European Proceedings of
Social and Behavioural Sciences
EpSBS

www.europeanproceedings.com
e-ISSN: 2357-1330

DOI: 10.15405/epsbs.2021.06.04.9

PNP 2021
Personality in Norm and in Pathology 2021

INTELLIGENCE AS A PREDICTOR OF PERSONALITY DEVELOPMENT: A NEUROCONSTRUCTIVIST APPROACH

Marina Saprankova (a)*, Lidia Rychkova (b)
*Corresponding author

(a) South Ural State University (NRU), Komsomolskyprospect 109-121, Chelyabinsk, Russian Federation, E-mail vaineri.81@mail.ru
(b) South Ural State University (NRU), Lenin prospect 76, Chelyabinsk, Russian Federation, E-mail rychovaly@mail.ru

Abstract

The possibilities of the neuroconstructivist approach to the study of intelligence as a driving force of personality development are considered in the study from the dynamic concept position. Two disciplines, cognitive developmental psychology and intelligence, psychology focused on cognition and intelligence, most accurately explain the developmental changes of intelligence due to the active interaction between the developing system and environmental factors involved in different periods of ontogenesis. The weak relationship between intelligence testing and psychological theory is one of the particular features. Intelligence tests are relatively independent of theory, and this gap grows and is further exacerbated when it comes to development. Multiple factors affect intellectual functioning during personality development. The purpose of this paper is to gain a unique idea into the neuroconstructivist approach to the study of intelligence. The concept of "intelligence" is ambiguous and is interpreted in connection with cognitive styles, learning ability, mental action system. Nowadays, intelligence is not usually considered as a unitary phenomenon explained by a single mechanism; the structure of intelligence is very complex and includes several general and specific factors.

Keywords: Cognitive development, intellectual functioning, individual differences, neuroconstructivist approach

https://doi.org/10.15405/epsbs.2021.06.04.9
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Selection and peer-review under responsibility of the Organizing Committee of the conference
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1. Introduction

The scientific literature is full of ongoing discussions about the development of human intelligence; according to psychologists, there remain basic questions and questions about perspectives that simultaneously take into account the different constraints affecting intelligence development. The need to consider intelligence as a dynamic concept explains the significance of the research study.

The concept of intelligence focuses on the mental abilities necessary for progress and survival in any environment (Urben at al., 2018).

Attempts to understand this versatile concept have contributed to the notion that one IQ point can often express individual differences in intelligence (Maryutina, 2014). Such a notion aimed to suggest that intellectual ability would remain largely stable throughout life.

2. Problem Statement

Current publications about empirical research report on intelligence from the developmental point of view. Viewing intelligence as a dynamic concept implies the need to identify complete developmental trajectories, to assess genes, brain, cognition, and environment interaction.

The neuroconstructivist approach gives the most accurate explanation of intelligence rise or fall during development caused by fluctuating interactions between the developing system and environmental factors involved in different periods of ontogenesis.

3. Research Questions

This paper attempts to explore this area of science. According to the researchers, the neuroconstructivist approach focused to the human intelligence formation is based on the integration of various approaches in the study of the brain and cognitive development.

The notions under consideration are: probabilistic epigenesis; experience-dependent neural substrate; interactive specialization in the development of brain areas; body-based cognition; J. Piaget's constructivism; computer modeling presented by formalized descriptions of information processing; and the leading role of the social environment in child development.

Neuroconstructivism is a system of ideas aimed at integrating all of the ideas available in psychology and neuroscience about cognitive development into a unified whole, linking the transformations occurring at different stages of ontogenesis into a continuous development trajectory.

4. Purpose of the Study

The paper aims to characterize the scientific context of the process of intellectual developmentwithin the neuroconstructivism framework.

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5. Research Methods

Within the framework of differential and general psychology the study of intelligence is focused on two directions: 1) explicit theories relying on empirical data in measuring intelligence (testological direction); 2) implicit theories relying on theoretical models of intelligence (Demetriou et al., 2013).

6. Findings

Intelligence is an ideal construct explained from a neuroconstructivist perspective. It is not the authors' intention to provide an exhaustive overview of theoretical and experimental ideas because littlesources of literature data can give a general description and show theoretical and research detailsin the field of intelligence. Precisely for this reason, it is necessary to study the development of human intelligence from the perspective of the neuroconstructivist approach.

This paper aims to provide a unique understanding of intelligence. To make sense of the concept of intelligence, the number of attempts has increased in recent years, forcing the researchers to discuss this concept profoundly on a global scale. However, despite the long history of the psychological and neurobiological communities, scientists are still searching for a precise definition of intelligence and a suitable theoretical framework.

In psychology, the neuroconstructivist theory can describe the dynamics of the developmental nature of intelligence, compared to theoretical models based on the principle of intelligence stability. In particular, diverse developmental principles and mechanisms existing at different levels (i.e., genetic, cellular, neural, behavioral), and having effects on cognitive abilities show changes in intelligence overtime at both behavioral and neural levels, can be explained by the components engaged in the formation of these links affecting intelligence (Kievit et al., 2016).

The emphasis is placed on the interaction of the listed subsystems. For example, neural activity in the brain changes due to mental experience gained during the period of development. For this reason, it is very important to follow the neuroconstructivist principle that supports adaptive behavior at various levels over time. When considering adulthood, it is essential to note a more stable state of developmental trajectory than at earlier stages of life. Consequently, it can be assumed that intelligence will be more stable in adulthood than in adolescence, which is consistent with the received data. In general, intelligence acts as the result of multiple interactions between hereditary factors, behavior, cognition and the environment.

For this reason, researchers suggest that one can explain the development of intelligence if all these factors are considered simultaneously.

The notion of intelligence clarifies and organizes this complex set of phenomena. That is, intelligence focuses on the mental abilities necessary for progress and survival in any environment.

Sternberg (1987) says that:

> the truth, however, is that behind the seemingly simple definition of intelligence is the complexity of the cognitive architecture that makes effective adaptation possible. Some cognitive processes, such as perception, learning, memory, reasoning, and problem solving, are indeed needed in the right combination to learn, understand, and cope with new situations (pp. 92-105).

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One of the most significant advances in the history of psychology and, at the same time, one of its most controversial issues concerns the intelligence measurement. Indeed, various criticisms have been made that no test can measure human intelligence's complexity and that cultural factors inevitably influence this measurement.

Nisbett, Aronson and Blair say, "While these criticisms have good validity, there is no doubt that the measurement of intelligence is of great practical value, for it is a good predictor of educational attainment, performance at work, and many other aspects of life success" (as cited in Ursache & Noble, 2016, pp. 71-82). Individual differences in intelligence are now commonly measured by psychometric tests, which cover many different cognitive domains, such as problem-solving, executive function, memory, processing speed, and verbal and spatial abilities.

Moffitt and Caspi (2001) argue that intelligence tests should show marked individual differences that are considered fairly stable in rank order throughout development and even over long periods of time.

Deary, Penke and Recon state that "differences in population intelligence almost follow a normal distribution, with the only exception of a slight excess at the lower point of the distribution due to persons with severe impairments having a poor cognitive ability" (as cited in Demetriou et al., 2013, p.745). Of particular importance is the relationship between intelligence testing and psychological theory that has always been moderately weak. Individual intelligence tests are left untested by theory, and this gap is further exacerbated when it comes to development. For example, developmental intelligence perspectives go back to Jean Piaget, even though his theory of cognitive development is hardly used as a model for intelligence research (Karmiloff-Smith, 2015).

Developmental intelligence is less stable than is often assumed, and reported in a systematic review of studies examining perceived stability of cognitive abilities during development. In particular, there are three independent lines of evidence to challenge the classical view of intelligence as a stable trait (Murray et al., 2016).

In most cultures, intelligence is viewed as a stable human trait. According to this general view, cognitive abilities are perceived as static, relative to intelligence levels, which should remain relatively stable over time, as evidenced by the fact that IQ measurements taken at various points in a person's life tend to correlate well. However, efforts to challenge this view are not insufficient. For example, according to Valsiner (1985), intelligence theories must move from being primarily intrinsic or static to being dynamic and expressed as a sign of correlation with context. Strong correlations over time can indeed hide unobserved individual variations. Two-component theories of intellectual development also offer an alternative view of the static model of intelligence, suggesting that different components can disconnect in their development direction.

The data discussed earlier call into question the classical notion of intelligence as a stable trait, emphasizing that IQ levels undergo significant fluctuations relative to developmental levels (Schermer & Richard, 2018). One should clarify that recent proposals suggest that the composition of the central core of intelligence is not stable, it changes and evolves over the years.

Therefore, the main task for developmental psychologists who seek to master intelligence in development entirely is to integrate individual observations into the trajectory of development and to consider the multiple sources that give rise to it, in an attempt to identify the possible mechanisms that

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determine changes in development (Altinay et al., 2020). In this sense, a broad theoretical framework is needed to better understand intelligence during development and account for its dynamic nature at various analysis levels, including the biological, environmental, and behavioral correlations of IQ.

The term "neural constructivism" is opposed to selective theories because it implies that neural architecture is largely formed by activities at different environment levels, ranging from the cellular environment to the social one.

Various studies have shown that the environment influences the brain. The relationship between children's socioeconomic status and individual differences in intelligence is one issue that often puts science in the public spotlight (Maryutina, 2014). The influence of the environment on young children's IQ and academic performance can indeed be marked, with children who grow up in poverty showing lower IQ scores. This suggests a broad influence of the socioeconomic environment on various neurocognitive domains such as working memory, cognitive control, and especially language and memory, closely related to general intelligence (Escorial et al., 2019).

The detection of changes in gray and white matter volume and cortical thickness in the early years of life may be important to better understand variations in intelligence scores compared to development.

An explicit attempt to describe how different levels of constraint shape the development of human intelligence and, in particular, how they relate to neural representation and behavioral outcomes from a neuroconstructivist perspective. Indeed, there is enormous individual variability in how different people's brains adapt to the environment, with smarter individuals exhibiting more plastic brains and more efficient neural activations in a range of cognitive tasks (Foster et al., 2018).

From the clinical and scientific point of view, a better understanding of the developmental dynamics of intelligence is essential. Moreover, it also must be considered in terms of its impact on educational and public policy. Indeed, individual IQ trajectories must be monitored over time can contribute to a child's development along protected routes. This is particularly relevant because intellectual functioning has cascading effects on many important life outcomes (Rinaldi, 2017). For example, individual differences in general intelligence are among the strongest predictors of occupational achievement, social mobility, and job performance. Children and young people with higher overall intelligence also tend to have better overall physical health, contributing to a longer life expectancy. Besides, children with higher IQs have a lower risk of developing dementia and being diagnosed with schizophrenia, major depression, or an anxiety disorder in adulthood. It is crucial to understand the links of the differential IQ levels with these life situations not only in terms of their validity but also in developing public policies and idealizing effective interventions (Poletti, 2016).

7. Conclusion

A neuroconstructivist approach can describe the dynamic nature of intelligence. The operation and interaction ofdevelopmental principles and mechanisms occur at genetic, cellular, neural, behavioral and environmentallevels. They explore the formation of cognitive and creative abilities, the integration of abilities with the private sphere, the creation of individual cognitive preferences, which in general is a favorable basis for the self-actualization of the adolescent.

Individual differences in general intellect are among the strongest predictors of professional activity, social mobility, and performance. Connection of psychometric intelligence and psychometric creativity values with educational, intellectual, creative and social achievements (Schermer et al., 2020).

Despite some controversial points, on the whole, the appearance of such a large-scale psychology phenomenon as neuroconstructivism can be considered as a scientific breakthrough because a logically consistent integration of knowledge from different disciplines and scientific fields can be more productive than their isolated analysis.

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