

◆ Editorial

Strengthening social connectedness and neurocognitive development through family bonding

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Abstract

Human psychological development is built upon other maturing features. It is well established in the literature that neurocognitive development relies on neurological maturation. Similarly, emergent research has highlighted the relevance of social features for neurocognitive development. Family factors have been increasingly remarked as direct contributors for neuropsychological maturation dynamics in childhood and adolescence. This relationship becomes more evident when the young person is at a disadvantage. Family bonding has been proposed to be a crucial factor for the development of social connectedness. Gaps on parental care are reflected in less school participation and slower neurocognitive development. Thus, parental styles are informative of the trajectory of neurocognitive development and social connectedness, both highly relevant for life satisfaction. By reaching an integrated understanding of these topics, health and education professionals will be better equipped to identify and reverse temporary neuropsychological difficulties. In this sense, family emerges as a key collaborator towards strengthening social connectedness and neurocognitive development.

Introduction

Human psychological development occurs founded on other maturing features. Classical theorists coincide that the satisfaction of maturation biological needs matches the fulfillment of psychological needs (Bowlby, 1969; Freud, 2017). Other influential scholars agree that evolutionarily acquired

movements are the basis for the emergence of cognition (Piaget, 1976; Wallon, 1934). Expanding the analysis to social features, authors such as Kurt Lewin (1936) and Vygotsky (2012) represent psychological development as a gradual expansion on the boundaries of one's skills. Unified, the theoretical framework in developmental psychology considers shared dynamics of development in motor, cognitive, emotional, and social domains.

It is well established in the literature that neurocognitive development relies on neurological maturation. Those common developmental patterns across different biopsychosocial aspects have been highlighted by current developmental neuroscience. The optimizing reorganization of brain gyri, neurotransmitter systems, and networks during adolescence is the basis for the reorganization of cognitive functioning (e.g., Vijayakumar et al., 2018). It occurs through the refined implementation of strategies, reaching adult levels and patterns (Friedman et al., 2016; Mota, 2016). Referring to neuropsychological aspects, an equivalence between cognitive, emotional, and prosocial self-regulatory processes has also been proposed (Echelbarger and Epley, 2023; Mota et al., 2017).

Similarly, emergent research has highlighted the relevance of social features for neurocognitive development. Family factors have been increasingly recognized as direct contributors to the neuropsychological maturation dynamics in childhood and adolescence. This relationship becomes more evident when the young person is at a disadvantage. Thus, literature shows that positive parental styles are protective against developmental vulnerabilities.

Cohesive and expressive families moderate the pre-adoption adversity on cognitive and behavioral development among toddlers (Keil et al., 2022). In economically disadvantaged families, nurturing and tolerance have been associated with higher executive functions in children (Jung et al., 2018). In conditions of poverty, family support (including encouragement, involvement, and communication) during adolescence has been shown to prevent reduced brain network connectivity in young adults (Brody et al., 2019). Indeed, children and adolescents with adverse family experiences—like negative parental practices, family instability, childhood trauma, and parental history of depression or alcohol problems—have shown more externalizing disadaptive behaviors or reduced neurocognitive performance (Cullen et al., 2023; Dick et al., 2021; Jeon and Bae, 2022; Jung et al., 2018; Keil et al., 2022; Yang and Jiang, 2023; Yu et al., 2024).

Moving forward, family bonding has been proposed to be a crucial factor for the development of social connectedness. From classic authors (Bowlby, 1969; Freud, 2017) to recent researchers, there is indication of differences in social connectedness, mediated by the course of the development of affect, along family interactions. For example, the differential impact of family attachment patterns can be observed in school adaptation across cultures. Parental trust has been positively associated with school adaptation among Japanese preadolescents and adolescents (Sugimura et al., 2020). For Spanish adolescents with developmental language disorders, family involvement has emerged as a protective factor for school adaptation (Valera-Pozo et al., 2020). However, studies claim that fragile family bonding manifests in the school environment as prolonged adaptation. Spanish mothers with reduced sense of parent competence are associated with their offspring's reduced school adaptation in adolescence, but not in childhood (Jiménez et al., 2009).

Those gaps on parental care are reflected in less school participation and slower neurocognitive development. American kids neglected by their families showed reduced school participation, as well

as lower academic performance, during kindergarten and first grade (Manly et al., 2013). Parental emotional separation has been associated with less learning review and homework done among Japanese preadolescents and adolescents (Sugimura et al., 2020). Perceived parental rejection has predicted lower self-esteem, which predicted lower academic achievements among Chinese adolescents (Lan and Wang, 2023). Moreover, children exposed to family patterns of psychological violence reduce their responsiveness at school. Among low-income children, American maltreated children show lower levels of interaction and fewer interpersonal skills in social contexts compared to non-maltreated children. (Fantuzzo et al., 1998). Interestingly, Chinese parents who have been exposed to maltreatment during childhood also impact differentially on their offspring's school adaptation (Zhang et al., 2024). Altogether, these family challenges contribute for reduced social connectedness, which can last for years and even decades.

In a general approach, social connectedness has been described as social interaction, network or absence of isolation (Wickramaratne et al., 2022). When deeply established, it involves fulfilling and immersive feelings, with restricted attention to other aspects, objects, or persons in the situation (Keeler et al., 2015). Social connection is healthy when there is a balanced exchange of affect, with proper attribution of relevance, between two or more people. The resulting reciprocity or mutuality contributes to improving confidence through easy identification (social cognition, empathy) and action (compassion) regarding other individuals' feelings.

Thus, social connection is highly related to emotional wellbeing, providing synchronized affect (Cheong et al., 2023). It also brings self-efficacy and positive expectations towards novel interactions, expanding boundaries in a comfortable way. Social connection, along with self-esteem and prosocial behaviors, has been a protective factor for American adolescents during social isolation (Preston and Rew, 2022).

Neurologically, social connection processes rely on reward and social cognition brain systems, involving the medial frontal corticosubcortical areas (Delgado et al., 2023). They are proposed to be boosted by rhythm (Fiveash et al., 2023), as well as to exert influence on brain development (Lamblin et al., 2017). In conclusion, social connectedness contributes to the neurological, cognitive and affective development. When socially connected, individuals experience a sense of belongingness, which enhances their interest in sharing (Delgado et al., 2023). These circumstances, highly influenced by secure family bonding, consolidate a proper context for the stimulation of neurocognitive abilities and the optimization of emotional wellbeing.

Therefore, a novel perspective on human neuropsychological development, coherent with previous theoretical contributions, should simultaneously consider the relevance of both interpersonal and neurological aspects for healthy cognitive, emotional, and social development. Among the interpersonal experiences, parental styles inform the trajectory of neurocognitive development and social connectedness, both highly relevant for life satisfaction.

By reaching an integrated understanding on these topics, health and education professionals will be better equipped to identify and reverse temporary neuropsychological difficulties. In this sense, family emerges as a key collaborator towards strengthening social connectedness and neurocognitive development.

Conflicts of interest

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