of attention and concentration, but is not to perform choreographies (Romero Naranjo, 2017).

It is evident, after searching for information on the engines mentioned above, that except for the BAPNE method, there is no research related to the improvement of selective attention and executive functions through body percussion. Piqueres Juan et al. (2018) include in their article the publications that attempt to substantiate and justify the possible effectiveness of the BAPNE method divided into three parts: theoretical sample articles of the activities and their justification; protocol or research design articles and publications with statistical data from the control and experimental groups in which possible significant changes are shown.

We can find in the scientific literature published by the BAPNE method eleven research articles directly related to attention (Crespo Colomino, Pons Terrés, Romero Naranjo, Romero Naranjo, & Liendo Cárdenas, 2014; Jauset Berrocal, Tripovic, & Romero Naranjo, 2014; Pons Terrés, Romero Naranjo, Romero Naranjo, Crespo Colomino, & Liendo Cárdenas, 2014; Piqueres Juan et al. 2018; Piqueres Juan, Sarmiento Alienes, Sánchez González, & Romero Naranjo, 2019; Romero Naranjo et al., 2014; Romero, Liendo, Romero, & Menargues, 2014; Trives Martínez et al., 2014; Romero Naranjo, 2015; Jiménez Molina, Vicedo Cantó, Sayago Martínez, & Romero Naranjo, 2017; Ros Silla et al., 2019).

In quantitative terms, statistically significant results are observed in different studies that corroborate the possible cognitive stimulation and give the executive functions of the BAPNE method, both in the school population and in other groups (Álvarez Morales & Romero Naranjo, 2019; Castelló Juan, Antón Suay, Flores Morales, Vicedo Reche, & Romero Naranjo, 2019; Cozzutti, Guaran, Blessano, & Romero Naranjo, 2017; González Sánchez, Romeu López, & Romero Naranjo, 2019; Latre Nava et al., 2019; Piqueres Juan et al., 2019; Ros Silla et al., 2019; Torró Biosca et al., 2019). On the other hand, and in a more specific way, the works of Piqueres Juan et al. (2019) and Ros Silla et al. (2019), show significant results on the selective attention in students between 8 and 13 years old.

3. Research Questions

- 3.1. Are the activities carried out in the BAPNE neuromotricity program effective in increasing the selective attention of pupils in the 3rd year of Primary Education?
- 3.2. What impact does participation in the BAPNE neuromotricity program have on the selective attention of students in the 3rd year of Primary Education?

- 3.3. What is the difference in increased selective attention between students who participated in the BAPNE neuromotricity program and those who did not?

4. Purpose of the Study

The objectives that we propose in this research are:

- 4.1. To measure the impact quantitatively of the body percussion BAPNE method on the selective attention in students of 3rd of Primary Education.
- 4.2. To verify that the use of the BAPNE body percussion method is effective in increasing the selective attention of students in the 3rd grade of Primary Education.

5. Research Methods

The research work was carried out with a group of $n=67$ children from 3rd year of Primary Education from two public centers in the Valencian town of Buñol (Spain) with ages between 8 and 9 years and divided into control and experimental groups. The control group consisted of 31 students divided into two groups, 15 of them in group A and 16 in group B. On the other hand, the experimental group consisted of 36 students also divided into two groups, 16 in group A and 20 in group B. All the students of the two experimental groups participated in the intervention sessions, four of whom were excluded from the research for different reasons: two of them due to late incorporation into the school, not carrying out the initial evaluation and two more due to absences. Both the control group and the experimental group belonged to a middle level of society and had similar cultural and socio-economic characteristics.

The study began with the delivery of an explanatory dossier to the directors of the educational centers. It explained in detail the course of the investigation. Following the acceptance of participation by the management teams, a meeting was held with the parents of the students and the entire research process was explained to them. At the end of the meeting, they signed the authorization model in which they consented to the participation of their children in the study.

The evaluation instruments used to measure the attentional performance of the students were the CARAS-R, D2, and the WISC-IV key, symbol, and animal tests. Due to the limitation of words in this article will expose the results obtained in the 4th edition of the test of selective attention and concentration "d2" by Rolf Brickenkamp, specifically the Spanish adaptation revised by Nicolas Seisdedos and published by TEA editions in 2012 (Brickenkamp & Seisdedos Cubero, 2012). The person in charge of carrying out the evaluation tests was the psychologist Pilar Hernández Simarro, a member of the Buñol City Council.

We used a methodology with a basic quasi-experimental design measuring and collecting samples before and after (pre-test and post-test) the intervention. A statistical analysis of mixed character (inter-intra subjects) was made with the data obtained in the evaluation of the pre-test and post-test extracting from these results.

The intervention program applied to the experimental group was developed during 25 weeks between December 1, 2017, and May 30, 2018, stopping in the festive periods of Christmas and Easter. Thirty-six practical sessions were given to each group (A and B) of fifty minutes each and with a periodicity of two sessions per week, on Wednesdays and Fridays. The sessions were held during school hours from

12:05 to 12:55 in group A and from 13:00 to 13:50 in group B. The subjects replaced by the BAPNE sessions were assembly-values and Valencian, and these were distributed among the global timetable. It was considered not to substitute the classes of Music-Plastic or Physical Education due to the interest of the students in these subjects and thus avoid the demotivation or apathy towards the intervention as occurred in the research carried out by Torró Biosca et al. (2019).

The intervention in the experimental group was articulated through a neuromotricity program of the BAPNE method. This is a protocol of activities, which Romero Naranjo (2017) justified in his publications *Bodypercussion- Teaching Method-Volume 1 and 2*. This program contains music motor activities for cognitive stimulation, attentional, and executive functions in normo-typic children for a full academic year.

On the other hand, the control group was not intervened using the BAPNE neuromotricity program and continued with its academic programming without making any change in its development.

Once the thirty-six practical sessions with the experimental group had been completed, both groups (control and experimental) were evaluated through post-test using the tests mentioned above. The purpose of this evaluation is to analyze the evolution of both groups and then compare them with each other and thus extract the quantitative results on the established hypothesis. The results obtained will be triangulated in the future with different investigations of the same nature carried out by the research team of the BAPNE method and thus give greater significance to these conclusions.

6. Findings

The programs used for data analysis were, on the one hand, the SPSS v. 24 for Mac, applying the t-student test for the extraction of the results. On the other hand, Microsoft Excel, to make the final result of tables and graphs more attractive as you can see in Figure 01, Figure 02, and Figure 03.

Since we have worked with a significant sample, with several individuals greater than 30 for each independent group (experimental and control) as you can see in Table 01, we have assumed the normality of the data by the central theorem of the limit. For the analysis of results, a significance level of 0.05 has been taken.

After data analysis, statistically significant differences were found between the averages in favor of the experimental group versus the control group when subtracting the pre-test measurements from the post-test in the following variables: omissions (O), commissions (C), concentration index (CON) and total effectiveness of the test (TOT) with the following pre-values respectively $p=0.014$; $p=0.05$; $p=0.004$ and $p=0.02$.

On the other hand, statistically greater differences were obtained in the experimental group as opposed to the control in the total response variables (TR), total hits (TA) and line with the lowest number of attempted elements (TR-) with the following respective pre-values $p=0.005$; $p<0.001$ and $p=0.02$ as you can see in Table 02.

Table 01. Group statistics

| Variable | GROUP | N | Mean | Std. Deviation | Std. Error mean |
|----------|--------------|----|--------|----------------|-----------------|
| Opost | EXPERIMENTAL | 36 | 6,06 | 6,706 | 1,118 |
| | CONTROL | 31 | 15,55 | 19,401 | 3,484 |
| Cpost | EXPERIMENTAL | 36 | 2 | 2,986 | 0,498 |
| | CONTROL | 31 | 12,71 | 29,034 | 5,215 |
| CONpost | EXPERIMENTAL | 36 | 124,94 | 27,841 | 4,64 |
| | CONTROL | 31 | 103,35 | 31,333 | 5,628 |
| TR | EXPERIMENTAL | 36 | 8,67 | 46,417 | 7,736 |
| | CONTROL | 31 | -36,06 | 78,322 | 14,067 |
| TA | EXPERIMENTAL | 36 | 9,75 | 15,459 | 2,577 |
| | CONTROL | 31 | -17,52 | 32,603 | 5,856 |
| TR- | EXPERIMENTAL | 36 | 0,39 | 4,325 | 0,721 |
| | CONTROL | 31 | -3,29 | 7,529 | 1,352 |
| TOT | EXPERIMENTAL | 36 | 19,08 | 29,906 | 4,984 |
| | CONTROL | 31 | -41,77 | 61,452 | 11,037 |

Table 02. Test of independent samples: Levene's test for equality of variances and t-test for equality of mean

| Variable | GROUP | F | Sig. | t | df | Sig. (2-tailed) | Mean Dif. | Std. Error Dif. |
|----------|-----------------------------|--------|-------|--------|--------|-----------------|-----------|-----------------|
| Opost | Equal variances assumed | 22,875 | 0 | -2,754 | 65 | 0,008 | -9,493 | 3,447 |
| | Equal variances not assumed | | | -2,594 | 36,162 | 0,014 | -9,493 | 3,659 |
| Cpost | Equal variances assumed | 11,449 | 0,001 | -2,202 | 65 | 0,031 | -10,71 | 4,863 |
| | Equal variances not assumed | | | -2,045 | 30,547 | 0,05 | -10,71 | 5,238 |
| CONpost | Equal variances assumed | 0,383 | 0,538 | 2,986 | 65 | 0,004 | 21,59 | 7,229 |
| | Equal variances not assumed | | | 2,96 | 60,636 | 0,004 | 21,59 | 7,294 |
| TR | Equal variances assumed | 3,181 | 0,079 | 2,89 | 65 | 0,005 | 44,731 | 15,48 |
| | Equal variances not assumed | | | 2,786 | 47,191 | 0,008 | 44,731 | 16,054 |
| TA | Equal variances assumed | 7,608 | 0,008 | 4,472 | 65 | 0 | 27,266 | 6,097 |
| | Equal variances not assumed | | | 4,262 | 41,411 | 0 | 27,266 | 6,397 |
| TR- | Equal variances assumed | 4,343 | 0,041 | 2,495 | 65 | 0,015 | 3,679 | 1,475 |
| | Equal variances not assumed | | | 2,401 | 46,268 | 0,02 | 3,679 | 1,532 |
| TOT | Equal variances assumed | 7,546 | 0,008 | 5,266 | 65 | 0 | 60,858 | 11,556 |
| | Equal variances not assumed | | | 5,025 | 41,987 | 0 | 60,858 | 12,11 |

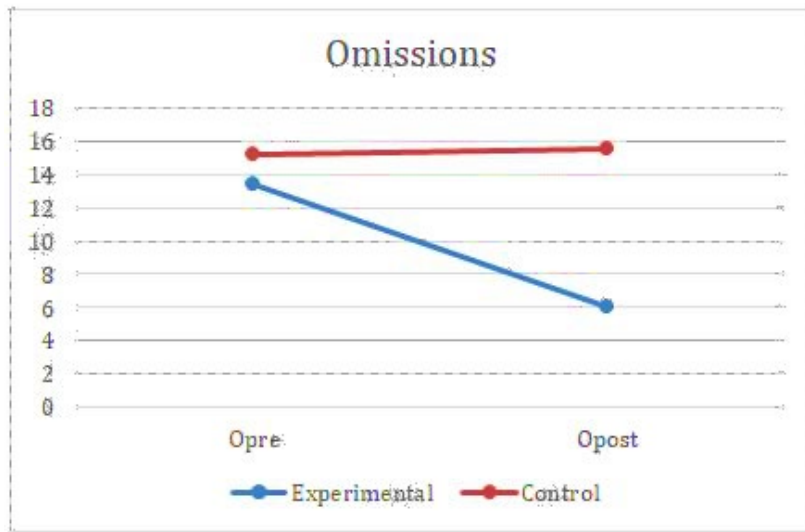


Figure 01. Result omissions control and experimental group



Figure 02. Result of control and experimental group commissions

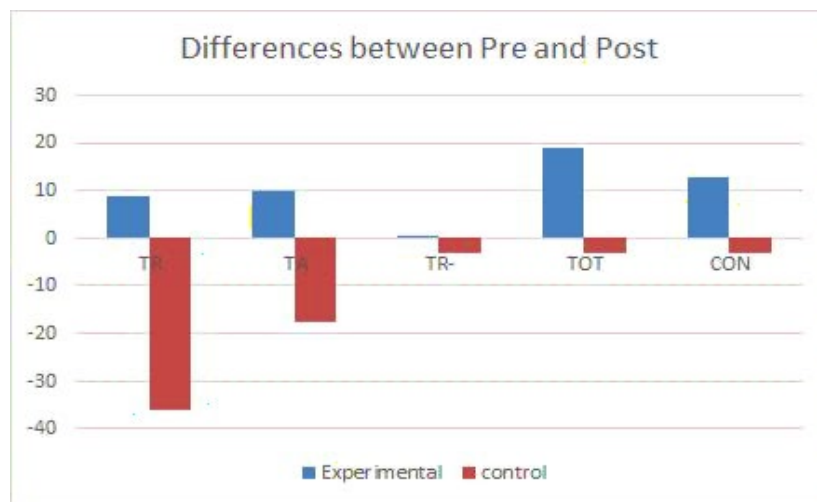


Figure 03. Difference between variables of the control and experimental groups

7. Conclusion

This research shows, after the quantitative observation of the pre-test and post-test, that the BAPNE method, evaluated through the test of attention and concentration "d2" offers positive results on the selective attention of students in the 3rd year of Primary Education. These results postulate the BAPNE method as a possibly effective instrument to be considered in Primary Education for the attentional stimulation of students.

Observing the results extracted in test "d2" we can affirm that the attentional and concentration development has been satisfactory. Also, we can confirm the effectiveness of the BAPNE neuromotricity program on selective attention in the students studied.

After the application of the neuromotricity program to students in the 3rd grade of Primary Education, the data were analyzed. Statistically, significant improvements were observed in the post-test in all variables in favor of the experimental group over the control group, which confirms the established hypothesis. These results are consistent with those obtained in similar studies by Piqueres Juan et al. (2019) and Ros Silla et al. (2019).

Although the duration of this research has been significant (25 weeks), it would be important to carry out future studies covering a full academic year and, with it, to give greater reliability and significance to these statements.

Finally, and in conclusion, this study carried out with a sample of 67 students (31 in the control group and 36 in the experimental group) provides a line to follow for future studies that may verify the improvement of selective attention in this population. On the other hand, it confirms that the use of the BAPNE percussion method can be effective for the development of attention and executive functions in students in the 3rd year of Primary Education.

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