



# Brain development and the attention spectrum

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Decreased attention span, hyperactivity, distractibility, and impulsivity are sensitive but non-specific brain functions and behavioral patterns. These expressions of altered functioning should be acknowledged as non-specific, rather than trying to fit them into existing diagnoses.

These abnormalities should be viewed in terms of underlying developmental processes and not as components of discrete non-overlapping disorders. The tendency to squeeze a group of symptoms into a diagnostic entity has the potential to lead to a non-accurate diagnosis, a less than successful treatment plan, and has the potential to be of little prognostic value (Berger and Nevo, 2011).

The developmental approach can provide predictions as to how characteristics associated with attention change over time, and how multiple risk and protective factors influence these temporal changes. It also has the potential to more readily anticipate associated co-morbid features and disorders (Berger and Nevo, 2011; Visser et al., 2014).

Attention Deficit Hyperactivity Disorder (ADHD) seems to be considerably more common than other diagnoses among “double-diagnoses” given to children with developmental dysfunctions. Yet the exact prevalence, neurobiological mechanisms, genetic and epigenetic modifications, diagnostic difficulties and treatment methods have not been clearly identified or quantified.

During the last years, the number of publications in this field has grown substantially, but, in part, due to the wide range of interested professionals, these studies have been published in a wide range of journals, sometimes missing some of their “target” populations.

In this research topic, we have focused on the latest research on the biological and neural pathways, as well as on psychosocial and behavioral correlates of brain development and attention spectrum. Thirty-Eight contributors representing the broad spectrum of professions involved in clinical and research aspects of attention in 11 articles, including original research, review, mini-review, and opinion articles, provided a broad scope of state-of-the-art research in order to enhance our knowledge regarding this new conceptualization of attention as a complicated spectrum.

This research topic challenges the reader to view attention in new conceptual ways, including: focusing on brain maturation delay among otherwise healthy children diagnosed with ADHD compared to their age group (Berger et al., 2013); the effects

of age and task load on attention success (Remington et al., 2014); the attentional function among children with fetal alcohol spectrum disorder (Lane et al., 2014); the differential diagnosis of sensory modulation disorder and ADHD (Yochman et al., 2013); the effects of environmental distractors on attentional performance (Cassuto et al., 2013); and the much debated effect of alpha-linolenic acid supplementation on ADHD symptoms (Dubnov-Raz et al., 2014).

This research topic also addresses innovative aspects of attention which are discussed in relation to extreme prematurity (O'Shea et al., 2013), the co-occurrence of ADHD and autism (Leitner, 2014), the limited visual orientation ability of children with autism (Landry and Parker, 2013), the possible effects of sex hormones on attentional abilities (Haimov-Kochman and Berger, 2014), and the possibility of elevating hope among ADHD children through virtual reality (Shiri et al., 2014).

We hope that this topic will provide the reader with exciting and thought provoking aspects about the mechanisms underlying attention, and pointing where this field is headed in terms of developing our understanding of the link between brain development and attention performance.

As such, this research topic seeks to serve as a useful tool for a wide range of professionals with special interest in the unusual aspects of attention in order to increase their knowledge, sensitivity and treatment methods among our patients.

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