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Empathy and Altruistic Behavior: Psychological Mechanisms, Boundary Conditions, and Future Directions

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Abstract. Understanding the link between empathy and altruism in adolescents is crucial for promoting their social and moral development. This review examines the relationship between empathy and altruistic behavior among high school students. Generally, empathy is positively correlated with altruistic behavior because it allows individuals to understand and share others' emotions, which can trigger helping responses. While empathy is often seen as a motivator for helping others, this relationship is not fully understood in the complex context of adolescence. The paper explores core mechanisms like mirror neurons and the ventral striatum, which underpin the empathy-altruism link. It also discusses how different types of empathy, namely affective and cognitive, contribute differently to promoting altruism. This paper focus on the boundary conditions of the link between empathy and altruistic behavior, as their correlation is dual-sided. Mediating factors such as neuroticism plays a partial role in the relationship between empathy and altruistic behavior. The findings highlight the nuanced nature of this relationship, suggesting that personality factors must be considered alongside empathy levels. Understanding these interactions is crucial for developing effective strategies to foster genuine altruistic behavior in adolescents.

Keywords: Empathy, Altruistic Behavior, Psychological Mechanism, Boundary Condition.

1. Introduction

In recent years, cultivating adolescent social-emotional skills has become a key focus in psychological research. Among these, the development of altruistic behavior and empathy has garnered particularly widespread attention. As core components of social emotions, altruism and empathy serve not only as psychological foundations for interpersonal interactions but also as key factors in building positive social relationships and promoting collective well-being. In this context, in-depth exploration of the intrinsic mechanisms and boundary conditions between empathy and altruistic behavior holds significant theoretical and practical importance for understanding adolescents' social development.

Altruistic behavior refers to voluntary actions aimed at enhancing another's well-being, typically undertaken without expectation of external rewards like material gain or social approval, and often involving costs such as time, resources, or assuming risks. Its core characteristic is its other-oriented motivation [1]. Empathy refers to an individual's ability to perceive another's emotions while attempting to understand that emotional experience from their perspective. This process involves

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equal sharing and communication based on mutual respect [2]. For individuals, empathy is a crucial indicator of moral development and a foundation for building positive interpersonal relationships. For society, empathy is a prerequisite for strengthening emotional bonds and establishing a harmonious community. To thrive in society, adolescents must develop various competencies aligned with social development, among which empathy is essential [3]. Moreover, fostering empathy can help adolescents realize their personal value in later life [4]. Adolescence is a critical period of physical and psychological development, where worldviews and values form and solidify, alongside rapid growth in cognitive abilities and self-awareness. Existing research generally shows a significant positive correlation between altruistic behavior and empathy [5].

However, this relationship is not straightforward and may be moderated by certain psychological factors such as neuroticism and moral disengagement, thereby presenting a dual-sided nature. Neuroticism, a personality trait characterized by emotional instability and a tendency to experience negative emotions, may inhibit the expression of empathy or lead to self-focused distress rather than other-oriented concern. Moral disengagement refers to a set of cognitive mechanisms through which individuals rationalize harmful behavior toward others by distancing themselves from their own moral standards, thereby attenuating the link between empathetic feelings and subsequent altruistic actions. Therefore, this paper integrates empirical research and academic literature to explore the developmental patterns of adolescent empathy, the relationships between empathy and altruistic behavior, and to reveal the complexity and boundary conditions of the empathy-altruism link.

2. Developmental patterns of adolescent empathy

High school is a critical period of intense physical and psychological change. Students' physiological development matures, but their psychological development often lags, particularly in emotional, moral, and social domains, indicating a significant imbalance between physical and psychological growth [6]. This developmental asynchrony may significantly influence the formation and expression of empathy.

To better capture its multidimensional nature, empathy is generally categorized into affective empathy, cognitive empathy, and mixed empathy. Cognitive empathy emphasizes intellectual processes for understanding another's experience, such as perspective-taking, critical thinking, or reasoning. For example, a doctor might infer a patient's feelings by observing them and comparing possible reactions to their own, without necessarily experiencing emotional contagion. Affective empathy primarily emphasizes empathy as an emotional experience or sharing, directly understanding another's emotional state through emotional contagion or resonance [7].

When adolescents process emotional cues related to others, brain regions associated with socio-emotional processing, like the medial prefrontal cortex and left temporal pole, show higher activation [8]. Consequently, cognitive empathy develops relatively steadily during adolescence and adulthood, while affective empathy tends to decline before adolescence, rising gradually during adulthood, showing a U-shaped developmental trajectory [9].

3. Empathy as a core driver of altruistic behavior

3.1. Mirror Neurons

Mirror Neurons and the Ventral Striatum as Neural Bases for Empathy and Altruism. Mirror neurons are a specialized type of sensorimotor neuron in the cerebral cortex [10]. The matching function of mirror neurons, linking action execution and observation, supports embodied simulation theory [11].

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Mirror neurons facilitate this "mapping" function (using our own actions to understand others), building a "neural bridge" for communication, sharing conscious experiences and emotional feelings, making empathy possible.

The ventral striatum is a key component of the brain's reward system, involved in processing reward and motivation [12]. The striatum plays a crucial role in computing value in social behaviors, such as predicting and learning from social rewards [13]. The pursuit of social acceptance and belonging is a fundamental motive for caring about others' needs and can stimulate altruistic behavior [14]. These social rewards, such as feeling accepted by others, would create a positive feeling that reinforces helpful behavior. Therefore, when empathy motivates a person to help someone else, the potential for social acceptance acts as an internal reward. This reward encourages future altruistic actions. In this way, the brain's empathy networks and reward systems work together to support sustained prosocial behavior.

3.2. Psychological motivational mechanisms

The psychological motivational mechanisms of empathy-driven altruistic behavior can be explained through multiple theoretical frameworks. Self-Determination Theory suggests that fundamental human psychological needs include maintaining positive interpersonal relationships. When individuals empathize with others' emotional states, they are more inclined to consider others' interests, thereby significantly enhancing their prosocial motivation [15,16]. At the same time, the Social Responsibility Norm theory emphasizes that existing social and moral norms are key factors driving altruistic behavior. Prosocial motivation involves adherence to these social norms and is thus likely to substantially influence altruism [17]. This indicates that empathy may promote altruistic behavior by stimulating prosocial motivation [17].

From a motivational process perspective, empathy enables individuals not only to perceive others' distress but also to generate a need to reduce their own negative arousal, which can be fulfilled through helping behavior. Hence, empathy itself serves as an intrinsic motivational factor for prosocial and altruistic actions. Altruistic behavior fully manifests only when cognitive ability, behavioral intention, and motivation interact [18]. Furthermore, human empathy-driven altruism is not limited to kinship; its sustainability is supported both by intrinsic rewards from the dopamine system and by positive reinforcement through external social feedback [19].

At a deeper psychological level, individuals' sense of self-worth and meaning in life is often realized through relationships with "others." Self-esteem is largely built upon recognition from others. Therefore, from an individual's perspective, "altruism" reflects the value and meaning of human existence. Altruistic behavior is not only a response to social role expectations but also a moralized need [20], forming the intrinsic psychological motivation behind altruism.

It is worth noting that empathy-induced altruism may also involve self-oriented motivations. According to the Negative-State Relief Model, witnessing others' suffering can trigger two types of responses: if the helping behavior aims to alleviate one's own anxiety, it is egoistically motivated altruism; if the core motivation is to relieve others' suffering, it more closely resembles pure altruism [21]. This suggests that emotional arousal triggered by empathy may also lead to altruistic behavior out of a need for self-regulation, such as reducing personal discomfort.

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4. Complexity and boundary conditions of the empathy-altruism link

4.1. Differential mechnisms of empathy types

Adolescents with higher levels of affective empathy often exhibit stronger altruistic motivation. When noticing others in adverse situations, these adolescents are more likely to adhere to moral standards and take corresponding helping measures, rather than choosing indifferent avoidance.

Teens with higher cognitive empathy also demonstrate considerable altruistic motivation, though through a different mechanism. In this case, cognitive empathy significantly reduces their moral disengagement, producing a facilitative effect that leads to more altruistic behavior [22]. Moral disengagement means people find excuses to avoid helping others, like thinking the victim deserves it. Cognitive empathy reduces this by helping teens understand others' feelings and see things from their point of view, making it harder to ignore their needs.

In conclusion, affective empathy primarily drives the willingness to help directly through emotional contagion and shared feelings. Cognitive empathy, on the other hand, inhibits moral disengagement by fostering an understanding of others' situations and perspective-taking, thereby promoting altruistic behavior.

4.2. The moderating role of key personality trait: neuroticism

Altruistic behavior and empathy show a significant positive correlation [5], yet their relationship exhibits a dual nature due to the mediating variable—neuroticism. It plays a partial mediating role between empathy and altruistic behavior, leading to a bidirectional effect: higher empathy does not necessarily lead to more altruistic behavior.when an individual's level of empathy increases, if their neuroticism is also high, their altruistic behavior may instead decrease.

Neuroticism is an important personality trait characterized by emotional instability, anxiety, sensitivity, and a tendency to experience negative emotions [23]. individuals with high empathy often also exhibit certain neurotic tendencies. Associated traits such as emotional instability and high sensitivity make them more prone to emotional distress. This heightened emotional sensitivity may impair their ability to effectively regulate negative emotions arising from empathy, leading them to prioritize managing their own emotional burdens. Until they adequately address their emotional difficulties, it becomes challenging for them to exhibit altruistic behavior effectively.

These mediation results suggest that the influence of empathy on altruistic behavior resembles a double-edged sword. On one side, the direct effect shows that as empathy increases, so does altruistic behavior. On the other side, the mediating role of neuroticism implies that higher empathy may lead to stronger neurotic traits, which in turn reduce altruistic behavior. Therefore, this study reveals a bidirectional complexity in the relationship between empathy and altruistic behavior. The positive aspect is that empathy can directly promote altruism; the negative aspect is that for individuals with high levels of neuroticism, increased empathy does not necessarily lead to more altruistic behavior and may even suppress it due to emotional overwhelm. Previous studies have largely emphasized the positive effects of empathy on altruism while overlooking the reduction in altruistic behavior that can occur through the mediating role of neuroticism [23].

5. Conclusion

This review finds that empathy significantly promotes altruistic behavior with neuroticism playing a partial mediating role. Empathy is also a core driver of altruism; adolescents with higher affective

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empathy often have stronger altruistic motivation. Furthermore, the relationship between empathy and altruistic behavior is not a simple positive or negative correlation but is dual-sided: one side shows more empathy leads to more altruism; the other shows increased empathy can lead to more neurotic traits, which instead reduces altruistic behavior. These findings highlight the importance of considering personality factors, such as neuroticism, when studying prosocial behaviors. The review also identifies neural mechanisms, including mirror neurons and the ventral striatum, as foundational to the empathy-altruism link. Additionally, the distinction between affective and cognitive empathy provides further insight into how different empathy types contribute to altruism through separate pathways. Understanding these complex interactions is crucial for developing effective interventions aimed at fostering altruistic behavior among adolescents. Most current empathy research is based on Western texts. Future studies could compare different cultural values and expand cross-cultural research. Such cross-cultural studies would help clarify the universal and culture-specific aspects of empathy and altruism. This could ultimately lead to more culturally adaptive approaches in social-emotional education and mental health practices.

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