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Analysis of cognitive neuropsychology theory on children's emotional intelligence in the golden age period

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Abstract
Growth and development factors will influence the quality of a child's life. The quality of a child's life will be good if their growth and development can run optimally. Cognitive and emotional development is very important for the growth and development of children both now and in the future. Emotions play an important role in life. Several scientific papers discuss age differences in emotion processing from neuropsychological studies. This article was written to analyze the role of neuropsychology in developing emotional intelligence in children in their golden years. In this paper, neuropsychological studies are used to study the relationship between children's emotional development and the brain in the golden age. The principle of the neuropsychological approach is systematic. The principle of systematization of children's emotional intelligence referred to in neuropsychological studies is paying attention to the social nature of the soul combined with the principles of biological organization (the brain).

Keywords: Emotional, neuropsychology, golden age, brain

Introduction

Emotional intelligence is one's ability and capacity to assess and manage emotions, including how to identify the emotions of other people or groups. Emotional intelligence (EI) has been defined as a wide range of individual differences that characterize the adaptability of intelligence and subjective experience based on emotions (Hughes and Evans, 2018) [7]. For a child, emotions are characteristics that describe his level of trust in himself, other people, and the world. Emotions can influence a child's mental development. Emotions will influence a child's assessment of their environment and the direction of their attention.

Every action, decision, consideration, and activity that a person does will involve their emotions. Emotionally intelligent people are aware of their emotional involvement and use their thinking to manage their emotions. Over the past few decades, Knowledge of a person's skills and abilities in terms of work, learning at school, and daily life is a reflection of the concept of Emotional Intelligence (EI). Emotional intelligence plays an important role in successful performance, motivation, decision-making, management, and leadership (Tripathy, 2018) [22].

The golden age is an important developmental stage for children, where their brains and physical bodies experience the most rapid growth. Parents, teachers, and caregivers need to be knowledgeable about this period and understand what activities and experiences are best for children in this period. Children's cognitive development must be developed from an early age because, at an early age, children are in their golden age. Each child will have different development and growth, therefore there is an adjustment in cognitive development to the child's age (Rohmadi *et al*., 2020) [17].

The golden period in children is an important period that optimizes growth and development so it is a valuable period that should not be ignored. During this golden period, the basic formation of the nervous system has occurred. At this time, connections between nerve cells occur. The quantity and quality of these connections determine the intelligence of children at the golden age. The first five years of a child's age is the golden period. Children less than five years old are the golden period for a child to acquire superior skills such as perception, interaction, speaking, and others (Cusick and Georgieff, 2016) [5]. This period is the foundation for various aspects of development. A child's growth and development is greatly influenced by the child's age. Early age is important for children's growth and development. The child's age has been widely reported to influence the child's level of development (Meriem *et al*., 2020) [12].

Early life conditions have a long-term impact on the formation of human resources and the success of the next phase (Manas, 2020) [10]. The golden age is considered the most important phase of development. Healthy physical, emotional, and cognitive development of children is preceded by the development of healthy early childhood. All events and experiences that occur at an early age have a big impact on their growth and development later in life. If at an early age, they experience unhealthy development, children will fail to reach their potential in cognitive and social development (Pem, 2015) [15]. Early age in children has a very important role in children's growth and development. Several research results have revealed the role of early age changes in a child's level of development. It is further said that these changes are influenced by many factors originating from the environment or factors inherent to oneself as well as the type of evolution.

Over the past few decades, more and more research has been conducted in the field of neuroscience to understand the basics of emotions. One of the latest innovations in the

world of psychology is the application of neuropsychology in studying children's emotions from infancy. The neuropsychology of emotion is a field that has come a long way in the last half-century. Child neuropsychology is a study that studies the characteristics of children's emotional development from infancy. In the process of ontogenesis, subsequent mental formation is closely related to the process of emotional development (Huidu, 2018) [8]. Through their emotional brush, children will be stimulated to assimilate information from the outside world. This process of socialization with the outside world will influence mental activity, the dynamics of children's genetic development, and the formation of emotional intelligence. Mental development, the ability to empathize with people is influenced by environmental emotional well-being factors and emotional competence (Chystovska *et al*., 2022) [4]. Even though there has been research on child neuropsychology, the study of the development of emotional intelligence in golden-age children is still less studied.

The aim of writing this article is to theoretically analyze neuropsychology's relationship with emotional intelligence in golden-age children.

The Developmental of Emotional Intelligence in Children

In previous science, there was no explanation of the meaning of emotional intelligence. According to scientists, the ability to understand oneself, including needs, attitudes, self-control, knowledge, and how to manage and understand emotions is the meaning of emotional intelligence, self-expression, and adaptation to the environment. (Chystovska *et al*., 2022) [4]. Emotional intelligence (EI) refers to the ability to understand, express, and manage emotions. This understanding of emotional intelligence can protect against the emotional burden experienced in certain professions (Bru-Luna *et al*., 2021) [3].

Emotional intelligence, as defined by Shanthi *et al*. (2022) [18], is an individual's ability to recognize their own emotions and the emotions of others. It involves distinguishing different feelings and labeling them appropriately, using emotional information to guide thinking and behavior, and adjusting emotions to adapt to the environment. With emotional intelligence, we will be more creative in thinking and using emotions to solve problems. To some extent, it may overlap with general intelligence. Emotionally intelligent people will have skills in identifying, using, understanding, and managing emotions.

Currently, there has been significant progress in understanding the basic stages and mechanisms of mammalian brain development. Many studies have been carried out to explain the neurobiology of brain development, including levels of neural organization from macroanatomic, cellular, to molecular. The stages of brain development are the product of a series of dynamic and complex adaptive processes. This stage of development occurs within a context that is organized genetically and is very limited in nature. However, developments continue to change. The process of brain development from a developmental neurobiology perspective provides challenges and opportunities for psychologists who want to learn to understand the fundamental processes of social and cognitive development, as well as the nervous systems that mediate them (Stiles and Jernigan, 2010) [20].

Brain activity forms a set of structures that are important for human life, which is called emotional intelligence. Higher brain centers have grown out of the limbic zone, the emotional part of the brain that plays an important role in the structure of the nervous system. The limbic system (from the Latin limbus, for "hem" or "border") is a collection of other related structures in the brain that form loose circuits throughout the brain. This limbic system is a fairly old part and is found in the human brain as is also found in many other vertebrates. In reptiles, this brain is known as the rhinencephalon, or "olfactory brain", this is because it reacts primarily to olfactory signals. Of course, in humans, the variations that can influence the emotional brain are unlimited (Ackerman, 1992) [1].

The limbic system is responsible for most subconscious drives emotions and behavior. The limbic system is responsible for animal survival interests, such as pain and pleasure, fear, anger, sexual feelings, and even obedience and affection. Like the rhinencephalon which has a strong sense of smell. All smells that are perceived and pass through the nerves from the olfactory bulb, will at some point travel directly to the limbic system and then be connected through that system to other parts of the brain, therefore the ability of pheromones, and perhaps also other smells will influence behavior in quite a way. complex without having to reach our awareness (Goleman, 1995) [6].

Emotions are the result of the activation of certain neural populations in various parts of the brain cortex, including the anterior cingulate, insula, and ventromedial prefrontal cortex. Apart from that, there is also activation of subcortical structures such as the amygdala, ventral striatum, putamen, caudate nucleus, and ventral tegmental area. New concepts about the connectivity and function of the cingulate cortex in terms of the development of emotion, action, and memory suggest that the anterior cingulate cortex receives information from the orbitofrontal cortex. The posterior cingulate cortex receives spatial and action-related information from areas of the parietal cortex. This input of information allows the cingulate cortex to learn the results of incoming actions. Additionally, because the anterior cingulate cortex links outcomes with actions, it is said to be involved in emotion, and because the posterior cingulate cortex has output to the hippocampal system, it is also involved in memory. This distinct function of the cingulate cortex is related to its pro-isocortical limbic position in the brain (Roll, 2019) [21].

Activation of these nerves gives rise to conscious emotional experiences, also known as feelings. These feelings contribute to the neural networks responsible for thought, language, and behavior and help improve our ability to predict, learn, and reassess stimuli and situations based on previous experiences.

Contemporary theories of emotions all agree on the importance of the amygdala as the center of subcortical emotional brain structures. The amygdala is tasked with evaluating and integrating various sensory information from the surrounding environment and providing appropriate emotional values such as valence, intensity, and approachability. The amygdala also regulates autonomic, endocrine, and decision-making functions, adaptation of instinctive behavior, and motivation to environmental changes. Regulation is carried out through implicit associative learning, short-term and long-term changes in synaptic plasticity, and activation of the fight-or-flight response through efferent projections from its central nuclei to cortical and subcortical structures (Simic *et al*., 2021).

The quality of children is said to be influenced by growth and development factors. The quality of children will be good if their growth and development can take place optimally. According to Marliana (2018) [11], children's growth and development are influenced by cognitive and emotional mental development. The formation of development in early childhood will be the basis for the formation of health and well-being later when they grow into adults. Development from an early age to a prosperous adult is an important component of the Sustainable Development Goals (SDGs). To achieve children's cognitive and mental-emotional development, both for the present and the future, special attention is needed. This attention can take the form of knowledge in detecting cognitive and mental-emotional development problems as well as factors that may influence and be related to the developmental problems that occur (Lu *et al*., 2016) [9].

Cognitive Neuropsychological Approach to Children's Emotional Intelligence

Emotional intelligence is influenced by the readiness of the brain to function to receive adequate and comprehensive knowledge about the world and learning. Morphofunctional readiness of the brain provides readiness for real cognitive situation awareness processes in connection with the formation of higher mental functions. In turn, the interaction of social factors and biological factors plays an important role in the development of mental functions (Mikadze, 2013) [13].

The development of the child's psychophysiological formation depends on his specific emotional processes. Ontogenically, socialization plays a very important role in the process of child growth and development. The socialization process will influence mental characteristics and the formation of emotional intelligence. A child's mental development depends on his or her emotional well-being, environment, and emotional competence. Mental well-being is determined by the characteristics of mental development and is formed based on a sense of empathy. Even though there have been many articles reviewing neuropsychology, the issue of the psychological development of emotional intelligence and children's personality is still under-researched.

When a child reaches the age of three, their basic neural connection system is already well developed (Miller *et al*., 2016) [14]. Strong pathway connections have been established between auditory and visual centers, as well as between auditory and motor areas. This allows for better coordination between visual, auditory, and motor nerves. As these connections strengthen, the child gains the ability to control pain, stop and move again, change direction suddenly, and imitate the movements of others such as clapping or kicking at high speed. With a strong brain network capacity, they can perform twisting movements, jumping, running, tiptoeing, walking on tiptoes, and many more. At this age, children's mental abilities are more refined than at previous ages

Children's brains can think symbolically using abstract concepts, according to research conducted by Rodriguez *et al*. in 2011. By the age of 4 to 6 years, the child's neural connections are well established, helping the coordination of physical and non-physical movements of the brain.

Children's emotional manifestations are influenced by social and biological factors. Emotions will arise when there are physiological processes in the child's body. Emotional sensitivity may be partly caused by genetics, while emotional intelligence is caused by non-genetic factors. The brain is responsible for emotional behavior. Any emotion can occur accompanied by activation of the nervous system. Activation of this nervous system can produce biological substances in the blood that can change respiratory rate, heart rate, and internal organ activity. Threats and dangers originating from outside the body are recognized and processed in the brain. If there is emotional stress, it can cause the brain to experience fatigue, as a result, there will be reduced activity, and the nervous system will be drained (Chystovska *et al*., 2022) [4].

A child's level of emotional intelligence may be related to physiological events in the brain in the form of "information hunger". To increase children's emotional intelligence and to achieve successful emotional socialization, it is necessary to combine neuropsychology with pedagogical technology. To achieve success, the child's age and characteristics need to be considered.

To develop emotional intelligence, the application of a neuropsychological approach must be systematic and comprehensive. Based on neuro-psycho diagnostic results, success is achieved when carried out with a differential approach, competence, and paying attention to the "emotional" and "rational" neurobiological mechanisms of the child's brain as well as partnerships with teachers and friends (Chystovska *et al*., 2022) [4].

Neuropsychological studies aim to examine the relationship between behavior and brain function. Neuropsychology developed because of the importance of explaining the nature and origins of individual strengths and weaknesses in domains such as cognition, attention, social-cognitive, language, and motor function (Braconnier and Siper, 2021) [2].

There are several scientific papers regarding the neuropsychological perspective due to age differences in

emotional processing. There is also an increasing number of scientific papers discussing the involvement of certain brain regions in emotional processing, and brain regions that overlap with other brain regions, especially regions known to be most affected by normal aging (Phillips *et al*., 2002) [16].

In developing children's emotional intelligence, the basic principle of the neuropsychological approach is the systematic principle. Based on various scientific writings, it is stated that the influence of multi-complex components in social culture and emotional phenomena will lead to the formation of holistic personal emotions.

Cultural and historical factors systemically influence Emotional problems personal mental phenomena and cognitive processes.

In the ontogenic process of child growth and development, emotional and cognitive processes are interconnected and manifest in the form of "intellectualization" of emotions. The main principle of systematization is a combination of the principles of biological organization (brain) with the social nature of the soul. (Chystovska *et al*., 2022) [4].

Conclusions

For a child, emotions are a reflection of his level of confidence in himself, other people, and his environment. Through neuropsychological studies, it is stated that the brain's readiness to receive adequate and comprehensive knowledge about the outside world will have an impact on the development of children's emotional intelligence. The development of emotional intelligence is a system of emotional attitudes in the process of becoming aware of real cognitive situations regarding the environment. The basic principle of the neuropsychological approach to developing emotional intelligence in children is a systematic method. The main principle of systematization is to pay attention to and take into account the combination of psychological properties, with the biological organization in the brain of emotional phenomena.

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