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Review Article

Role of cognitive and emotional empathy in the development of social cognition among adolescents

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ABSTRACT

Empathy and social cognition among adolescents have been mainly studied in recent years. There are several reasons that adolescence and social cognition are being studied. Adolescents find themselves fully facing the external world and equipped with social cognitive skills, including emotional and cognitive empathy, along with the theory of mind acquired at home or school. Now, they must interact with others with diverse views, thoughts, and emotions from society. One of the fundamental components of social cognition among adolescents is described as empathy. Archival techniques are used in this review paper. This paper explores the connection between empathy and social cognition in adolescent development and how emotional and cognitive empathy influence social cognitive skills. It also investigates the changes in brain regions to social cognition and empathy among adolescents. Identifying this relationship reveals that emotional and cognitive empathy are both indispensable in the construct of social cognition during the adolescence period. The findings of the study point to the need for assessing the different components of empathy in psychopathological conditions among adolescents, which is marked by difficulties in emotional identification and expression. Developing a typical training program that improves social cognitive skills may help adolescents track their behavior in every aspect.

1. Introduction

The period of adolescence is explained as a particular period of life between puberty and the achievement of social identity and emotional maturity.[1] This time is also characterized by physical, social, behavioral, and cognitive changes. Late adolescence is a period that encompasses more cognitive development than physical development. Advanced brain imaging technology in recent years has enabled tremendous changes in identifying the functional and structural changes in the human brain during cognitive development in adolescence.[2] Major research areas in neuroscience are empathy, social cognition, and the theory of mind (ToM), where empathy enables adolescents the share others' emotions and may result in an empathetic understanding of society. Theory of mind (ToM) provides a cognitive understanding of others' thoughts or intentions.[3] A better understanding of the adolescent period and its specific features in terms of social cognition and its major component, empathy, has profound implications for protecting and preventing social cognitive impairments in the future.[4]

This review analyses the role of affective and cognitive empathy in developing social cognition among adolescents within the context of adolescent neurocognitive development. Social cognition includes four areas of development in adolescence.[5] They are:

1. Cognitive ToM
2. Affective ToM

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3. Interpersonal understanding of social norms
4. Intrapersonal understanding of social norms.

The development of empathetic behavior in adolescents will act as a pre-condition for creating good interpersonal relationships, which is essential in an individual's social competence.

1.1. Social Cognition and adolescence

The adolescent period is characterized by understanding social relationships. MRI studies prove that there is considerable structural development takes place in the brain during adolescence. Few brain regions responsible for social cognition, including parts of the prefrontal, parietal, and superior temporal cortex, undergo the most pronounced change.[6] Cognition is at the core of human effectiveness. It is the process of utilizing, obtaining, and organizing information from the brain. Cognitive science in recent years has focused on information processing, action control, and schemata. The primary focus of social cognition is the mental process involved during interpersonal, intrapersonal, cognitive, and affective empathy; it may be explained as the capacity to act wisely in social situations.[7] Previous research in normal adolescent populations proved that social cognition plays a vital role in communicating effectively during social interaction.[8]

Interaction between infancy and childhood typically occurs within the family or in quasi-familiar environments like a playground, primary and secondary schools, etc. The global social network of adolescents develops when the individual obtains behavioral and emotional autonomy primarily from family and then from the society where they live.[9] Various studies on social cognition among adolescents are concerned with the higher-order cognitive processes that help people identify and interpret the behaviors of others.[6] Cognitive abilities make adolescents capable of processing and understanding social information to respond appropriately in everyday actions.[10] Thus, it is clear that the social cognition of an individual during adolescence deals in increasingly complex ways with various contexts:

1. One's mental status
2. Others who are close to them.
3. Strangers.
4. Organizations and other groups

Social cognition requires intertwining with other "cognitive functions" like identifying and recognizing emotions, understanding others' plans and organizing theirs, developing cognitive and emotional empathy, appropriately managing social cognitive skills, etc.[5]

1.2. Need and significance of the study

Since empathy is a fundamental component of social cognition among adolescents, this study helps to work on the neural and psychological implications of promoting empathy and related abilities. Empathy is a sophisticated aspect in adolescents, and studies on this aspect will help to understand the cognitive and affective or emotional aspects of it in a detailed way.

Primarily this study contributes to reviewing a few fMRI studies to prove that there is a typical neural influence in the process of affective and cognitive empathy in adolescent development. Secondly, few studies present the role of social and cognitive supports that modulate the process of social cognition to develop empathetic attitudes. The third and most important significance of the study is that it explains the research question of whether empathy is an indispensable factor in the social cognitive process.

2. Research Questions

The requisite of the social cognitive process for cognitive and emotional empathy has inspired the research question: Is emotional and cognitive empathy a primary factor in developing social cognition among adolescents? What is the role of the brain in processing empathy which may enhance social cognitive skills among adolescents? In addition, age is a primary factor in the development of emotional and cognitive empathy in Adolescents since it is presumed that both occur during the same period in adolescence.[11] This element prompts the examination of social cognition through an additional research question: Must adolescents develop cognitive and affective empathy to perceive these dynamics through social cognition? In other words, is it necessary for adolescents to be able to create emotional and cognitive empathy through social cognition?.

3. Research Methodology

This article will try to answer the above research questions by referring to multiple databases, including Google Scholar, JStore, ProQuest, EbscoHost, and Sodhganga. It uses the keywords 'social cognition, the theory of mind (ToM), cognitive, and emotional empathy among adolescents. From these multiple databases, articles exploring empathy (cognitive and emotional) and social cognition were collected and analyzed for the article. Archival techniques are used in this research article, which includes the grounds established through existing studies.

This research article is Quantitative and qualitative since it is based on the method applied in the relevant studies, including both quantitative and qualitative studies.[12] The data-related information provided here is from an empirical analysis of existing studies based on the instrumentation applied. Also, it consisted of examinations and observations conducted in the referenced studies.[13]

The method used in the research procedure will be determined by the methods indicated in the necessary research materials. The analysis and interpretation of the collected data will use the techniques performed in the context of the studies tested. Finally, the conclusion will be presented based on the detailed information given in the compiled details representing essential knowledge content based on the available references. One significant advantage of archival research is that if there is a rich availability of the research, this type of design encourages researchers to incorporate as wide or narrow and little or as much their focus on what they are trying to prove or determine.[14]

3.1. Illuminating the concept of social cognition during adolescence

The biological, cognitive, and social changes in adolescence may be the reason that leads to new social interaction and increased concern for others. In this context, social cognition refers to the various social and psychological processes enabling adolescents to experience the advantage of being part of a social group or society. Adolescents' social cognition aims to provide impersonal, process-oriented explanations of complex cognitive and social phenomena.[15] Recognition of emotions from facial expressions is one of the significant areas of social cognition investigated during adolescence.[16] Developing executive functions during adolescence is a necessary change that must be taken care of in social cognition. Executive functioning is the process of the brain that is responsible for developing empathy, emotional regulation, and general abstract thinking among adolescents.[17] Several fMRI studies in adolescents have shown that social cognitive skills of executive functioning let adolescents be more empathetic and notice others in action, processing emotional and cognitive empathy and emotional regulation. The fundamental component of social cognition among adolescents is empathy.[18]

3.2. Cognitive and affective empathy in social cognition

Empathy and social cognition are found to be the internal and external input factors in adolescents that have an influencing effect on the development of social cognitive skills in their lives.[19]

Critical social skills in adolescence are essential to feeling concerned for others and understanding how others think they are undergoing significant changes. Social cognition among adolescents is the capacity to make sense of the world in a particular manner, primarily through processing the responses or signals they generate, or it is the capacity to understand affective and emotional aspects in themselves and others.[20] One of the essential components of social cognition is empathy, which helps us to experience the emotional states of another person. Researchers now posit that empathy is a multidirectional concept consisting of both an affective and cognitive component.[21]

Empathy is distinguished into affective/emotional and cognitive empathy.[22] Thus, empathy can be explained as a cognitive and emotional response. Researchers distinguish between cognitive and emotional empathy.[23] While emotional empathy is sharing others' emotions and feeling distressed in response to someone's pain, Cognitive empathy, also known as empathic accuracy, refers to how well an individual can identify, process, and interpret the emotions of another individual. This involves more specific and complete knowledge about what other individuals think, including how the person experiences.[24] It is understood that cognitive empathy is more like a skill: Adolescents learn to identify and understand the emotional states of others to process their emotions about their social contexts. In cognitive empathy, an individual understands what others' emotions and thoughts might be without being emotionally involved.[25]

Cognitive empathy arises from the brain region of the medial prefrontal cortex, which develops later through adolescence. There is a connection between children's affective empathy, which can predict their cognitive empathy level as adolescents.[26] Empathy is based on the cognitive component, which means taking into account the view of others and the ability of adolescents to view the circumstances from a third perspective by taking into account their perspective and that of others.

Affective or emotional empathy is the ability of an adolescent to experience what it feels like for another person to experience a particular emotion.[27] Emotional or affective empathy is a kind of emotional response that develops in grasping, understanding, and sensing the emotional wanting of the other individual and also the feelings similar to those of the others and those expected to be felt. This is an essential social cognitive skill that permits adolescents to identify and experience others' points of view. Emotional empathy is inevitable in developing social cognitive skills, including social understanding and positive adolescent social behaviors.[28] Impulses for affective or emotional empathy originate from the limbic region of the brain, which also regulates emotional responses. Adolescents learn to identify and practice empathy by experiencing themselves, watching their parents, and being well-treated by elders or adults.[29]

Generally, it is understood that empathy requires both cognition and emotion. The research underscores that in many complex social situations, affective and cognitive empathy are collectively required to provide a sense of the world to the adolescent population. Referring to the available data on empathy in a given context, different neural networks will be co-activated with the core empathy-related network.[30]

3.3. Neural mechanisms of empathy in adolescents

Adolescence is a time of significant changes in social cognitive skills. It also has the components of empathy, the growing complexity and importance of social relationships, and improved knowledge of individuals' current emotional status.[31] Therefore, empathy can be explained in detail as an emotional experience in response to the understanding of others' emotions, encouraging the others to respond, help, act, relieve pain, or be involved in the other individual's happy experience, based on the current emotion that is perceived.[29] Empathy comprises an emotional state and a cognitive state called mentalizing.[31] Developmental psychologists emphasize that empathy develops in childhood and increases in adolescence. Since empathy is considered the fundamental factor of social cognition.[15] Researching more about cognitive and affective empathy among adolescents is crucial. They entail significant changes in one's emotional status and regulatory works.[32] Considering this a key for the study on the aspect of empathy concerning social cognition, and thus knowing the procedures that are essential in the trajectory from empathy in childhood to adolescents' empathy in the process of social cognitive development. Several studies prove that empathy is a context-dependent behavior. The development of empathy can be explained by several brain regions and systems.[33]

Adolescence is the period of learning emotional identification and regulation, and empathy follows a linear path from childhood to the period of adolescence. Few neurological research has shown that cognitive and affective empathy reflects independent processes and is regulated by different brain areas and systems.[28–31] Brain regions responsible for empathy among adolescents are the somatosensory cortex, periaqueductal grey (PAG), anterior insula (AI), and anterior cingulate cortex (ACC). Development of these brain regions is in fast mode during adolescence.[2]

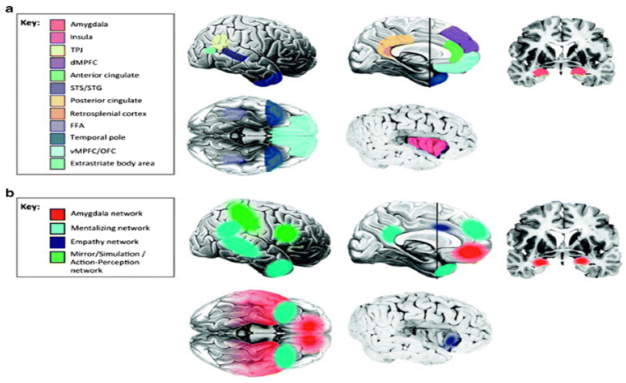

Figure 1:

Note. Structural network representing social cognition. A) Brain regions responsible for social cognition, in general, are TPJ, temporoparietal junction; dMPFC, dorsomedial prefrontal cortex; STS/STC, superior temporal sulcus or gyrus, fusiform face area; and OFC, the ventromedial prefrontal cortex. B) Networks. There are three networks in this area. The first is a network that is centered on the Amygdala, the second network is the ToM network, and the final is the Empathy network, which is highlighted in blue and reprinted from "Empathy and social cognition" by Melloni, Lopez & Ibanez,2013, Cognitive, Affective and Behavioral neurosciences, 14,407-425.(https://link.springer.com/article/10.3758/s13415-013-0205-3).

A group of distinct and interacting neurocognitive components influences the experience of empathy. According to Decety, the functional areas of the brain responsible for affective arousal are the hypothalamus, orbitofrontal cortex, and amygdala, which undergo rapid changes in emotional input among adolescents. Emotional understanding is controlled by the ventromedial prefrontal cortex (vmPFC), medial prefrontal cortex(mPFC), and temporoparietal junction (TPJ).[25]

Thus, it is clear that most neuropsychiatric conditions have significant deficits in social cognitive abilities and related domains, especially in the area of brain regions responsible for empathetic action.[33]

4. Results

The result of this research study has several implications for promoting and practicing empathy as part of their social cognitive skills development during adolescence. Adolescence can be considered the period of life between the onset of puberty and achieving autonomy and self-sufficiency.[34]

Finding evidence for the first research question put forward in this review study, it is said that in adolescence, affective and cognitive empathy has become increasingly essential as more advanced social cognitive skills develop, such as ToM, the judgment of social status, understanding social norms, etc. ToM depends on the accurate identification and interpretation of social signals from social cognitive processing.[35] Thus, it is clear that emotional and cognitive empathy are the primary factors in developing social cognition among adolescents.

5. Discussions

Cognitive and affective empathy starts to develop from childhood and mature towards the end of adolescence and continues to adulthood. Adverse training and practicing contributed to specific differences in adolescents' emerging Empathetic approach toward others in their locality[25]. It is found that stimulating the brain region, which is responsible for empathy-related skills, may improve social cognition

among individuals. Moreover, improved practices in social cognitive skills can enhance the neural activities of the empathy network.[23]

Discussing the second research question, which tries to seek the relationship between neural networks and empathy, the researcher found that changes in social brain development are responsible for the appropriate detection and growth of empathy among adolescents in a broad range of neural networks and social cognitive processes that support them. Major reviews show that neurocognitive development in adolescence has been explained by the relations between regulatory and affective-cognitive processes and their related neural circuits.[13] Maturational changes in the brain result in faster and more brain circuits which will respond more appropriately to the task related to empathy they perform. Several studies prove that adolescents approach social situations using affective and cognitive empathy, or whether it is a side effect of anatomical brain development.

Additionally, developing empathy in adolescents is vital as it encourages them to reflect, observe, and think about their behavior. It helps them to notice and name emotions and communicate them to others appropriately. The changes in grey matter in the temporal lobe is at the highest level at 16-17 years old and are related to increased intensity of empathetic responses, and increased white matter growth in adolescence might relate, among other things, with the development of social cognition and related regulatory processes.[34] This answers the third research question.

Both affective and cognitive empathy are a highly adaptive and flexible psycho-physiological process that makes adolescents develop enhanced social interaction in many different social situations. Adolescence is majorly characterized by social, cognitive, and physical development at its peak. Empathy is a primary factor in social, cognitive, and physical processes embedded in their development journey into adulthood.

5.1. Implications of the study

The development of empathy in social cognition among adolescents can predict their willingness to help others.[22] This idea can be used to develop new strategies for enhanced neural development, which is responsible for social cognition. Impairment in the area of the Somatosensory cortex, which is responsible for empathy among adolescents, may lead to exhibiting lower levels of affective and cognitive empathy and also tend to be more selfish and self-centered.[16] This study supports paying more attention to the treatment pharmacological and psycho-therapeutic approach to encourage cultivating empathy ability in adolescents for a good foundation for a future life with good social cognitive abilities. Adolescents need social and psychological support in the development of empathy to have a proper understanding of the theory of mind and social norms.

5.2. Future research

In future research, it must be possible to identify whether the progress in empathy toward adolescence may positively help to build social cognitive skills just as ToM skills, and also the understanding of social norms, etc. A typical training program on social cognitive skills will help the adolescent obtain enhanced psychological well-being and increased empathy as well. The quantitative approach will also significantly help in finding the degree of relationship between empathy and social cognition.

6. Conclusion

This study contributes primarily to understanding the trajectory of cognitive and affective empathy in adolescence and highlights how it becomes part of social cognitive development during adolescence.

Overall, research indicates that young offenders have more significant difficulties in both cognitive and affective empathy.[23–26] Therefore, when we answer the first question in the current study, emotional and cognitive empathy can be one of the primary factors in the development of social cognition among adolescents. Adolescent empathy failures may reflect executive dysfunction.[34,35] This element is demonstrated in adolescents, who found that they can conceptualize their emotions related to their social cognitive abilities.

When examined in this context, since both cognitive and emotional/affective empathy in social cognition in adolescents, age is considered as another factor because of the tremendous changes that happen in the period of adolescence in social and cognitive development.[4] This idea resolves the second and third questions put forward in the initial stage of this research that neural mechanism has a significant role in processing. To develop emotional and affective empathy, adolescents must develop social cognitive skills through appropriate social brain development. However, this study has a few limitations since the determinations rely upon existing empirical data. New research can be conducted using adolescent subjects and empathy assessment tests to prove the assertions made in the current study.

This study validates previous studies whereby empathy predicts accurate emotional expressions and variations in the brain in adolescence have a positive influence on the development of social cognition. Literature proves that empathy has a significant role in social cognitive functioning during adolescence. This indicates implications for interventions to promote empathy and psychological well-being, highlighting the need to increasingly train adolescents to be attentive in identifying emotions of themselves and others and practice it in their daily lives.

7. Conflict of Interest

Hereby I announce that no conflict of interest is associated with the materials presented in this paper.

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