

Individual Differences in Human Development

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Abstract

This article discussed four main topics, where the results of observations in previous research are then connected with educational issues that occur today. The topic of observation is as follows: the role of the genome in the evolution of uniquely human traits occurs dynamically, the relationship between the genome, brain, and sub-sections related to cognition, attempts to associate cognition in the genome, correspondence between a particular level of behavioral complexity and the mechanisms by which the genetic system regulates both, genome and its role in education. The research method in this article is literature review in part one at Innovations in Educational Psychology book edited by David D. Preiss and Robert J. Stenberg as the primary source and other supporting literature as secondary sources. The results of this study reveal that the genome has an important benefit for education, although not directly but can better understand the nature and degree of flexibility of individual differences in the classroom.

Keyword: Individual Differences, Human Development, Role of Genom

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PENDAHULUAN

Understanding the relationships between heritable and nonheritable factors and what about behavior is something that psychologists and educators want to know for a long time ago (Preiss & Sternberg, 2010). An interdisciplinary field that attracts both psychologists, geneticists, and educators indicates that the majority of complex human traits associated with cognitive functioning and educational achievement are heritable factors (Bertisch et al., 2010).

This journal journal discusses the first hypothesis that the different variations of human language correspond to the differentiation of genetic variation between different human populations. This is also mentioned in the research conducted by (Creanza et al., 2015), that family or different, The second hypothesis is that there could be a causal relationship linking genetic variation within a given population, as well as language features that characterize the language used by that population. For example, it has been proposed that the variation that appears to be related to certain genes — such as the gene involved in it is called corticogenesis (e.g. H. sapiens abnormal spindles mRNA, ASPM or MCPH5, located at 1q31, and Microcephalin, MCPH1, located at 8p23, genes) – causally related to the language variation, but not directly.

First, variations in the brain are due to differences in (a) brain size, (b) brain structure, and (c) activation patterns within the brain. There are many studies on the relationship between cognition and brain size and structure (Messé et al., 2014). Examples of intelligence in monozygotic twins are better than in dizygotic twins, according to their

different brain structures. Postmortem studies show that the brains of individuals with higher IQ and higher levels of education are characterized by a large number of dendrites and dendritic branching(Zwir et al., 2020).

In conclusion, the highest genetic influence appears not to be related to the details of the activation pattern but the cognitive strategy chosen in general(Preiss & Sternberg, 2010). These findings provide new knowledge for educators, especially in understanding the individual uniqueness of students, so that they can develop a holistic strategy for how students can learn according to their uniqueness(Usha et al., 2015).

From note is the fact that the candidate genes studied were very diverse, with evidence either supporting or disproving the involvement of nearly every one of these genes with the basic science of cognition(Preiss & Sternberg, 2010). And then, genes have diverse functions (e.g gene connections belonging to a family of protein groups with known respective functions in the brain), suggesting that the genetic pathways related to cognition are highly complex or multi-layered(Messé et al., 2014).

Third, in many studies of the association of these genes with cognition, the behavioral variables of interest were defined beyond IQ. They encompass the overall characteristics of intelligence (verbal and nonverbal, at a minimum) and cognition (e.g, executive function, creativity, working memory, and IQ itself)(Pambudi et al., n.d.).

The hope is that by understanding the functions of genes and the protein networks within them, one will gain some additional understanding of how Artificial Intelligence in general (and genetics specifically) Artificial Intelligence, cognition, learning, and academic skills is. Such discoveries could spark a discussion about maximizing human potential, but pedagogically and perhaps with pharmacological additions(Messé et al., 2014).

Concerning the number of genes involved in the manifestation of so-called Endophenotypes for intelligence as chronometric indicators, the assumption that less complex traits are governed by less complex mechanisms may not always be true or helpful in terms of understanding how dynamic genomes work and providing for their changes. on cognition(Andrey et al., 2015).These observations may also be directly related to classroom practice by informing individual differences such as lower vs. higher-level processes of pedagogical intervention targets(Preiss & Sternberg, 2010).

METHODS

In this research, use a literature reviews method, which the main source using a book from David D. Preiss dan Robert J. Stenberg, Innovations in Educational Psychology, and focus discuss in chapter one by title "Individual Differences" Literature reviews are essential for identifying what has been written on a topic, determining the extent to which a specific research area reveals any interpretable trends or patterns, aggregating empirical findings related to a narrow research question to support evidence-based practice, generating new frameworks or theories; and identifying topics requiring more investigation(Snyder, 2019). There are six steps involved in conducting a review article: formulating the research question, searching the extant literature, screening for inclusion, assessing the quality of primary studies, extracting data, and analyzing data(Levy & J. Ellis, 2006).

RESULTS AND DISCUSSION

Talk about genetics and heredity which are closely related to human cognition, one of which has implications for the world of education, providing new insights for researchers, especially in the fields of genetics, psychology, and education. however, further research is needed to explore the interrelationships between these disciplines(Preiss & Sternberg, 2010).

First, development is characterized by a large amount of variation between sources, which forms the basis for individual differences(Warman & Ennos, 2009). Several

studies on various human traits, distinctive and typical, that have been carried out with genetically informed designs (i.e., designs including pairs or larger groups of genetically related individuals) have undeniably demonstrated the result that the genome is paramount when viewed from the source of these differences (Zwir et al., 2020).

Second, human behavior is regulated by the brain in general and by specific circuits in particular. Many of these specialized circuits, at least in the broad and general field of study, allow researchers to begin to specifically address the relationship between the genome and the circuits present in the neuron (Bouchard, 2004). However, this field was originally concerned with attempts to translate the associations between clinical and educational practice (Preiss & Sternberg, 2010).

Third, the specificity of brain circuits is defined anatomically by certain modulated and neurosignal transduction patterns that develop functionally, in response to environmental stimulation (Marigorta & Gibson, 2014). All of these so-called "Contributors" to specificity and plasticity are, in turn, regulated or guaranteed by certain proteins synthesized by certain genes. Understanding what these genes are and how they function is critical to understanding the regulation of human behavior by the brain (Boyce et al., 2020).

Fourth, brain circuits are responsible for processing and combining information from stimuli that are internal and external to an individual. These stimuli form a flow of information that is captured and transduced by various sensory pathways (Onogi et al., 2021). Identification of the genes involved in establishing the biological basis for these sensory pathways will be important for understanding the relationship between the genome and information processing (Andrey et al., 2015).

Discussion

Genetics discussed in this chapter, where is it more likely? Does genetics affect IQ/EQ? Then whether parenting can affect the inherited genetic changes? The answer for this question we must know that genetics carries a set of information which merge into one is referred to as a genome (Junaedi & Slamet, 2017). It is in this genome that the cognitive systems humans are stored and of course affect too on behavior. Then, it will affect IQ or EQ? IQ/EQ is an intelligence assessment tool humans in the form of logical reasoning intelligence general and emotional intelligence in each individual (Nulhakim & Berlian, 2020).

However if the question is more to carry intelligence or emotional information, then the answer is both. Parenting will not be able to change innate genetics, only can modify or add only, but the genetic brought will continue to exist until the end of human life (Melzer, D., Pilling, L. C., & Ferrucci, L., 2020). That's why the potential for Intelligence to change is so difficult or will only add a little bit, and talent or genetically inherited intelligence will never lost, only a few buried temporarily because of long not worn or sharpened. Regarding the child's character, how about Child character management system from the research in this chapter? The answer is genetics from mom and dad merge into one and form a character or character trait from birth (Zwir et al., 2020). However, character and personality as well as behavior can be changed or modified with appropriate parenting. Even though in character the basis of the child will not disappear, but can be at least reduced, if strict and disciplined parenting (Preiss & Sternberg, 2010).

Associated with dyslexia (study) the case of a dyslexic child, it turns out that the father and mother are not have dyslexia too) are there other factors that affect a child apart from genes? genetics can also carry chromosomes where there are chromosomes with carriers or talent carriers an abnormality or abnormality, for example in people with diabetes or dyslexia. Combined father and mother genetics may cause a child is dyslexic because of the nature of the gene the carrier. However, other factors can't either denied. For example, in autistic patients, according to recent research, it is also influenced by nutrition and also the environment where the mother lives, where if polluted environment

and unhealthy lifestyle from the mother, the more likely the child suffers from autism, as well as cases of dyslexia. To find out about the cause, need a series of tests which is not simple.

Can genetics change and how is the relationship between disease and inherited genetics can it stop for the next generation? Genetics will not be able to change but can only be modified, namely increasing or decreasing if it is related to behavior and personality (Sutin et al., 2019). However, the disease will not be able to change even though in practice the disease talent brought from both parents can't develop with a strict lifestyle, the talent for the disease can be buried (*Genes and Disease*, n.d.). However, people who have a talent for disease will be more at risk of getting the disease, it can be discussed like that (Preiss & Sternberg, 2010). So if you want it not to be passed down to the next generation, you can improve your lifestyle in order to reduce the impact of the genetic inheritance (Preiss & Sternberg, 2010). Because especially during pregnancy or in neonatal development it is also a very important period if you want to change congenital diseases, although it is not uncommon to ensure that genetic material is not genetic will decrease again (Rammstedt et al., 2016).

How is the relationship between genetics, brain structure, and the environment and their role in life? Genetic is the subtlest element that carries human characteristics, such as physiological criteria to the cognitive system (Rammstedt et al., 2016). So relation genetic with the structure of the brain is very large, the brain structure is clearly shaped by genetics (Patra, 2015). Everyone has a different brain volume and neurological system, and of course it will have an impact on different ways of thinking, acting and behaving in each individual (Messé et al., 2014). While the environment also affects, although not as strong as genetic impact. Because even people in a damaged environment, if genetically that person does not like such a life, then it is not impossible that the person is not affected. However, there are several things such as language that can be affected by its development due to environmental factors (Patra, 2015) (Marigorta & Gibson, 2014).

CONCLUSION

The results of the observations described earlier are certainly not very complete to explain the relationship between the genome, brain structure, cognition, and also its relation to the world of education. However, by going through this initial understanding, it is possible to formulate a new conceptual framework for further study of the connections between genomes and behavior. This framework takes us far beyond nature and nurtures controversy and opens up new and exciting perspectives on understanding human complexity, from its evolutionary roots to its future manifestations. And among the many questions, there is one very important one, how to summarize this wealth of information to bring it into the school or academic world with the aim of better understanding the nature and degree of flexibility of individual differences in the classroom.

By knowing about individual differences where genetic factors are very important in terms of differences in behavior and also ways of thinking, it can be used to understand the potential of each individual, including children. In the world of education, understanding the character of children and also the basic abilities they have is a very important thing to do. Then the discussion of genetic studies and its relationship to behavior needs to be done a lot. In addition to understanding fundamental individual differences, it can also be used to create educational systems and also innovations in educational science so that students' abilities can be explored optimally.

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