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RESEARCH APPROACHES AND PERFORMANCE OF ACADEMICS – A SHORT ESSAY ON POTENTIAL EPIGENETICS’ EXPLANATIONS

Editorial

Abstract

Scientists have tried to find out what are the main mechanisms explaining human behavior – genes or environment, nature or nurture? For a long period of time, cognitive-developmental and behavior-analytic approaches to the study of human behavior have been considered as totally incompatible, yet today organismic and contextualist perspectives are more and more often brought together by scientists from various fields of research. Behavioral epigenetics, a really young and controversial branch of science, applies epigenetics’ principles to the study of various physiological, genetic, environmental and developmental mechanisms of human behavior. This is why a question arised – could we apply the same principles for academic research? Behavioral epigenetics could explain academic behavior in terms of preferred research approaches and designs, productivity and performance, publishing or collaboration between individuals, as a consequence of exposure to environmental adversity (lack of financing, hard competition for funds), social stress (deteriorating image and position of researchers in society) or traumatic experiences (frequent change in financing and promotion criteria, article rejection and negative reviews). Additive influences of nature and nurture type of factors on the development of exceptional competences and performance have already been intensively studied, and lately attention shifted to the interactions and reciprocation of nature and nurture, including nature mediated or revealed through nurture. Studies suggest that physiological and psychological characteristics acquired during the lifespan could even be transmitted as a kind of soft inheritance, which could explain a specific behavior. In fields as health, medicine and biology, as well as in cultural studies, analysis performed on twins growing up in different environmental conditions may offer an answer as far as epigenetics is concerned. In academic research, some clues could be offered by analyzing researchers from genetically related countries, such as Romania and Moldova, grown up and developed in significantly different environmental conditions. The present essay tries to launch into discussion this potential explanation, recognizing that significant conceptual shifts and further research would be needed to fully understand the dynamic of interactions between genes, environment, epigenetics, social and economic processes for the behavioral changes of academics in terms of research involvement and academic performance.

CONTEXT

Academia has always had a strong interest to explain researchers' evolution in terms of career and research productivity, not to mention the impact of their research results in society. For "younger" participants to the research financing regional and global competitions and to the highly ranked publishing process, as Eastern European countries, the efforts for the catching up sprint were enormous, but not necessarily very efficient. How could we explain academic behavior in these countries, in terms of preferences for epistemological positioning in research, for the adoption of specific research designs and especially for publication strategies? How could we explain differences in research approaches and productivity for researchers from a specific country, living and working in the origin country or an adoption one? Could we have implications and explanations coming from the way researchers are borned, raised and trained, and then perform their job in the same country and institution (scientific family)? With so many questions we tried to find an answer outside the classical motivational and academic productivity theories. We based this essay on the significant attention given by psychologists to recent advances in epigenetics, as *study of stable heritable changes in gene function that do not involve changes in the DNA sequence*, changes which would therefore be influenced by environment, not by genes. From a post-genomic perspective, the environment has a crucial role for constructing phenotypes (*the set of observable characteristics of an individual resulting from the interaction of its genotype with the environment*). (Donahoe, 2012; Hurley, 2013; LaFreniere & MacDonald, 2013). A similar perspective could be adopted for the comparative analyses (cross-sectional and longitudinal) on administration systems (catalysts and barriers) and researchers' perceptions and motivations, for researchers from specific academic institutions, taking advantage of a sibling type of relationship between the countries of origin (Romania and Moldova, for example) and the different environments in which they evolved.

The main difficulty of such an approach, besides delicate political issues, is to find generations of researchers for a longitudinal study. We would need generations of researchers – father and son type and if possible siblings – from both countries, which is rather difficult. A solution could be to consider a fairly large definition of the "scientific family" – case in which we could analyze generations of researchers from two institutions from two sibling countries, considering that young scientists trained in that institution have with their mentors, senior academics, a relationship similar to the father and son one.

MAIN ISSUES

Behavioral epigenetics studies effects on learning, memory formation and social communication (Lester et al, 2010; Donahoe, 2012), so it makes sense to consider that it could explain the way in which academics and researchers adjust their specific scientific behavior. The relationship between personality psychology and economics was also analyzed (Almlund et al, 2011). Universities are traversing nowadays significant epistemic, sectoral or geopolitical boundaries, with increasing frequency and amplitude, and along this way they encounter many important challenges - in mitigating unequal capacities and resources, increasing, soaring financial costs, as well as many proprietary concerns (Oleksiyenko, 2015). Universities' multiple roles within the society (education, research, technological transfer, community and societal involvement, etc.) and the increasing number of stakeholders make things even more difficult. The bridging of stakeholder interests, most of the time quite disparate and even highly contradictory, requires an enormous effort, as research policies, institutional norms and organizational cultures in global science often remain irreconcilable, despite all applied strategies (Oleksiyenko, 2015).

Concepts of heredity have been largely broadened, so that to be able to integrate the accruing evidence of non-genetic inheritance, and more and more evolutionary biologists are calling for the inclusion of non-genetic inheritance into an inclusive evolutionary synthesis, referring to culturally and genetically inherited behavior (Danchin, Pujol & Wagner, 2013; Hurley, 2013; Heckman, 2008). Psychological and social contextual factors are recognized for their ability to produce profound effects on brain development and plasticity, and epigenetic processes - such as DNA methylation - actively regulate our genomes in response to environmental input, during earlylife development and as we develop throughout the lifespan (Roth, 2013; Heckman, 2007). Other studies focused on issues of collaboration – there are new theories on group selection approaches and the cooperation between individuals, favored by increasing group benefits; reducing individual cost and increasing the proportion of genetic variance that is between-group as opposed to within-group (Bateson, 2014). We also notice a revival of Lamarck's theory, according to which the physiological characteristics acquired in life, caused by various environmental exposures, could be passed on to the offspring, similar to genetic inheritance, which is labeled "soft inheritance", in this case (Jackson et al, 2013; Hurley, 2013).

The nature versus nurture debate is of particular interest for researchers in the field of talent and

extremely gifted people or exceptional competencies. Previous studies already looked at nature versus nurture, nature and nurture (reciprocation and interaction), and nature in nurture (nature mediated or revealed through nurture) influences for the development of exceptional competence (Yun Dai & Coleman, 2005; Heckman, 2007). Contrary to former beliefs, it appears that the genome is far more responsive to the environment than previously thought, and not all transmissible variation is underlain by genetic differences. Specialists already talk about four types of inheritance which co-exist - genetic, epigenetic, behavioral, and symbol-based, with interdisciplinary support from molecular biology and cultural studies (Jablonka & Lamb, 2007). Resuming, the main issues of interest for the field of academic research involvement, conduct and productivity are related to learning (the learning mechanisms of researchers), memory formation, social communication, academic networking and cooperation among scientists, exceptional competences, and decision taking, all in relationship with environmental adversity (institutional + national level), social stress and traumatic experiences. All variables would need a conceptual and operational definition for a future development of a potential explanatory model.

PROPOSED EXPLORATORY RESEARCH DESIGN

If we would try to apply this theory for explaining differences in academic behavior for researchers belonging to similar higher education institutions from sibling countries, further exploratory research is needed. At this stage only some initial steps could be envisaged: thoroughly describe academic environments in both reference universities, one from each country (observation and content analysis – research strategies, web pages etc., followed by in-depth interviews with managers at various levels, scientific and administrative); analysis of stated academic values in time (internal records); in-depth interviews with selected researchers; productivity and performance analysis of selected researchers from both universities; critical cases analysis – highly successful and least successful researchers; initial sketch of “soft inheritance” potential explaining factors. A second stage of the analysis could be based on longitudinal study of selected small samples of researchers, together with experimental research designs.

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