CHAPTER 102

Incidence of Smartphones in the development of brain plasticity in children from 0 to 6 years old, in a context of high vulnerability

10.56238/pacfdnsv1-102

Jose Manuel Salum Tome
Ph.D
Doctor in Education

Miguel Angel Ponce Lopez
Klgo
Degree in Kinesiology

ABSTRACT
The research project presented below essentially aims at a systematic review regarding the use of Smartphones in the development of brain plasticity in children aged between 0 and 6 years.

This review will be composed of three large categories of content: Intellectual, Attitudinal and Behavioral, each of which is made up of a certain number of Skills, which will be expressed according to the different systematic reviews, including gray literature, which will provide the basis and theoretical and practical foundations that would allow the deduction of new research.

Keywords: Smartphone, brain plasticity, development, behavioral skills.

1 INTRODUCTION

The research project presented below essentially aims at a systematic review regarding the use of Smartphones in the development of brain plasticity in children aged between 0 and 6 years.

This review will be composed of three large categories of content: Intellectual, Attitudinal and Behavioral, each of which is made up of a certain number of Skills , which will be expressed according to the different systematic reviews, including gray literature, which will provide the basis and theoretical and practical foundations that would allow the deduction of new research.

Once the review of literature and different studies in relation to the aforementioned have been exposed, objectify that the dependence and misuse of Smartphones in children have a negative impact on brain neuroplasticity, which ultimately is the product of the above that is expressed in misbehavior, low self-esteem, low cognitive level as appropriate to their age and associated skills.

From the results of this quantitative and qualitative (mixed) analysis, we will be able to classify the level of efficient performance of the children according to their age.

As there are no studies of a meta-analysis nature that would allow us to reflect a more advanced search with a higher degree of evidence, the current one is limited to carrying out a systematic review study.

This research process facilitates and elucidates the myths of parents that the use of the Smartphone in their children "makes them more intellectual".

It is clear that technological development advances day by day, with a greater part of the population having access to these technological means, without measuring the consequences of the neuronal brake that occurs in children under 6 years of age in the use of cell phones.

Smartphone indiscriminately and discriminately without perceiving the noxa in children, from a socioeconomic context of high vulnerability.

2 PROBLEM FORMULATION

In recent years, the entry of these devices into the Chilean market has grown constantly, whether at home or at school, generating notable changes in people's behavior, thus changing lifestyles or attitudes, for this reason. This is why it is important to understand and dimension the true effect that this technological movement has generated. Smartphones influence people's lifestyles by changing their already pre-established habits, facilitating communication and information in an agile and practical way. In this way, a technological dependency has been created, transforming traditional channels into more diversified communication channels.

A mixed quantitative and qualitative research will be carried out that will help us to have a clearer understanding of the influence that Smartphones have on users, in a more real and truthful way.

The misuse of Smartphones both at home and in kindergartens and first level education in Chile, has helped to curb brain plasticity in children from 0 to 6 years of age, a situation that occurs in highly vulnerable sectors.

The proposal presented in this research project is an evaluation of a formative nature that is aimed at improving the quality of education of young people from a vulnerable social context.

The arrival of smartphones in our daily lives has certainly changed our lives, it has certainly changed our neural development.

The brain is not an inert and fixed matter, but it is a true central unit of the human being. It is highly plastic, neural connections are developing every day and brain stimulation triggers the creation of new neural circuits.

This stimulation allows the traditional learning process and this has allowed human beings to adapt and evolve. Digital tools being powerful stimulators, they participate, like other elements, in the modification of our brain.

By 2018, estimates predict that a third of the world's population will own a smartphone. This represents at least 2.6 million users worldwide. And for many, the mobile phone has become an indispensable everyday object. To communicate, exchange with others, but also to follow the news or even have fun. On average, users spend at least 4.7 hours a day on their smartphones.

3 THEORETICAL FRAMEWORK

The World Health Organization (1982) defines the term neuroplasticity as the ability of cells of the nervous system to regenerate anatomically and functionally, after being subjected to environmental or developmental pathological influences, including trauma and disease.

Other authors indicate that neuroplasticity is the potentiality of the nervous system to modify itself to form nerve connections in response to new information, sensory stimulation, development, dysfunction or damage. In general, neuroplasticity is usually associated with learning that takes place in childhood, but its definitions go further and have a historical background. There are various biochemical and physiological components behind a neuroplasticity process and this leads to different chemical, genomic and proteomic biomolecular reactions that require intra and extra neuronal actions to generate a neuronal response.

The nervous system has extraordinary properties with the capacity for dynamic modification, a "never finished product" resulting from the interaction between genetic and environmental factors. Neuroplasticity comprises all the properties of the brain related to the constant modifications of its structure and is applied to a large number of phenomena such as neurogenesis in adults, the reorganization of cortical maps or synaptic changes associated with memory and habits. For a change to be a manifestation of functional plasticity, it must express an active process of readaptation to the requirements of the environment. At the same time the Active processes must involve changes in one of these mechanisms: number of synapses, efficiency of synapses, and intrinsic neuronal characteristics.

There are cellular and molecular mechanisms of neuroplasticity phenomena, which are organized around growth plasticity: axonal regeneration, collateralization, synaptogenesis, neurogenesis and functional plasticity that indicates changes in the efficiency of synaptic transmission.

Scientists from the University of Zurich (Switzerland) and Freiburg (Germany)

In a study published in the journal Current Biology in December 2014, given the recent obsession with smartphones, decided to explore the plasticity of the brain in everyday situations and analyze how the use of the fingers in handling cell phones with a touch screen shapes it, producing greater brain activity.

Each region of the body has a specific area in the emotional center of the brain, where its information is processed, which is flexible and can change.

The researchers studied the activation of the sensory-motor cortex, which is activated by the movement of the fingers. To do this, they performed electroencephalograms that measured the activity of the cortical regions of the brain in 37 right-handed people, 26 of whom were smartphone users with a touch screen and 11 cell phones with traditional keyboards.

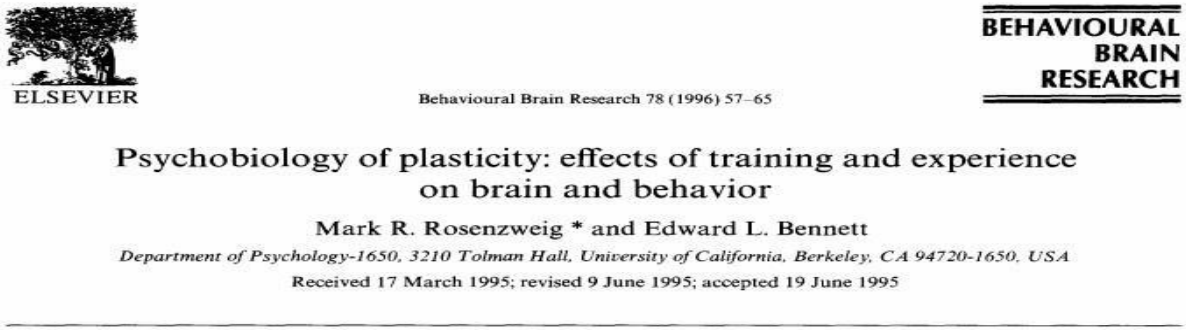
Thanks to the electroencephalogram, they recorded the brain response when smartphone users touched the screen with their thumb, index and middle fingers in order to then compare it with that of people who are still using the old phones with traditional keyboards.

The results suggest that repetitive movements on the surface of touch screens reorganize the sensory processing of the hand, with daily updates of the brain representations of the tips of the fingers. fingers.

The scientists concluded that electrical activity in the brains of smartphone users was increased by touching the tips of the thumb, index and middle fingers.

They also revealed that the use of touch screens changes the way the thumbs and the brain work together and that the amount of cerebral cortex activity associated with the thumb and index finger was directly proportional to the amount of time the thumb was used. smart device. The sensory processing of the cortex in our brain is continually reshaped by personal digital technology. The use of Smartphones is the ideal tool to study the daily plasticity of the human brain.

Below we present studies in which reference is made to the beginnings of neuroplasticity, which is associated with behavioral changes and then details studies of which we have systematically reviewed, integrating some concepts such as: neuroplasticity, academic performance associated with the use of the Smartphone.



ELSEVIER

Behavioural Brain Research 78 (1996) 57–65

BEHAVIOURAL BRAIN RESEARCH

Psychobiology of plasticity: effects of training and experience on brain and behavior

Mark R. Rosenzweig * and Edward L. Bennett

Department of Psychology-1650, 3210 Tolman Hall, University of California, Berkeley, CA 94720-1650, USA

Received 17 March 1995; revised 9 June 1995; accepted 19 June 1995

The first experimental evidence that neuroplasticity depends on experience comes from the work of Rosenzweig and Bennet in the 1960s. These authors observed rats raised in enriched environments and found that they developed a thicker cerebral cortex, with more synaptic contacts and a greater number of both dendrites and dendritic spines.

CORTEX 92 (2017) 222–232

Available online at www.sciencedirect.com

ScienceDirect

Journal homepage: www.elsevier.com/locate/cortex

ELSEVIER

Cortex

Historical paper

"The world is upside down" – The Innsbruck Goggle Experiments of Theodor Erismann (1883–1961) and Ivo Kohler (1915–1985)

CrossMark

Pierre Sachse, Ursula Beermann, Markus Martini, Thomas Maran, Markus Domeier and Marco R. Furtner*

Department of Psychology, Leopold-Franzens University of Innsbruck, Innsbruck, Austria

Erismann and Ivo Kohler conducted an experiment in which they established the association between plasticity and behavioral changes. In subjects exposed to lenses that invert the visual fields (seeing everything upside down), after days of effort and confusion, they manage to function relatively normally both to dress, eat or walk, as well as to ski or ride a bike, and these behavioral changes are matched to transformations in the motor cortex and posterior parietal cortex.

The mere presence of your smartphone reduces brain power, study shows
Date: June 23, 2017
Source: University of Texas at Austin (UT Austin)

Background: Your cognitive ability is significantly reduced when your smartphone is within your reach, even if it is turned off. That 's the takeaway finding of a new study from the McCombs School of Business at the University of Texas at Austin.

Objective: to evaluate if the cell phone being within reach, even turned off, significantly reduces their cognitive capacity.

Methods: McCombs Assistant Professor Adrian Ward and his co-authors conducted experiments with nearly 800 smartphone users in an attempt to measure, for the first time, how well people can complete tasks when their smartphones are nearby, even when they 're not using them. In East experiment the researchers asked the study participants to sit in front of a computer and perform a series of tests that required concentration total for can score right. The tests I know designed for to size the available cognitive capacity of the participants, that is, the brain's ability to retain and process data at any given time. Before starting, participants were randomly instructed to place their smartphones face down on the desk, in their pocket or personal bag, or in another room. All participants were instructed to silence their phones.

Bottom Line: The researchers found that participants with their phones in another room significantly outperformed those with their phones on the desk, and also slightly outperformed participants with their phones in a pocket or purse. These findings suggest that the mere presence of a smartphone reduces available cognitive capacity, and impairs cognitive functioning, even though people feel that they are giving their full attention and focus to the task at hand. Hands.

Checking phones in lectures can cost students half a grade in exams
Date: July 28, 2018
Source: Taylor & Francis Group

Background: Students perform less well on end-of-quarter exams if they are allowed access to an electronic device, such as a phone or tablet, for non-academic purposes at lectures, a new study.

Objective: Researchers at Rutgers University in the US conducted an experiment in class to test whether to divide attention between electronic devices and the teacher during class affected students' performance on in-class tests and an end-of-class exam. Trimester.

Methods: 118 cognitive psychology students from Rutgers University participated in the experiment during one period of their course. Laptops, phones and tablets were banned from half the classes and allowed the other half. When the devices were allowed, students were asked to record whether they had used the devices for non-academic purposes during the conference.

Conclusion: The study found that having a device did not lower students' scores on comprehension tests within lectures, but lower scores on the end-of-term exam by at least 5% or half a grade. This finding shows for the first time that the main effect of divided attention in the classroom is long-term, less purposeful retention of a later recalled study task. Also when they were allowed to use devices electronics in class performance was also worse for students who did not use devices, as well as for those who did.

Is Technology Producing A Decline In Critical Thinking And Analysis?
Date: January 29, 2009
Source: University of California-Los Angeles

Background: As technology has played a larger role in our lives, our skills in critical thinking and analysis have diminished, while our visual abilities have improved, according to psychological research.

Methods: Students have changed as a result of their exposure to technology, says Greenfield, who analyzed more than 50 studies on learning and technology, including research on multitasking and the use of computers, the Internet and video games.

Bottom line: Reading for pleasure, which has declined among young people in recent decades, enhances thinking and engages the imagination in a way that visual media like video games or television don't, Greenfield said. No medium is good for everything, if we want to develop a variety of skills, we need a balanced diet of media. Each medium has costs and benefits in terms of what skills each one develops. By using more visual media, students will process information better, however, most visual media are

measured in real time that do not allow time for reflection, analysis or imagination, those that do not develop with real time media such as television or video games. Technology is not a panacea in education, because of the skills that are being lost. Students show that reading develops imagination, induction, reflection, and critical thinking, as well as vocabulary. Greenfield.

Relationship among smartphone usage, addiction, academic performance and the moderating role of gender: A study of higher education students in India
Author links open overlay panel Jogendra Kumar Nayak

Backgound: Smartphones have penetrated people's lives at a faster rate in recent times in India. They are used for various purposes apart from talking and messaging such as live chatting, searching for information, mobile banking and entertainment, etc. Smartphone discussions have taken over personal discussions and one-on-one interactions between people. Usage has become so high that it has turned into addiction in many cases.

Objective: In this study, smartphone addiction was measured on students' academic performance, and the effect of gender and relationship status on smartphone use and addiction was also checked. Smartphone usage was measured with the help of the amount of time spent on the phone and the monthly bill.

Methods: A questionnaire was developed and administered to 429 higher education students in India to verify addiction, effect on performance and use of smartphones, along with the main uses of a smartphone and the demographic profile of the respondents.

Conclusion: The results show that the use is more in the case of women than male students. However, the effect on performance is severe for male students. Aside from behavioral changes, female students were found to have hardly any effect on smartphone addiction, unlike male students who were found to neglect work, they felt anxious and lost control of themselves. However, the effect on performance is severe for male students.

Cellphone addiction harming academic performance is 'an increasingly realistic possibility'
Date: August 28, 2014
Source: Baylor University

Background: Female college students spend an average of 10 hours a day on their cell phones, while male college students spend almost eight hours, according to a study on cell phone activity. "As cell phone features increase, addictions to this seemingly indispensable piece of technology become an increasingly realistic possibility," the researchers noted.

Objective : The study notes that about 60 percent of college students admit they may be addicted to their cellphone, with some indicating that they become agitated when it's not in sight, said Roberts, lead author of the article "The Invisible Addiction: Cellphone Activities and Addiction". Among male and female college students.

Methods: The study, based on an online survey of 164 college students, examined 24 cell phone activities and found that time spent on 11 of those activities differed significantly between the sexes. Some features, including Pinterest and Instagram, are significantly associated with mobile phone addiction.

Conclusion: Of the main activities, respondents reported that they spent the most time texting (an average of 94.6 minutes a day), then emailing (48.5 minutes), checking Facebook (38.6 minutes), surfing the Internet (34.4 minutes) and listening to their iPods (26.9 minutes).

Men send the same number of emails but spend less time on each one. "That may suggest they are sending shorter, more utilitarian messages than their female counterparts," Roberts.

Women spend more time on their cell phones. While that finding runs counter to the traditional view that men are more engaged with technology, "women may be more inclined to use cell phones for social reasons like texting or emailing to build relationships and have conversations." deeper." Excessive or obsessive cell phone use can also cause conflict inside and outside the classroom: with teachers, employers, and families. And "some people use a cell phone to get out of an awkward situation. They can pretend to pick up, send a text message or check their phones," Roberts.

4 CONCLUSIONS

Based on the present study and systematic bibliographic review, as well as gray literature texts , they allow us to demonstrate and objectify that the dependence and misuse of Smartphones in children have a negative impact on brain neuroplasticity, which ultimately is a product of the above that is expressed in misbehavior, low self-esteem, low cognitive level as appropriate to their age and associated skills.

As we also demonstrated in our review, we indicate that the excessive use of Smartphones closely affects the development of neuronal plasticity in children from 0 to 6 years of age, where according to neurodevelopmental anatomy-physiology studies indicate that it is the period where the greatest number of modifications in the shape of the cerebral turns and grooves are presented, which are translated in last terms in an intellectual, attitudinal and behavioral way.

The study also states that those who use smartphones are people classified as "intuitive thinkers", that is, they trust their instincts when making a decision. However, for scientists, people with higher intelligence are those who are more analytical and less intuitive. They consider that since the history of humanity, people tend to avoid spending energy to solve a problem and "everything seems to indicate that it seems likely that people will use their smartphones more and more."

Finally, the present study leaves open the possibility of mixed observational and/or experimental research.

REFERENCES

A.StolzJonathan, A.Fugelsang: The brain in your pocket: Evidence that Smartphones are used to supplant thinking.

Baylor University. (2014, August 28). Cellphone addiction harming academic performance is 'an increasingly realistic possibility'. ScienceDaily. Retrieved September 13, 2018

Brown, B. (2002). Studying the use of mobile technology. En B. Brown, N. Green &

R. Harper (Eds.), Wireless world. Social and interactional aspects of the mobile age (pp. 3–15). Londres: Springer–Verlag.

Cooper, G. (2002). The mutable mobile: social theory in the wireless world. En B. Brown, N. Green & R. Harper (Eds.), Wireless world. Social and interactional aspects of the mobile age (pp. 19–31). Londres: Springer–Verlag.

Copyright © 2014, Universia España. Campbell, Phil. Fuente: Flickr.

De Sola Pool, I. (Ed.). (1977). The social impact of the telephone. Cambridge: MIT Press.

Dimmick, J. W., Skiand, J. & Patterson, S. J. (1994, octubre). The gratifications of the household telephone. Sociability, instrumentality, and reassurance. Communication Research, 21 (5), 643–663.

Engel, G.; Green, T. (2011). Cell Phones in the Classroom: Are We Dialing up Disaster? In: TechTrends: Linking Research and Practice to Improve Learning, v55 n2 p39-45 Mar 2011.

Erismann, THEODOR, & Kohler. IVO (nd). “The world is upside down” – The Innsbruck Google Experiments of Theodor Erismann (1883-1961) and Ivo Kohler (1915 – 1985). Retrieved July 1, 2017.

Estévez-González A., García-Sánchez C., Junqué C. (1997). Attention: a complex brain function. REV NEUROL 1997; 25 (148).

http://www.universia.es

Kolb, B., Mohamed, A., & Gibb, R., The search for factors underlying brain plasticity in normal and damaged brains, Journal of Communication Disorders (2010), doi: 10.1016/ j.jcomdis.2011.04 0.007.

KumarNayak, JOGENDRA (nd-a). Relationship among smartphone usage, addiction, academic performance and the moderating role of gender: A study of higher education students in India. Retrieved August 13, 2018

Lakes, I (2011). Perceptions regarding the use of ict tools in the classroom: Case study from the perspective of rural teachers. Thesis to qualify for the title of Professor of Language and Communication. Southern University of Chili.

Lecannelier F.: Attachment and intersubjectivity: influence of early attachments on human development and mental health. Santiago. Chile: Lom Editions. 2006.

Maciques E. Plasticity Neural.

Prensky Marc (2001). Digital Natives, Digital Immigrants. In On the Horizon (MCB University Press, Vol. 9 No. 6, December 2001).

Proceedings of the National Academy of Sciences (PNAS) at 2014.

R. Rosenzweig, MARK (nd-a). [Psychobiology of plasticity: effects of training and experience on brain and behavior]. Retrieved June 13, nineteen ninety six,

Rodríguez A. El apego: Más allá de un concepto inspirador. Rev. Asoc. Esp. Neuropsiq. 2010;30:581-95.

Taylor & Francis Group. (2018, July 28). Checking phones in lectures can cost students half a grade in exams. ScienceDaily. Retrieved September 13, 2018

University of California - Los Angeles. (2009, January 29). Is Technology Producing A Decline In Critical Thinking And Analysis?. ScienceDaily. Retrieved September 13, 2018

University of Texas at Austin (UT Austin). (2017, June 23). The mere presence of your smartphone reduces brain power, study shows. ScienceDaily. Retrieved