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**ATTENTION IN CONSERVATOIRE STUDENTS USING BODY**  
**PERCUSSION FOLLOWING THE BAPNE METHOD**

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***Abstract***

The aim of the current investigation is to show by means of a quantitative study the possible improvement in attention levels and to discover if anxiety levels can be reduced in elementary grade students in a music school using psychomotor stimulation in practice of body percussion following the BAPNE method. The study has been based on a protocol with a total of N=61 subjects, divided between an experimental group and a control group, all with similar socioeconomic and educational characteristics in the Valencian Community (Spain). The intervention was carried out across 24 weeks using a programme of Neuromotricity following the BAPNE method. The experimental group took part for 50 minutes twice a week. The control group continued with their normal routines and were not subject to any change in their academic and cognitive development. The methodology used was basic quasi-experimental in its design using collection of pre- and post-test sample measurements, before and after the method was implemented. Subsequently, statistical analysis was carried out. This was factorial in design and considered the measurements taken before and after. Analysis of the results shows a notable improvement in cognitive skills involving attention after the post-test of the experimental group. A reduction in levels of anxiety can also be seen. Both are key factors in effective teaching and learning.

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**Keywords:** Anxiety, attention, body percussion, executive functions, motor control, music.



## 1. Introduction

Processes involving attention are involved in, and indeed crucial to, many of the situations in our daily life. In fact, nowadays, easy access to computers, tablets, telephones, mobile devices, which are all interconnected through the Internet, has caused a radical change in the way we access information, the dynamics of social interaction, learning and in entertainment. In some way, it has also influenced our brains (Small, Moody, Siddarth, & Bookheimer, 2009).

Similarly, inappropriate use of technological tools, as well as the information that is now available, can alter the development of children and increase their risk of suffering from behaviour disorders or attention deficit disorders (Swing, Gentile, & Anderson, 2010; Christakis, Zimmerman, & Di Giuseppe, 2004; Bilbao, 2015).

An understanding of what is going on in the brain when it is learning, and what is beneath the learning and memorisation process, or how age, genetics, environment or emotion can affect this process by means of the latest scientific discoveries, are all essential to plan and perfect new educational strategies targeting a wide range of different needs (Blakemore & Frith, 2005).

From this perspective, and especially within the field of education where we know that attention is directly involved in executive processes and the active manipulation of information (García Sevilla, 1997), a key priority for educational professionals is the development of activities and strategies that stimulate the attentional mechanism and the different forms of attention to facilitate teaching and learning.

In this regard, BAPNE is a method of socioemotional, psychomotor and neuro-rehabilitative stimulation and is based on the theory of Multiple Intelligences. Various different authors mention that this methodology:

*Allows us to work not just on physical bodily aspects, but also on cognitive and emotional aspects. Performing repetitive movements along with song stimulates different areas of the brain in both hemispheres which are linked to superior motor and cognitive functions. These include planning and/or attention. These activities, if conducted correctly by the trainer, stimulate an increase in the secretion levels of certain neurotransmitters such as dopamine and oxytocin. These are reinforced by the neurotransmitters themselves and foster an appropriate group environment which is beneficial for all those participating (Jauset-Berrocal, Tripkovic, & Romero-Naranjo, 2014, p. 1684).*

The aim of the present study is to show by means of a qualitative study the improvements in levels of selective attention in students in primary education in the conservatoire in Ágora Lledó International School de Castellón (Spain) which arise as a result of cognitive, socioemotional and psychomotor stimulation by means of the distinct body percussion activities found in the BAPNE Method. This aim follows a wide-ranging bibliographic review which showed that, for now, no study has been conducted into body percussion with a group which is studying music formally.

The assessment of attention levels was carried out by using the D2 (Brickenkamp, 1994) and CORSI BLOCK-TAPPING (Wechsler, 2004) tests, which allow measurements to be taken of selective attention.

It is thus important to point out that the systematic use of body percussion using the BAPNE Method activities can lead to improved attention levels (Carretero-Martínez, Romero-Naranjo, Pons-Terrés, & Crespo-Colomino, 2014).

## **2. Problem Statement**

Through exhaustive searching on different academic meta-search engines (Web of Science, Eric, CSIC, Scopus, Redired, Proquest, SCImago JR, JSTOR) we can see that several authors address the subject of attention and its link to musical education in primary education (León, 2018; Wang, Ossher, & Reuter-Lorenz, 2015).

The tests used to assess both groups were ENFEN, D2, CORSI BLOCK-TAPPING, CARAS-R and STAIC and these were conducted by Ruth Gasparini Berenguer, a neuropsychologist at Alicante General Hospital. However, due to the precise nature of this conference, and the word limit of this article, we will focus on the significant results obtained using the D2 and CORSI BLOCK-TAPPING tests. In future publications, the results of other tests carried out will be set out.

There are numerous written pieces about body percussion, however, very few are justified and measured. The BAPNE® Method can be singled out as a systematic method which is based on neuropsychology and which experimentally proves the possible cognitive stimulation by use of validated tests (Trives-Martínez et al., 2014; Díaz Pérez, 2016; Romero-Naranjo, 2013). For this reason, a search was carried out on review articles about this subject (Romero-Naranjo, 2013).

## **3. Research Questions**

Do students in their first and second year of primary conservatoire study improve their attention levels significantly through neuromotricity using the BAPNE® Method compared to those who have not participated?

## **4. Purpose of the Study**

To study the effect of the BAPNE® method on the attentional processes in a pilot group undertaking primary conservatoire studies

To check the viability of use of the BAPNE® Method in a pilot group to then use it in significant future investigations.

## **5. Research Methods**

### **5.1. Participants and context**

The research project was carried out in Ágora Lledó International School, a private educational establishment which is located in Castellón (Spain) and which has a conservatoire for primary studies. The sample consisted of 27 students, all of whom had Spanish as their first language.

In order to find a reliable control group, a centre with similar educational characteristics was found. The Conservatori Professional de Música de Torrent (Valencia, Spain) was chosen as its student body has similar characteristics.

It is important to point out that the students in both groups under study were in their first and second years of primary conservatoire education and compulsory studies in this type of public-private school and that their studies were similar during this study. Similarly, the socioeconomic levels of the students were

similar and were average to above average. However, neither of the two groups had been involved in work which included the systematic use of body percussion through the BAPNE Method.

## **5.2. Measurements**

To see if the BAPNE Method has a significant influence on selective attention, the D2 (Brickenkamp, 2012) and CORSI BLOCK-TAPPING (Farrell-Pagulayan, Busch, Medina, Bartok, & Krikorian, 2006) tests were used. The tests were performed in collaboration with Innovation and.

## **5.3. Process**

The experimental group undertook an intervention using the BAPNE® Method, whilst the control group continued to receive their traditional teaching methodology. The activities used are published in the two manuals in the teaching programme (Body Percussion – Programación didáctica volumen 1 y 2), and the manuals on the foundation of the BAPNE® Method.

For this quantitative study, a quasi-experimental design was used: two non-equivalent groups with measures taken before and after use of the BAPNE Method (pre- and post-tests). There was one experimental group of 27 participants (15 boys and 12 girls) and a control group of 34 participants (15 boys and 19 girls). The experimental group was made up of students from Ágora Lledó International School, and the control group of students from Conservatori Professional de Música de Torrent. All of the 61 participants were undertaking studies in their first or second year of primary conservatoire education.

Firstly, the proposed research project was presented to the two participating educational establishments to check the viability of its delivery. At all times, the anonymity of the data collected was assured. The informed consent of the parents or legal guardians of the participants was then obtained.

For the collection of sample, a working protocol was set out to perform the pre- and post-tests on the experimental and the control groups. In turn, a programme of structured body percussion activities using the BAPNE Method was planned to be used with the experimental group.

The pre-test began on 13 October 2017. Following this, the twice-weekly 50 minute sessions began, and were carried out during the course of 20 weeks (between October 2017 and April 2018).

The control group continued with the activities they would routinely practise and were not subject to any change to their academic cognitive development and did not use any of the BAPNE Method activities.

Once all the practical sessions were completed, the post-test was carried out, and the final sample was collected on 25 April 2018. Both the tests were carried out in the normal classrooms of each groups during school hours with the assistance of the year group's teachers.

## **5.4. Design and data analysis**

The design of this investigation was quasi-experimental and inter-subject. When analysing both tools (D2 and CORSI BLOCK-TAPPING), the design t-Student was used to compare mean averages for independent samples with a sample big enough to apply the central limit theorem.

Due to the quasi-experimental nature of this study, two groups which already existed in the two establishments in the provinces of Castellón and Valencia were used. The design consists of an experimental group (the conservatoire of Colegio Ágora Lledó International School in Castellón) where the

BAPNE® Method was used twice a week for 50 minutes at a time during their music lessons, and a control group (the conservatoire Conservatori Professional de Música de Torrent-Valencia), which followed with their normal programme for the first and second years of primary conservatoire education. The post-test was conducted six months after the pre-test. The program IBM SPSS 24 for Mac was used for the analysis of the results to obtain the difference between the experimental group and the control group.

## 6. Findings

The analysis of the data used the t-Student test to compare mean averages for independent samples, and a level of statistical significance of 0.05 was used. The statistical software used was IBM SPSS v.24 for Mac. The graphs and tables have been made using Microsoft Excel for Mac for greater aesthetic appeal.

There are no statistically significant differences between the control and the experimental groups when conducting the pre-test. However, there are statistically significant differences when conducting the post-test in the total number of responses (TR,  $p=0.016$ ) showing a difference in mean averages of 52.705, in the total number of correct answers (TCA,  $p<0.001$ ) with a difference of mean averages of 40.535, in omissions (O,  $p=0.044$ ) and a difference of -21.692, and in the commissions variable (C,  $p=0.018$ ) where the difference in mean averages between the control group and the experimental group is -18.069 (Table 1 and 2). In the specific case of the omissions, the number of omissions in the control group was three times higher than in the experimental group (Figure 1).

Statistically significant differences were also found when calculating the mean average of the differences between the post-test minus the pre-test for each one of the groups in the variables TR, TCA,  $TR+ y TR-$  ( $p$ -value: 0.001,  $<0.001$ , 0.028, 0.002 respectively).

**Table 01.** Independent Samples Test for the Post-Test D2

		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
TR	Equal variances assumed	1,374	0,246	2,478	59	0,016	52,705
	Equal variances not assumed			2,611	55,923	0,012	52,705
TCA	Equal variances assumed	2,149	0,148	4,253	59	0	40,535
	Equal variances not assumed			4,477	56,154	0	40,535
O	Equal variances assumed	9,341	0,003	-1,876	59	0,066	-21,692
	Equal variances not assumed			-2,088	36,654	0,044	-21,692
C	Equal variances assumed	17,69	0	-2,219	59	0,03	-18,069
	Equal variances not assumed			-2,487	34,112	0,018	-18,069

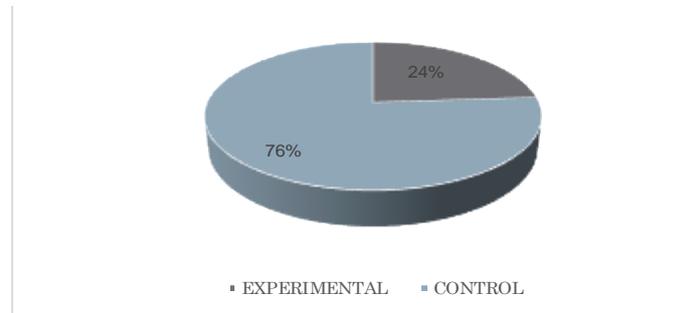
Note: TR (total number of responses), TCA (total number of correct answers), O (omissions), C (commissions).

**Table 02.** Group Statistics for the Post-Test D2

	GROUP	N	Mean	Std. Deviation
TR	Experimental	27	354,85	59,729
	Control	34	302,15	96,764
TCA	Experimental	27	138,74	26,984
	Control	34	98,21	43,252
O	Experimental	27	9,93	12,434

	Control	34	31,62	58,956
C	Experimental	27	4,67	4,867
	Control	34	22,74	42,016

Note: TR (total number of responses), TCA (total number of correct answers), O (omissions), C (commissions).



**Figure 01.** Average of Omissions in the Post-Test D2

### Corsi block-tapping

Statistically significant differences were found in the difference in mean averages of the experimental group and the control group when conducting the post-test on all the variables measured. Statistically significant differences were also found between the two groups when calculating the difference between the post- and pre-tests. In the post-tests, we find differences in the score in forward order (SFO,  $p=0.023$ ), in the score in backward order (SBO,  $p<0.001$ ), in the total score (TS,  $p=0.001$ ), numbers memorised in forward order (FO+,  $p=0.002$ ) and in numbers memorised in backward order (BO+,  $p=0.004$ ) (Table 3 and 4). For the total score variable, the value in the experimental group was almost four times higher than in the experimental group (Figure 2).

**Table 03.** Independent Samples Test for Post-Test Corsi Block-Tapping

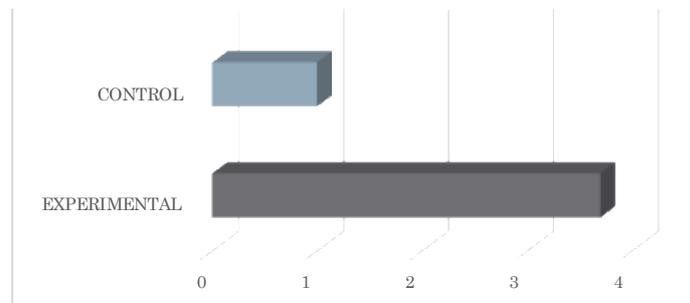
	Levene's Test for Equality of Variances			t-test for Equality of Means			
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
SFO	Equal variances assumed	0,001	0,979	3,159	59	0,002	1,476
	Equal variances not assumed			3,16	55,967	0,003	1,476
SBO	Equal variances assumed	0,851	0,36	2,411	59	0,019	1,191
	Equal variances not assumed			2,344	48,399	0,023	1,191
TS	Equal variances assumed	0,943	0,335	3,521	59	0,001	2,704
	Equal variances not assumed			3,431	49,054	0,001	2,704
FO+	Equal variances assumed	0,772	0,383	9,36	59	0	2,436
	Equal variances not assumed			9,562	58,858	0	2,436
BO+	Equal variances assumed	1,768	0,189	5,464	59	0	1,683
	Equal variances not assumed			5,295	47,401	0	1,683

Note: SFO (Score in Forward Order), SBO (Score in Backward Order), TS (Total Score), FO+ (Numbers Memorised in Forward Order), BO+ (Numbers Memorised in Backward Order)

**Table 04.** Group Statistics for Post-Test Corsi Block-Tapping

	GRUPO	N	Mean	Std. Deviation
SFO	Experimental	27	1,74	1,81
	Control	34	0,26	1,814
SBO	Experimental	27	1,93	2,165
	Control	34	0,74	1,693
TS	Experimental	27	3,7	3,338
	Control	34	1	2,663
FO+	Experimental	27	2,26	0,903
	Control	34	-0,18	1,086
BO+	Experimental	27	1,89	1,368
	Control	34	0,21	1,038

Note: SFO (Score in Forward Order), SBO (Score in Backward Order), TS (Total Score), FO+ (Numbers Memorised in Forward Order), BO+ (Numbers Memorised in Backward Order)



**Figure 02.** Mean difference between the post- and pre-tests for Corsi Block-Tapping

## 7. Conclusion

This study and the results obtained allow us to state that the information obtained in the D2 and CORSI BLOCK-TAPPING test in terms of the development of selective attention was satisfactory. Consequently, we can confirm the viability of using the BAPNE Method as a neuromotor programme for the stimulation of executive functions in the population under study.

After the application of the neuromotor programme, the attentional aspects of children in their first and second years of primary conservatoire education were analysed. The group undertaking BAPNE activities obtained statistically significant improved scores in selective attention, thus confirming the initial hypothesis.

By analysing the data obtained, we can confirm that the differences found between the control group and the experimental group, both in the pre- and post-test phases, in all variables, are notable for their lack of homogeneity.

The duration of this programme was 6 months, but it would be useful in future studies to plan for 12 months. This would allow the data to be more significant and reliable.

In conclusion, this pilot study with a sample of 61 participants (27 in the experimental group and 34 in the control group) sets out a viable line of future investigation which could further confirm the

improvement in selective attention brought about. It also proves the benefits that the BAPNE® Method can bring to this line of investigation.

## References

- Bilbao, A. (2015). *El cerebro del niño explicado a los padres*. Barcelona, España: Plataforma Editorial.
- Blakemore, S.J., & Frith, U. (2005). *The learning brain: Lessons for education*. Malden: Blackwell Publishing.
- Brickenkamp, R. (1994). *Test d2 Aufmerksamkeits-Belastungs-Test. Handanweisung*. Göttingen, Germany: Hogrefe.
- Brickenkamp, R. (2012). *Test de Atención D2: Manual*. Madrid: TEA Ediciones.
- Carretero-Martínez, A., Romero-Naranjo, F. J., Pons-Terrés, J., & Crespo-Colomino, N. (2014). Cognitive, Visual-spatial and Psychomotor Development in Students of Primary Education through the Body Percussion – BAPNE Method. *Procedia - Social and Behavioral Sciences*, (152)7,1282-1287.
- Christakis, D., Zimmerman, F., & Di Giuseppe, D. (2004). Early television exposure and subsequent attentional problems in children. *Pediatrics*, 113(4), 708-713.
- Díaz Pérez, A. (2016). *Trastorno del desarrollo de la coordinación: Programa de Intervención a través de la Música, la danza y la percusión corporal (Método BAPNE)* (Doctoral dissertation). Universidad de Murcia, España.
- Farrell-Pagulayan, K., Busch, R. M., Medina, K. L., Bartok, J. A., & Krikorian, R. (2006). Developmental Normative Data for the Corsi Block - Tapping Task. *Journal of Clinical and Experimental Neuropsychology*, 28 (6), 1043 - 1052. doi: 10.1080/13803390500350977
- García Sevilla, J. (1997). *Psicología de la atención*. Madrid: Síntesis Psicología.
- Jauset Berrocal, J.A., Tripovic, Y., & Romero Naranjo, F.J (2014). El método BAPNE y su repercusión en las capacidades cognitivas. *XII Jornadas de Redes de Investigación en Docencia Universitaria. El reconocimiento docente: innovar e investigar con criterios de calidad*, 1672-1684
- León, M. (2018). Neurodidáctica musical y procesos de aprendizaje. Un enfoque para la formación del educador musical. *Revista Educación Superior y Sociedad (ESS)*, 19, 32-32.
- Romero-Naranjo, F.J. (2013). Science & art of body percussion: a review. *Journal of human sport and exercise - North America*, 8, 442-457.
- Small, G. W., Moody, T. D., Siddarth, P., & Bookheimer, S. Y. (2009). Your brain on Google: patterns of cerebral activation during internet searching. *Am. J. Geriatr. Psychiatry*, 17, 116–126. DOI:10.1097/JGP.0b013e3181953a02
- Swing, E., Gentile, D., Anderson, C. (2010). Television and video game exposure and the development of attention problems. *Pediatrics*, 126(2), 214-221.
- Trives-Martínez, E.A., Romero-Naranjo, F.J., Pons-Terres, J.M., Romero-Naranjo, A.A., Crespo-Colomino, N., Liendo-Cárdenas, A., & Tripovich, Y. (2014). Los métodos didácticos musicales y la atención en relación al movimiento. *XII Jornadas de Redes de Investigación en Docencia Universitaria. El reconocimiento docente: innovar e investigar con criterios de calidad*, 1066-1079. Retrieved from: <http://rua.ua.es/dspace/handle/10045/41915>
- Wang, X., Osher, L., & Reuter-Lorenz, P. A. (2015). Examining the relationship between skilled music training and attention. *Consciousness and Cognition*, 36, 169-179. DOI: 10.1016/j.concog.2015.06.014
- Wechsler, D. (2004). *Escala de Memoria de Wechsler III: Manual de aplicación*. Madrid: TEA Ediciones.