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For a Neuro-Reductive approach to education : The Physico-Chemical factory of the learning student

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ABSTRACT

New advances in the physical chemistry of the learning process have made it possible to move beyond an oxidative approach to a reductive vision, critical of the current paradigm in neuro-education. This study proposes to apply an innovative methodology derived from the latest technologies in brain imaging coupled with pH-metric monitoring in order to measure the evolution of brain acid-base activity of post-adolescent (n=28) students learning rational knowledge.. The first results that have been obtained corroborate our hypotheses. They are encouraging for further research in this innovative field.

KEYWORDS: interdisciplinary, learning, neuro-education, pH measurement, physical chemistry

CITATION OF THE ARTICLE

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I. INTRODUCTION

From immemorial time men have sought to unify science (Bove and Goh, 2017). In this article we propose to explore an innovative approach at the crossroads of physical chemistry and neuroscience in education, through an experimental study aimed at the development of rational thinking in student learners. To date, no research has attempted to unite these fields of knowledge, indicating a lack of risk-taking among scientists, which we can explain by obvious evolutionary causes (Kumokun, 2015). According to the "grow up dude" conjecture, it is however time to evolve, that is to say, to rise, to mature, to learn. In the end, therefore, this is a resolutely educational issue. "The highly unstable pupil in the spring of his suffering is an acid base" (Pr. Xavier, 869, p.205, perhaps apocryphal)

The majority of studies in the field of education consider educational issues through the prism and concepts of a scientific discipline – psychology (Psykocouac, 2018), sociology (Colombi, 2016), history (Bril, 2017), didactics (Baratin, 2019) - and are based on a broad definition of education, which is not reduced to the simple question of instruction and teaching/learning issues. We consider this to be a double impasse.

Firstly, in order to achieve a deeper understanding of educational phenomena, taking into account the 21st century skills (OECD, 2010) and the Sustainable Development Goals (UNESCO, 2015), it is now necessary to go beyond the traditional disciplinary boundaries. We have seen multidisciplinary research (Taddei et al. 1953), interdisciplinary fields (Taddei et al. 1984), some are timidly attempting to move towards trans-disciplinarity (Aberkane et al. 2012), it is becoming absolutely inevitable to enter the post-disciplinary era. This calls for a real paradigmatic revolution (Khun et al., 1965), or for a Bachelardian psychoanalysis of the scientific mind (Bachelard, 1956). It is to be deplored that these revolutions require a substantial amount of time, and that we did not have it (Popper, 1982). In today's competitive environment, reinforced by the PBDA (Vidal et al. 2021), it is necessary to move quickly (Sanic, 1978) and go beyond current methods (Feyerabend, 1964; Raoult, 2020). We therefore tried to modestly show the way (Kneckels and Toutélier, 1979).

Moreover, in the digital age (Blanquer and Macrohard, 2017) and the age of artificial intelligence (Phi and Nguyen-Hoang, 2018; Alexandre, 2013) and in the context of a global pandemic crisis due to COVID-19 - which is the name of the disease and not of the virus, let us remember (Louis, 2020) - the adoption of a philosophy of cerebral realism seems necessary (Yter, 2019). Reducing education to the issue of learning was not enough to allow real scientific advances, which is why some people wished to reduce learning to neurological phenomena. We propose to go further and reduce these cerebral phenomena to their physico-chemical nature, in an innovative and rigorous approach that had not been envisaged since Albert Einstein (Einstein, 1905). From a Bayesian point of view (Nguyen-Hoang, 2016), it seems reasonable to think that one of the causes of this delay in the advancement of neuro-educational research is the weight of this physicist's brain. In fact, he weighed only 1,230 kg, compared to an average of 1,350 kg, a weight that is barely respectable (Kuwi, 2002; Poirier & Colonat, 2018). This information prompted us to update our credenza cursors.

Blanquer (2019) assured that "The acid-base balance of rich neuro-teaching subjects' proteases to abling-bling learners It's the dismal lot of new discoveries...disregarding the few blocks framing open science." Which is pretty much akin to Paul Feyeraband's famous saying: "Anything goes".

In order to develop the neuro-critical thinking skills of student learners and to assess changes in the acid-base balance of their prefrontal cortex during learning, we conducted brain pH readings of our subjects (n=28) throughout a semester of differential geometry (Kumokun et al. 1923) and cellular sociology (Bourdieu and Tehenezidien, 1990). Both scientific disciplines are particularly appropriate for the neural development of neutral rationality.

Cognitive sciences today offer an ergonomic and efficient taxonomy by proposing a dichotomization of intelligence and cognition. This approach is simplifying but does not take anything away from the complexity of the phenomena (Nguyen Hoang, 2015). In this dynamic, we have focused on the distinction between two groups of learners' brains: the cosmic, with a higher IQ, and the non-cosmic, with a lower IQ (Ramus, 2006; Gauvrit and Delouvée, 2019). This brain difference is mainly due to a different genetic capital, which can be explained by the theory of evolution (Darwin, 1859). Sexual selection is in fact at issue: cosmic brains with a high IQ are essentially sapiosexual and therefore reproduce among themselves, passing on their superior genes to their descendants (Sastre, 2018). Thus, this group has an innate ability to think critically and sensibly.

Conversely, holders of non-cosmic brains are unfortunately cognitively disadvantaged and have much more difficulty in demonstrating rational thinking (Dawkins, 2005). Some (Bourdieu and Passeron, 1955; Lahire, 2015) believe that differences in academic achievement and performance among students are primarily related to forms of social inequality and issues of school culture. We will not consider these post-modern theories.

We have measured the difference in cosmicity between the brains of learners in terms of stonkness (Mimman, 2019) corresponding to a pH normalization parameter. Indeed, a correlation was observed between the pH of the brains and their cosmicity, as NCBs (non-comic brains) do not have the bases, their pH is generally more acidic. We can therefore state that the main cause of the variations in the acid-base balance of the brains of the student learners is their cosmicity, which can be measured by the stonkness of the latter.

We have sought to test several strong hypotheses:

- That NCB have a lack of stonkness, due to a lack of basic thinking. (Which we can therefore measure with pH tests).
- That our experimental protocol will allow all subjects to learn.
- That the administration of very rational courses such as differential geometry and cellular sociology will allow NCBs to reach the cosmic stage.

To do this, we have followed the reset instructions of the National Education Science. Who knows, we may have conducted a case study based on a focus-group consolidation protocol. To be verified in the following study. he introduction of the paper should explain the nature of the problem, previous work, purpose, and the contribution of the paper. The contents of each section may be provided to understand easily about the paper.

II. MATERIALS AND METHODS

A. Study subjects

28 subjects aged between 17 and 20 years old, thus of post-adolescent (i.e. pre-adult) type, were recruited in our university (Hidalgo & Velib, 2016) within the framework of our experimental study. The test subjects followed a semester of courses in differential geometry and cellular sociology, given by Professor McGonagall, i.e. 10 hours of learning in total. Of course, we respected a strict code of ethics (Séralini, 2012), ensuring the consent of the subjects participating in our study (Polanski, 1977) and offering them a PlayStation 4 (Sony, 2015) as an incentive. Subjects were also given the choice of the game accompanying the console, FIFA 20, and FIFA 18. No non-human living creatures were harmed during the experiments.

B. pH live monitoring

For the acid-base monitoring, Hanna professional pH meters with calibration check and automatic data logging features simplicity of use together with state-of-the-art engineering to measure extreme pH values was used. Supplied complete with glass body combinational electrode, temperature probe, 12V DC adapter, pH 4 and pH 7 buffers, electrolyte solution and instructions. The student learners were biopsied every hour (no worries, they did not feel a thing) to monitor the kinetic evolution of acid-base brain activity during class.

C. CB/NCB imaging

Images of the cosmic brain of the student learners were acquired by portable MRI (Huawei, 2017). The alpha and delta waves were converted to .jpg to reduce weight and facilitate data processing (Figure 3). The images were anonymized and analyzed on ImageJ and a Student test was used to verify the significance of the results. The experiment was replicated at least 3 times on each of the 28 students (n=28*3≃84). Mathematics (Casio et al. 2013, Texas, 2011) is complicated (Nguyen Hoang, 2007).

Figure 1 Alpha wave converted to jpeg (to make it lighter)

D. Physicochemical analysis of the cosmic brain samples

To illustrate the physicochemical dimension of our study, we present here molecular diagrams, for science (Saruman, 1789). These images have been screen shotted from the Wikipedia page of glyphosate and ethanol (Ducros and Woessner, 2017). We thought it important to mention them as sources of inspiration in this article.

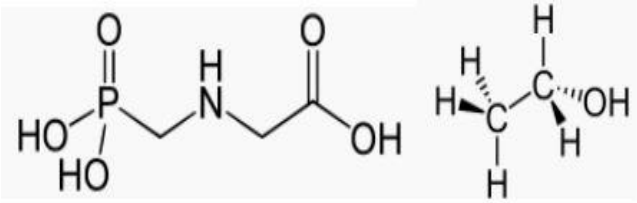


Figure 1 Chemical structures of some molecules of interest. A. Glyphosate. B. Ethanol. ($p < 0.05$)

III. STATISTICAL ANALYSIS and GRAPHICAL PRESENTATION

We verified the information, in a cold and non-politicized manner (Pandov, 2018), and analyzed its relevance. We will present our results in the form of graphs to allow the reader a deeper understanding of the experiences carried out on consenting learning students (Weinstein, 2019).

The most obvious result is the presence of two clearly distinct groups among our students, which we have called cosmic brains, the turbo-rational students with higher IQ (Daibeunkerdaiz et al, 2018) and non-cosmic brains, biased subjects (Schermer, 2017), obscured by their emotions (Pinker, 2017 ; Dawkins, 2017) and by their irrational beliefs and ideology (Sokal, 1996; Bogohossian & Lindsay, 2017; Pluckerose et al. 2018).

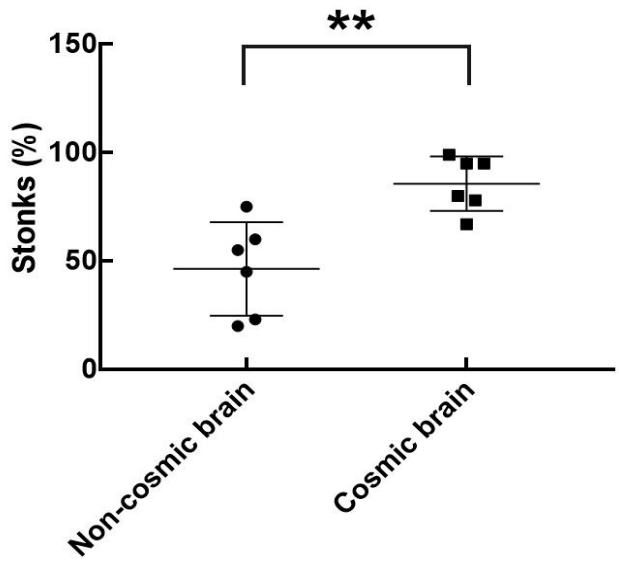
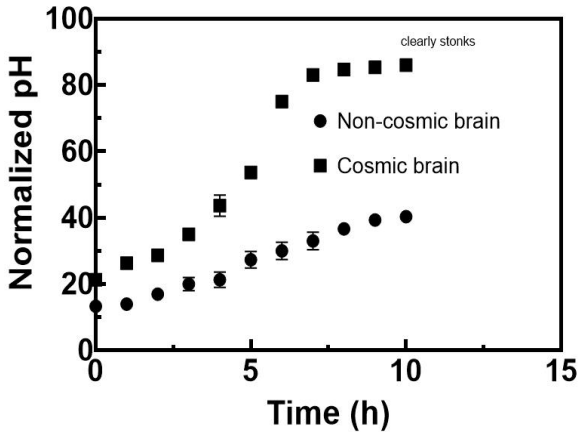


Figure 2 Stonkness degree of students' brains after one semester

Our results are very significant because there are two small stars above the line, and in addition, it is above my points (Statistik et al. 2015; Chaceptic 2009). As you can see, the NCB group are not stonking. They don't know anything about differential geometry but can, in some cases, understand certain notions of cellular sociology (notably the point above the standard deviation). My co-author said the opposite is true, but I don't really care (Mathilda et al., 1985). Research is also about disagreement (Mendax, 2008). We will have to replicate the experiment to verify this (Palareff 2011), but fear not, science is self-corrective (Dunning-Kinger, 2020). The rabid ones will rage because they have no sense of humour (Mistersamme, 2020).

Figure 4 pH-metry of CB vs NCB students during the course of the semester



The pH value is normalized, otherwise it's not much. Means and standard deviations come from 3 independent experiments. A semester is a long time, especially when it lasts 6 months. The non-cosmic brains were much more tired as a result, proof of their emotionality. Rational people do not need to rest to reach enlightenment. The error bars in our graphs are small, so it's fine. The reason our second group exhibits low basicity is because they don't have the basics.

IV. RESULTS

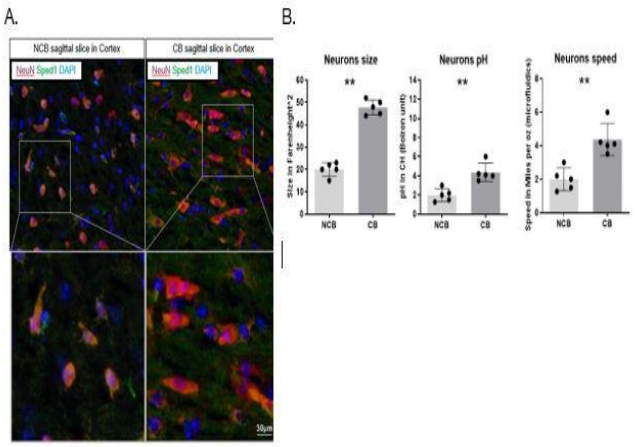


Figure 3 CB neurons exhibits increased size, motility and basicity compared to their NCB neurons counterpart

A. Immunohistochemistry on Neurons (NeuN; pH marker in neurons) and their velocity (Sped1; speed marker) in the cortex of NCB and CB at their best. B. Quantification of neurons size, speed and acidity in NCB and CB cortexes (n=5; Mann Whitney Houston).

To go further with these meta-cognitive data, we looked for histology level changes that could explain these tremendous results and made an outstanding observation. By immunohistochemistry we observed that the size of neurons in NCB doubled very significantly and this is correlated with increase basicity of the neurons (Fig. 6.B) (NeuN fluorescence is pH-dependent). As the neurons get the basics, their size increases so their base is more stable. This foundation effect therefore increasing the basicity of the neurons. Another interesting fact is that Sped1, the gaz marker relative to the speed force of the neurons is largely expulsed by the neurons and released into the matrix of the NCB compared to CB (Fig. 6.A ; green staining) showing incredible propulsion given that p=m*a (Newton, 1687). The mechanism behind this improved propulsion in NCB neurons is resembling the gases in the digestion process and need further investigations.

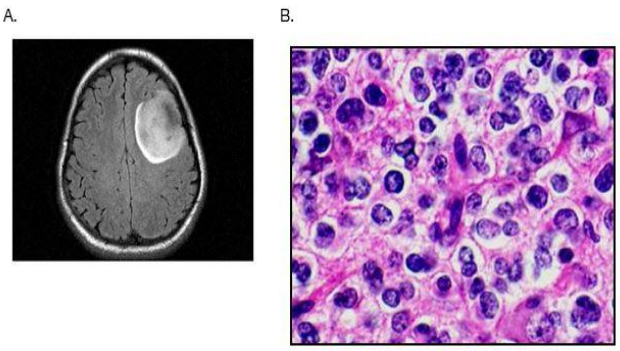


Figure 4 MRI and Hematoxylin-Eosin coloration of CB

Furthermore, we wanted to assess whether there is a specific area of stonkness in the CB. Through MRI we could observe that there is a well-circumscribed area where the contrast is really high (Fig. 7). We called this area the CB black hole because the area is really dense and white. We conclude the study on this observation that is a powerful anatomical clue to investigate further the complexity of the characteristics of the CB. Another hypothesis is that this mass could be a brain tumor, but such anatomical abnormalities are very rare, and some even question their existence (Truth & Beyond, 2018). At the histology level we can distinguish a circular white area around the nucleus of the neural cell in the brain that can be correlated with the speed gas expelled by the neurons in CB (Fig. 6).

V. DISCUSSION

Our results show that the learning activity of differential geometry and cellular sociology in post-adolescent students is correlated with an increase in brain pH leading to the formation of cosmic brains with multiplied rationality. The appearance of neuronal critical thinking is obviously caused by the higher acid-base balance of some student learners. The data tend to show that we are right to be right (Dunning-Kinger, 2020) and that the consensus has been respected (Drama, 2020).

Obtaining the results allows us to revisit our hypotheses in order to verify their corroboration. We had assumed that NCB students are not very stonky, due to either a brain that is too basic or a lack of basics. The brain pH readings of the subjects were intended to confirm this intuition, and it turns out that we were right.

We also said that all learning students would learn, and they did. This indicates the powerful relevance of the concept of learner learning, particularly in the situation of learning courses taught by learning teachers in a learning nation.

Our last strong hypothesis was that the administration of very rational courses such as differential geometry and cellular sociology would allow NCB subjects to reach the cosmic stage. We were wrong, sorry, that was not our intention. This error in judgment possibly indicates that we ourselves are NCB and did not know it. Using Bayesian reflective analysis, we then updated our belief cursors in that direction. Despite an increase in the normalized pH level of CBs during the semester, the gap with CBs remains. This shows that, despite following highly qualitative and rational courses, inequalities remain. It is not our fault if they are zero.

This is also true from a historical point of view (Sheik, 2016) and no doubt that for a long time it was much easier to see the traces of this first trade by not seeing the second. The idea conveyed by authors such as Schumpeter (Chabruti, 2020) is that John Stuart categorically denies this kind of misinformation. The differences remain between communities, even if the bulk of production is intra-community and communist (Demandred, 2018). Since we do not like the results, we are ending the discussion here.

VI. CONCLUSION

Our rigorous experimentation is synonymous with great advances for the skeptical movement and the struggle against the ideology of the postmodern left. It is also synonymous with the development of the neuro-critical mind (Baratin, 2019) in a learning-to-learn situation for many post-adolescents, an asset in curbing school dropout and social sciences' bio-phobia. This thought experiment was first thought up on a Thursday evening and continued through the night from Thursday to Friday, thus explaining its open and innovative methodology (open innovation), that helped us carry out this innovative and post-disciplinary study. This approach should be of interest to other post-disciplinary fields with an incomparable seriousness, such as evolutionary psychology.

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