Factors Influencing Emotional Intelligence in Adolescents: A Comprehensive Review Across Personality, Brain, and Environment

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I. Abstract

Emotional Intelligence (EI), the ability to perceive, understand, manage, and regulate emotions, plays a vital role in adolescent development, formulating academic achievement, interpersonal relationships, as well as mental health. This literature review analyzes many factors influencing EI in adolescents, underscoring the connection of gender and developmental components. Personality traits within the five-factor model, especially extraversion, agreeableness, and neuroticism, are shown to correlate strongly with EI, influencing emotional regulation and expressivity. Neural and cognitive research studies have emphasized the inclusion of the prefrontal cortex, amygdala, and anterior cingulate cortex in emotion processing and regulation, showing gender-specific patterns of activation connected to hormonal and developmental differences. Behavioral and socialization processes, guided by cultural expectations, further change emotional expression between boys and girls, with females showing greater levels of empathy and internalization of emotions, while males display greater external regulation and problem-solving tendencies. Environmental and socioeconomic status factors, such as family, emotional climate, school context, and socioeconomic status, also contribute to greater EI development, often limiting gender differences. Connecting these findings through Bronfenbrenner's bioecological model emphasizes that EI branches from continuous interactions between individual traits and influences across developmental systems. This assessment highlights the necessity for gender-responsive and culturally informed emotional education programs to promote balanced EI growth during the adolescent stage. Future research should include longitudinal and cross-cultural designs to better encapsulate how personality, neurobiology, and environment are connected and shape EI over time.

II. Introduction

Emotional Intelligence (EI) is the ability to perceive, understand, manage, and use emotions in oneself and interact with others [1]. First worked by John D. Mayer and Peter Salovey, and later advanced by Daniel Goleman, EI includes key components such as emotional awareness, emotional regulation, empathy, and interpersonal skills [2]. Adolescence portrays a crucial developmental period where cognitive, emotional, and social changes interweave with identity development and interpersonal relationships [3]. EI during this developmental period plays a significant role in forming academic accomplishments, peer relationships, and mental health effects [4].

This literature review dives into the comprehensive factors that influence EI in adolescents with a major emphasis on the convergence of gender and developmental components. Specifically, this paper analyzes the roles of personality traits, neural and cognitive correlates of EI, behavioral and social contributions to EI, and environmental and socioeconomic influences on the development of EI. Moreover, it investigates how these influences vary across gender, addressing biological and psychological differences in emotional development.

III. Personality Traits and Emotional Intelligence in Adolescents

Personality traits, especially those in the five-factor model–extraversion, agreeableness, openness to experience, conscientiousness, and neuroticism–have a strong relationship with emotional intelligence [5,6]. Extraversion has been positively correlated with emotional expressivity and social engagement, as well as emotional sensitivity [7]. Neuroticism, however,

is negatively correlated with emotional regulation, leading to higher emotional reactivity and lower EI results [8].

Petrides et al. conducted a study illustrating that trait EI is immersed within personality structure, demonstrating high correlations with extraversion and agreeableness and a significant negative correlation with neuroticism [9]. Facilitation of thought, one of the four branches of EI, also lines up with openness to experience, permitting adolescents to utilize emotions to prioritize thinking and reasoning, prompting decision-making [10].

Gender differences are clearly seen in personality expression and its influence on EI. Research has shown that adolescent girls typically score higher on agreeableness and neuroticism than boys, yet boys may score higher on traits like openness and extraversion based on the cultural context [11]. These distinctions account in part for observed gender disparities in EI levels, with females generally exceeding males in empathy and interpersonal functioning [12]. More importantly, socialization patterns– where girls are urged to express and regulate emotions– reemphasize these trait-based distinctions and emphasize the need for gender-specific EI assessments [13].

IV. Neural and Cognitive Correlates of Emotional Intelligence

The neural foundation of emotional intelligence has accumulated significant attention in adolescent research. Important brain structures in EI include the prefrontal cortex (PFC), which regulates higher-order cognitive functions such as decision-making and regulation; the amygdala, which controls emotional reactivity; and the anterior cingulate cortex (ACC), which plays a crucial role in emotional awareness and error detection [14,15,16]. Adolescents with higher emotional intelligence display increased activation in the medical PFC and stronger connectivity between the amygdala and regulatory regions of the brain, facilitating improved emotional control.

Kilgore et al. found that high-EI adolescents show enhanced neural efficiency, with lower amygdala reactivity and increased cerebellar and occipital lobe activation when processing emotional stimuli [17]. These findings highlight that emotional information processing is distributed over both emotional and visual-spatial brain regions.

Gender differences in neural correlates of EI have also been researched. Girls tend to display earlier maturation in the PFC and more significant, strong connections between emotion-related areas like the insula and the ACC [18]. Boys, in comparison, often show greater activity in motor and visuospatial processing areas, potentially illustrating different strategies in emotional appraisal [19]. Hormonal influences, like estrogen and testosterone, further regulate neural circuitry and can provide some explanation for the variance in EI expression across genders [20].

V. Behavioral and Social Contributions to Emotional Intelligence

Behavioral and social factors are crucial to comprehending how adolescents obtain and refine EI over time [21]. Emotional expression and regulation are among the earliest observable parts of EI that can differ across gender [22]. Research has shown that girls are a lot more emotionally expressive, specifically with internalizing emotions like sadness and anxiety, while boys, on the other hand, constantly express externalizing emotions like anger and frustration [23]. These trends are partially influenced by social expectations and reinforcement from caregivers, teachers, and peers [24].

The social learning theory proposes that adolescents model emotional behaviors based on the reactions they see in their own environments [25]. Girls are consistently rewarded for emotional openness and caretaking actions, while boys may be rewarded for emotional stoicism and self-reliance [26]. This branching leads to different assets in EI: girls typically score higher in empathy and emotional awareness, whilst boys often show greater confidence in emotional problem-solving, though not always significant skill [27].

Peer relationships and interactions play a crucial role in honing these emotional habits [28]. Co-rumination, a social process where two or more people repeatedly talk and dwell on negative thoughts, feelings, and experiences with one another, is more common in female friendships and contributes to intense emotional articulation, although with a risk of elevated internalizing symptoms [29]. Boys, however, are more likely to be involved in group-based competitive interactions, which may not encourage the same level of emotional dialogue but can elevate regulation through performance-driven emotional regulation [30].

To add on, exposure to emotionally supportive environments, such as nurturing peer groups or types of mentorship programs, can bolster EI no matter of gender [31]. Peer exclusion, bullying, and victimization have been shown to hamper the development of emotional competencies, specifically among boys who lack emotional outlets to vent about their distress [32]. Interventions that form emotionally validating spaces, specifically for male adolescents, can prevent this developmental gap and promote more balanced EI profiles [33].

All in all, these behavioral and social factors do not operate alone but interact with personality, cognition, and environmental structures to develop EI across adolescents.

VI. Environmental and Socioeconomic Influences on EI

Environmental conditions, such as family dynamics, school settings, and broader socioeconomic status (SES), are very significant in EI development [34]. Adolescents from higher SES backgrounds usually have greater access to emotionally nurtured experiences, such as quality education, extracurricular activities, and encouraged parental support for emotional expression [35]. On the other hand, low-SES adolescents may experience long-term stress, inconsistent and harsh parenting, and limited access to emotional education resources, which all of these factors prevent EI development [36].

Parental education and emotional modeling play very instrumental roles. Parents who provide effective emotion regulation and utilize emotionally rich language are able to provide an environment that nurtures children's emotional growth [37]. To add on, structured social-emotional learning (SEL) programs in schools have displayed strong positive results on emotional competence, especially when adapted to account for gender differences in various learning styles [38].

The quality of school climate, including teacher responsiveness, emotional safety, and inclusivity, also impacts adolescent emotional development. Studies have demonstrated that schools promoting emotional literacy, peer collaboration, and culturally responsive instruction formulate better outcomes in both academic and emotional settings [39]. This effect is more emphasized in under-resourced communities where school may be the only type of consistent setting for emotional learning.

Gender again moderates these environmental influences. Girls may be more responsive to emotionally enriched home environments, while boys could potentially be more influenced by peer normalities and the school environment [40]. For instance, studies have shown that female

adolescents in high-SES families benefit from more parental involvement and open emotional discourse, while male adolescents in very similar environments may gain a lot more from structured extracurricular activities that interweave emotional regulation into performance [41].

Cross-cultural studies have further revealed that expectations around emotional expression can differ by gender and region. In collectivist societies, both boys and girls may obtain stronger emotional guidance at home, whereas in individualistic cultures, emotional development may be more reliant on external settings, such as school and peer groups. These subtle differences highlight the necessity to contextualize EI development within local gender roles, cultural practices, and educational systems [42].

When looked at holistically, environmental and socioeconomic influences strongly underscore the crucial roles of structural and cultural conditions in enabling or preventing adolescent's EI development. Comprehending these conditions is essential for formulating equal interventions that address and solve both gender and socioeconomic disparities in emotional development [43].

VII. Integration of Factors and Mechanisms

Understanding EI in adolescents needs an integrative framework that includes personality traits, neural functioning, social behaviors, and environmental context. Each of these domains interact dynamically, and their impacts are regulated by gender-specific developmental pathways [44].

Personality traits such as extraversion and neuroticism shape how adolescents are able to respond to emotional experiences. For instance, extraverted adolescents may be more open to social-emotional learning and are able to benefit from peer interaction, while those high in neuroticism may tend to struggle with regulation and need targeted interventions [45]. These tendencies are biologically reemphasized through neural circuitry: elevated amygdala reactivity in emotionally sensitive adolescents may be amplified depending on the environmental stimuli such as parental support or stress from peers.

Behavioral patterns, specifically those understood through gendered socialization, directly influence both neural development and the expression of personality-based emotional tendencies. Boys may internalize cultural norms around stoicism, which prevents emotional reactivity even when neurological sensitivity is high. Girls may express emotions more freely, which reemphasizes neural pathways that are connected to empathy and emotion recognition. These processes are reinforced in the school and home environment, developing feedback loops that promote or inhibit various components of EI [46,47].

Brofenbrenner's bioecological model is specifically useful in mapping these multi-level interactions. At the microsystem level, peer and family interactions can provide emotional modeling. At the exosystem and macrosystem levels, societal expectations and cultural gender norms are able to guide which emotions are socially acceptable to express and how emotional competence is praised and rewarded. All levels are interwoven and evolve as adolescents mature in age [48,49,50].

This view illustrates that no single factor can account for all the differences in EI across adolescents. Instead, EI is an emergent trait, which is developed through the continuous interaction of internal and external influences. Gender, in this specific mode, can act as both a biological characteristic and a socially constructed filter through which emotional development is formed.

VIII. Conclusion and Implications

This literature review analyzed how EI in adolescents is impacted by personality traits, neural functioning, behavior socialization, and environmental context, with a targeted focus on gender differences. Research has shown that girls tend to score higher on emotional awareness and empathy, yet boys often would score higher in emotional problem-solving but could lack emotional support pillars.

These distinctions emphasize the significance of creating gender-responsive , culturally aware emotional education programs. Future research should provide more longitudinal and cross-cultural studies to encompass how EI is able to change and adapt over time and how gendered expectations affect its development.

By understanding and accounting for these diverse influences, educators and clinicians are able to improve support and care for adolescent emotional growth across a diverse range of backgrounds.

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