

**160 - IMPROVEMENT IN AUDITORY STIMULUS FOCUS OF ATTENTION**

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**1 - INTRODUCTION**

The changes brought about in companies seeking new technologies, such as requiring a market increasingly competitive, have a significant impact in the form of management of organizations. Processes have been and are metamorphosed by the further division of labor. The global economic market, designed by an irrational competition, produces a dynamic setting with multiple reflections in different sectors. (Sousa, 1989). In this context the Brazilian legislation of the NR 17 which says: "In workplaces where activities are performed that require intellectual and request constant attention, such as control rooms, laboratories, office rooms, or analysis of development projects, among others are recommended the following conditions of comfort"

Attention is the process that directs our waking when the information is captured by our senses, it can also be seen as a mechanism that is the stimulation of selective perception and directed (Guallar, PONS, 2006; Martens, 1987; SAMULSKI, 2002). Among its diverse types highlights the concentration that can be defined as focusing attention on a particular object or an action. In sport it is the ability to focus on relevant stimuli of the environment and to maintain that focus throughout the sporting event (Weinberg, 1988; Weinberg, Gould, 2001) and it can be divided into three parts, focusing on relevant cues, maintenance focus of attention all the time and aware of the situation.

In the United States, a professional can only stay focused on one task for a maximum of 11 minutes, on average, until you have his attention stolen by a new e-mail or a phone call. And each time that interrupts the activities, it needs about 25 minutes to regain concentration earlier. This way, you can lose up to two hours a day because of the lack of focus on their tasks. The brain works by firing neuroeletroquímicos forming beta waves, alpha, theta and delta. Each of these waves work in a different frequency band and is responsible for a particular state of consciousness. Photic stimulation and auditory allows us to condition the cortical activity to improve a particular performance or performance (HUTCHISON, 1986).

The benefits of photic and auditory stimulation, ranging from the increase in cerebral blood flow, increased production of certain neurotransmitters, stimulating neuroplasticity, until the balance of cortical activity between the cerebral hemispheres. These benefits potentiate the brain in order to open the door to new information, learning, memory, to facilitate and speed up mental processing. It is possible to select a particular frequency range to train an individual. By bombing the retina with strobe light and the perception of the frequency olivary nucleus and its receipt by the thalamus is the structure responsible for receiving and filtering stimuli Sterna (BEAR, et al.2002) with the reticular activating system sends this frequency to the cortex in a few minutes is to monitor the frequency that is being imposed (BRADY, 2002).

The importance of this work is given to the methods for enhancing the focus of attention, be somewhat modeled on procedures that work, but need a long time to establish them. Thus this research aims to optimize the results, for the scientific knowledge, so that subsidies can work properly for the improvement of care. There are new possibilities for learning to improve this, for through the cortical stimulation is as light and sound or not, enabling a new way to have this facilitated learning, thus filling a gap in science, developing this research to increase the information in this area of knowledge and in their corresponding areas. Based on these questions has been to identify if there is increased performance of attention in the workplace, employees whose primary work tool is the computer.

**2 - METHODOLOGY****2.1 - Population and shows**

The study population consisted of 20 individuals of both sexes and at random with age ranging from 20 to 42 years, employees of a business Internet provider, located in the city of Campos dos RJ.

**2.2 - Type of search**

This study is a descriptive means of data collection.

**2.3 - Criteria for inclusion / exclusion**

All volunteers for this research enjoys perfect physical and mental health over the past six months. Without being observed hemispheric preference of each individual in the absence of special equipment for this purpose.

**2.4 - Instrumentation**

The methodology of this study aims to measure the focus of attention on workers, which require the same for your work develops. Through the device of light and sound, aiming to develop a brain that worker empowerment minimizing the effects of lack of focus of attention in their place of work.

We used the apparatus of light and sound or sound called, computerized electronic device called Orion, manufactured by Mindplace composed of sunglasses with four LEDs on the inner surface of each lens, a stereo headset and a PC where the pre-programmed sessions, which used the appropriate section of No. 12 to focus attention lasting 10min. The test was used to identify the amount of trial and error was the kind of scale focused attention.

**2.5 - Procedures**

The test of the grid type of focused attention, composed of numbers arranged in columns randomly, ranging from 00 to 99. The main goal of each individual would identify, in ascending order, the numbers that were presented in a given time. That would be two minutes.

The tests were done in three stages. At first test was the beginning of the working day of each sample. The second time was a new test done at the end of the working day, to check the decline of the focus of each worker. The third stage happens with the division of groups. The first group uses the auditory stimulation of the device and performs the test a third time. The second group repeats the test for the third time without the use of any stimulus.

**2.6 - Variables Analysis**

Minimum score of four hits and a maximum of fifteen items, through the test grid.

**2.7 - Statistical analysis**

Initially we applied the normality test Kolmogorov-Smirnov and how the data followed the curve of normality test was applied TWO-WAY ANOVA and minimum significant differences the Tukey test was applied, whereas alpha 5% ( $p < 0,05$ ).

### 3 - RESULTS

The sample of this study showed the following characteristics: mean age 31 years and both sexes. And 8 males and 12 females. All with an average of 8 hours of work per day and an hour and a half apart.

The control group with 10 members of both genders, 6 females and 4 males with a mean age of 28 years. The group sound with 10 members including 6 females and 4 males with a mean age of 31 years.

After the period of data collection, can be observed that some changes have occurred regarding the behavior of the operators' attention between the different stages of evaluation, as shown in figuras 1e2:

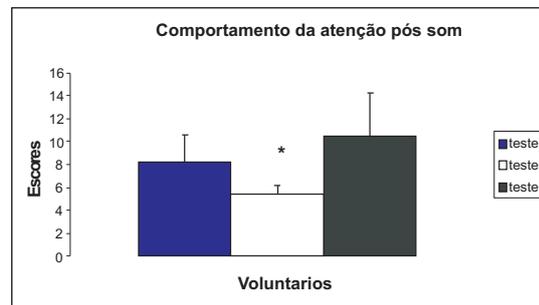


Figure 1: Average values and error bars of standard deviation after applying the Student t test for the group subjected to sound stimulation (\* p < 0.05).

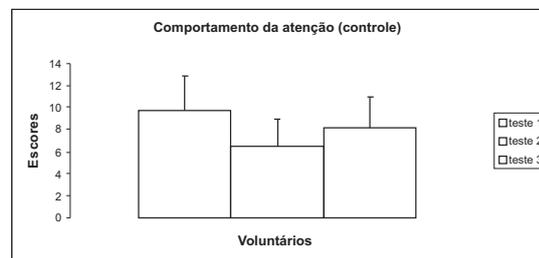


Figure 2: Mean values and error bars of standard deviation after applying the Student t test for the control group (p > 0.05).

Comparing the above figures (1 and 2) it was found that the group used the stimulus somz worsened the performance of attention at the end of the workday and after subjected to the sound stimulus increased its performance, so melhorando number of hits and overcoming the initial condition of a test that was conducted at the beginning of the working day (p < 0.05). The control group without cortical stimulation, had a drop in their income attentional expected to finish their work day, the test two. However, its response to the end of the test three was similar to the test two, not reaching the performance of a test (p > 0.05). To corroborate the results of this study, the studies of The Monroe Institute (2001), shows that it is possible to cause the brain to artificially reproduce these frequencies in the brain, using sound equipment hemisphere. As the equipment used by The Monroe Institute, other machines were developed and are known in the literature, such as brain machines, technology, light and sound or simply brain wave synthesizers. The brain machines operate in two modes sound, as sounds isochronic and binaural tones, which, associated with photic stimulates tion, are called AVE (audio-visual entrainment), and BWE (brain wave entrainment).

### 4 - DISCUSSION.

According to the results presented here emphasize that urgent as provided Hutchison (1986), auditory stimulation, as well as the photic zone allows us to link the cortical activity to improve a given performance. Such an assertion can be proven with the results above mentioned. To corroborate the results described above, Sadigh & Kozicky (2002) pointed out that the benefits of cortical stimulation ranging from the increase in cerebral blood flow, increased production of certain neurotransmitters, stimulating neuroplasticidade until the balance of activity between the cork cerebral hemispheres. These benefits potentiate the brain in order to open doors for mere information, learning, memory and mental processing speed.

In this sense, according to Luria (1976) becomes relevant, so that the right cerebral hemisphere and left play distinct roles in the process of acquiring knowledge and behavior of humans.

Studies of The Monroe Institute (2001), shows that it is possible to cause the brain to reproduce artificially frequencies in the brain, with the use of sound equipment hemisphere.

The Brain Machines operate in two modes sound, as sounds isochronic and binaural tones, which, associated with photic stimulates tion, are called AVE (audio-visual entrainment), and BWE (brain wave entrainment). Join compare that to the Light Group with the Group Light and Sound, one can observe that the behavior between stimulated groups was similar, indicating an increase in attention after the stimuli made. The results presented in this study indicate that it light and / or sound influence in improving the focus of attention in computer operators, even though there are other factors involved in this problem. It should be stressed that attention is the filter that we use, and it is that determines the quality of your life and what you do. Imagine, for example, the huge amount of stimuli that gets your mind. But in fact, she can not handle all these stimuli simultaneously. There is evidence that can only be a part of the record happens around us. Thus, to select what we recorded the attention, it determines what is important.

As seen, the concentration can be defined as focusing attention on a particular object or action, ie the ability to direct conscious attention to a specific point in the field of perception. It can be understood as a watch or a few environmental stimuli previously defined.

According Guallar & Pons (1994) the processing capacity of attention is limited by the amount of information that can be processed simultaneously. Thus, it is difficult to divide attention between different stimuli, and the tendency is to focus on one. To Laville (1976), the maximum capacity of mental work is not constant in time. It decays as a function of fatigue and varies with the degree of motivation and learning of the employee. This capacity can not be used for a long time. Moreover, the worker can not handle more information simultaneously, which ultimately increase their cognitive load, reducing thus their performance. In this

sense, the results are consistent with the findings in the literature. Moreover, the results found in this research indicate significant variation in test scores for focused attention made before, during and after work activity, highlighting the low performance at the time 2 in all tests.

Therefore, it is concluded that the results of this design methodology, suggest that the use of recording light and sound or resources during the working day, raising the performance increase in focus, is of paramount importance. In turn, can help, too, improved productivity and quality of jobs in sectors of employment, where the main tool is the computer. For this they need to do more research in this area so that the results can be found here alcansar improvements in living conditions of workers in their specific sectors.

Indeed the use of electric stimulation fótica and hearing is only one way to show how it is necessary to give due attention to detail, however small that seje Fasem a big difference in the final product.

## 5 - REFERENCES

Bear, Mark F., Connors, Barry W., Paradiso, Michael A. Neuroscience unveiling the nervous system. 2nd ed., Porto Alegre. Artmed, 2002. caps. 19 and 23. Apud: MARQUES, Luciene of Jesus, RIBEIRO, Luiz Henrique Brandão; BORGES, Daniel, Jr. GUAGLIARDI Mario Roberto. Method of MR Brain Empowerment and Mind Control in triathlon athletes. 2004. BRADY, D. Brian. Binaural-Beat Induced Theta EEG Activity and Hypnotic Susceptibility. Northern Arizona University. May 1997. Available at: <http://www.portalmonroebrasil.com/> accessed 20 nov 2002. Apud: MARQUES, Luciene Jesus 1,2,3, RIBEIRO, Luiz Henrique Brandão 4, BORGES, Daniel, GUAGLIARDI JR, Mario Roberto. Method of MR Brain Empowerment and Mind Control in triathlon athletes. 2004.

Guallar, A., PONS, D. Concentración y atención en el deporte. In I. Balaguer (Ed.), Psychological Entrenamiento en el Deporte. (pp. 207-245). Valencia, Spain: Albatros Education. Apud. Abes, Laurent Olivier, Revista Digital - Buenos Aires - Año 11 - N° 95 - April/2006.

HUTCHISON, M. MEGABRAIN: New Tools and Techniques for Brain Growth and Mind Expansion. New York: Ballantine Books. 1986. Apud: RIBEIRO, Luiz H. B., BORGES, Daniel; GUAGLIARDI JR, Mario Roberto. Method of MR Brain Empowerment and Mind Control in triathlon athletes. 2004.

MARTENS, R. Coaches guide to sport psychology. Champaign, apud, Abes, Laure. Focus attention on tennis. United States of America: Human Kinetics Publishers, 1987.

SAMULSKI, D. M. Sports psychology. apud, Abes, Laure. Focus attention on tennis. Barueri: Manole, 2002. SOUSA, Fernando Bridge. Physical Education in search of their course. Journal of Physical Education / UEM, Maringá, v. 1, n. 0, p. 5, 1989.

WEINBERG, R. S. (1988). The mental advantage: Developing your psychological skills in tennis. Champaign, United States: Leisure Press. Apud. Abes, Laurent Olivier, Revista Digital - Buenos Aires - Año 11 - N° 95 - April/2006.

WEINBERG, R. S. & GOULD, D. Fundamentals of sport psychology and exercise. (M. C. Miller, trans.) apud, Abes, Laure. Focus attention on tennis. Porto Alegre: Artmed. 2nd ed. 2001.

Guallar, A., PONS, D. Concentración y atención en el deporte. In I. Balaguer (Ed.), Psychological Entrenamiento en el Deporte. (p. 207-245). Valencia, Spain: Albatros Education. apud, Abes, Laure. Focus attention on tennis. 1994.

HUTCHISON, M. Megabrain: New Tools and Techniques for Brain Growth and Mind Expansion. New York: Ballantine Books. 1986. Apud: MARQUES, Luciene Jesus 1,2,3, RIBEIRO, Luiz Henrique Brandão 4, BORGES, Daniel, GUAGLIARDI JR, Mario Roberto 4. METHOD Cerebral MR Empowerment and Mind Control in 2004 triathlon athletes.

LAVILLE, A. Ergonomics. São Paulo: EPU, 1976.

Luria. (1976). Brain in El Acción. Barcelona: Fontanella. Apud. Freitas, Neli K. (2005). Mental representations, visual images and knowledge. Science & Cognition, Year 02, Vol 06, Nov/2005. Available in <http://www.cienciasecognicao.org/> Sadigh, M.R. and KOZICKY, P.W. The effects of Hemi-Sync on Electrocoital Activity: A Review of Three Empirical Studies. The Gateway Institute. 2002. Disponível the Internet at: <http://www.portalmonroebrasil.com/> accessed: 3 de nov. 2007.

## IMPROVEMENT IN AUDITORY STIMULUS FOCUS OF ATTENTION

### ABSTRACT

The study consisted of employees of both genders and random aged 20 to 42 years, officials from one Internet provider in the city of Campos dos RJ. We conducted a cross-sectional study with 2 groups tested with the grid type of focused attention, this test applied 3 times at the beginning of the working day at the end of that same day and next day also the end of the experienced. One group was stimulated using the auditory apparatus of light and sound and / or sound. Computerized electronic device called Orion, manufactured by Mindplace composed of sunglasses with four LEDs on the inner surface of each lens, a stereo headset and a PC where the pre-programmed sessions, which used the appropriate section of No 12 to focus attention lasting 10min. Unlike the second, which became the control group. We found statistically significant difference in the sound group ( $p < 0.05$ ) comparing the same with the control group ( $p > 0.05$ ), in that at no time was given any encouragement. The results suggest that the use of auditory stimulation made by this unit during the working day, leads to increased performance in focus which in turn could promote the improvement of productivity and quality of work in jobs where the main tool is the computer.

**KEYWORDS:** Empowerment brain; Focus of attention; Cognition.

## ESTIMULO AUDITIVO NA MELHORA DO FOCO DE ATENÇÃO

### RESUMO

O estudo foi formado por trabalhadores de ambos os gêneros e de forma aleatória com idade entre 20 a 42 anos, funcionários de uma provedora de internet, na cidade de Campos dos Goytacazes-RJ. Foi realizado um estudo transversal com 2 grupos submetidos ao teste do tipo grelha de atenção concentrada, teste este aplicado em 3 momentos, no início da jornada de trabalho, ao término da desta mesma jornada e no dia seguinte também ao término do experiente. Um grupo foi estimulado auditivamente utilizando o aparelho de luz e som e/ ou som. Aparelho eletrônico computadorizado denominado Orion, fabricado pela Mindplace, composto por óculos escuros com quatro leds na face interna de cada lente, um fone de ouvido estéreo e um microprocessador onde se encontram as sessões pré-programadas, das quais utilizou-se a sessão apropriada de nº 12 para foco de atenção com duração de 10min. Diferentemente do segundo, que ficou sendo o grupo controle. Foram encontradas diferença estatística significativa no grupo do som ( $p < 0,05$ ) se comparar o mesmo com o grupo controle ( $p > 0,05$ ), em que em momento algum foi dado qualquer estímulo. Os resultados encontrados sugerem que o uso da estimulação auditiva feita por este aparelho, durante a jornada de trabalho, leva ao aumento do desempenho do foco de atenção que por sua vez poderá promover a melhora da produtividade e qualidade das tarefas em postos de trabalho em que a principal ferramenta é o computador.

**PALAVRAS-CHAVE:** Potencialização cerebral; Foco de atenção; Cognition.

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