Neuroscience and Biobehavioral Reviews 183 (2026) 106570



Contents lists available at ScienceDirect

Neuroscience and Biobehavioral Reviews

journal homepage: www.elsevier.com/locate/neubiorev





A systematic review on the association between executive function and emotional regulation in autism, ADHD, and autism/ADHD

Marta Pozo-Rodríguez [a,1], Sara Cruz [b,1], Sabela Conde-Pumpido-Zubizarreta [a], Angel Carracedo [a,d,e,f], María Tubío-Fungueiriño [a,c,d,2], Montse Fernández-Prieto [a,c,d,f,2,*]

[a] Genomics and Bioinformatics Group, Center for Research in Molecular Medicine and Chronic Diseases (CiMUS), University of Santiago de Compostela (USC), Santiago de Compostela, Spain
[b] William James Center for Research, Department of Education and Psychology, University of Aveiro, Aveiro, Portugal
[c] Fundación Pública Galega Instituto de Investigación Sanitaria de Santiago de Compostela (FIDIS), Santiago de Compostela, Spain
[d] Genetics Group, Instituto de Investigación Sanitaria de Santiago (IDIS), Santiago de Compostela, Spain
[e] Fundación Pública Galega de Medicina Xenómica, Servicio Galego de Saúde (SERGAS), Santiago de Compostela, Spain
[f] Centro de Investigación Biomédica en Red de Enfermedades Raras (CIBERER), Instituto de Salud Carlos III, Madrid, Spain

ARTICLE INFO

Keywords:
Neurodevelopment
ASD
ADHD
Emotion regulation
Executive function
Transdiagnostic

ABSTRACT

Executive function (EF) and emotion regulation (ER) have been proposed as transdiagnostic factors that contribute to the socio-emotional and behavioural difficulties observed in neurodevelopmental disorders, particularly autism and attention deficit/hyperactivity disorder (ADHD). Investigating potential differences in the association between EF and ER in autism, ADHD and autism/ADHD co-occurrence could be an important avenue to inform possible differential diagnosis. In this study, we present a systematic review examining the associations between EF and ER in autism, ADHD, and autism/ADHD. PubMed, Web of Science, PsycInfo, and Scopus datasets were searched for empirical articles, published between January 2013 and October 2024. Twenty-two articles were included. Of these, four analysed the relationship between EF and ER in autism, 16 in ADHD and two in autism/ADHD, demonstrating a clear focus on the study of these dimensions in ADHD over the past decade. Although age (i.e., children versus adults) and methodological (i.e., task-based versus report-based measures) differences may contribute to the variability of findings, the overall evidence suggests an association between EF difficulties and emotional dysregulation across conditions. Further research comparing autism, ADHD and autism/ADHD individuals is needed to draw clearer conclusions about how the association between EF and ER differs across these neurodevelopmental disorders, to inform more accurate diagnosis.

Neurodevelopmental Disorders (NDDs) are a group of disorders that cause cognitive, socio-emotional, and behavioural impairments (American Psychiatric Association [APA], 2022). They typically emerge during childhood but may persist across the lifespan (Nylander et al., 2013; Parenti et al., 2020; Sibley et al., 2017). The prevalence and comorbidity rates of NDDs have increased in recent years (Cleaton and Kirby, 2018), with autism spectrum disorder (ASD) and attention deficit/-hyperactivity disorder (ADHD) being the most frequently diagnosed NDDs (Hansen et al., 2018).

Autism[3] is characterised by difficulties in different areas of development, including communication and social interaction, and by a restricted and repetitive pattern of behaviours, interests, or activities, whereas ADHD is defined by altered functioning in the areas of attention, hyperactivity, and impulsivity (APA, 2022). Both are more common in boys than girls (Cruz et al., 2024; Klefsjö et al., 2021) and cause significant disruptions in daily lives and adaptive problems at school, work, or at home, given the associated behavioural and emotional disturbances (Berenguer et al., 2018). The core diagnostic symptoms of

* Correspondence to: Edificio CiMUS, P2, D3, Avda. de Barcelona, s/n, Santiago de Compostela, A Coruña 15782, Spain.
E-mail address: montse.fernandez.prieto@usc.es (M. Fernández-Prieto).

[1] Authors share first authorship
[2] Authors share last authorship
[3] To align with the preferences of the autism community, the term "autism" will be used to refer to the clinical diagnosis of ASD (Kenny et al., 2016). Similarly, identity-first language (e.g. 'autistic person') will be prioritized over person-first language (e.g. 'individuals with autism') in accordance with the community's preferences and recommendations for autism researchers (Bottema-Beutel et al., 2021).

https://doi.org/10.1016/j.neubiorev.2026.106570
Received 4 June 2025; Received in revised form 12 January 2026; Accepted 20 January 2026
Available online 22 January 2026
0149-7634/© 2026 The Author(s). Published by Elsevier Ltd. This is an open access article under the CC BY license (http://creativecommons.org/licenses/by/4.0/).

autism and ADHD do not overlap, but homotypic co-occurrence has been evidenced, as autistic individuals commonly present ADHD symptoms and vice versa (Berenguer et al., 2018; Khachadourian et al., 2023; Rong et al., 2021).

Socio-emotional difficulties manifest differently in autism and ADHD. In autism, these range from simpler forms of social interactions (e.g., joint attention) to more complex processes (e.g., establishing and maintaining friendships) as they are unable to respond to their peers (e.g., lack of social smiling), have challenges in eye contact, body language, and speech production (APA, 2022). Contrarily, social problems in ADHD result rather from rejection by their peers, as their impulsive behaviour is perceived as upsetting or disruptive in social interactive contexts (Chiang and Gau, 2014).

The functioning heterogeneity observed in autism and ADHD may be explained by differences in executive function (EF) and emotion regulation (ER) in these conditions, which are crucial for social cognition and communication (Moriguchi and Hiraki, 2013). Therefore, a possible approach to the early identification and differential diagnosis of autism, ADHD and autism/ADHD co-occurrence (autism/ADHD) may be related to particularities in the association between EF and ER in these conditions.

EF consists of a set of top-down, higher-order cognitive processes that enable individuals to manage and regulate their thoughts, actions, and emotions to achieve goals (Diamond, 2013; García-Molina, 2018). Key components of EF include working memory (the ability to temporarily hold and manipulate information), inhibitory control (the ability to control impulses, resist distractions, and refrain from behaviours that may interfere with goal attainment), and cognitive flexibility/shifting (the ability to adapt to changing circumstances and adjust one's thinking in response to new information and problem solving) (Diamond, 2013; Friedman and Miyake, 2017; García-Molina, 2018; Miyake et al., 2000).

EF challenges have been proposed to be associated with autistic traits, including social domains and repetitive and restricted behaviours (Demetriou et al., 2018; Jones et al., 2018; Leung et al., 2016; Lopez et al., 2005; Pugliese et al., 2016), as well as with core ADHD symptoms (i.e. impulsivity) (Burgess et al., 2010; Craig et al., 2016; Tillman et al., 2011). Challenges in planning and flexibility are particularly prominent in autism, with the latter being associated with repetitive behaviours and social difficulties (Leung et al., 2016; Lopez et al., 2005). Difficulties in response inhibition and working memory are more characteristic of ADHD, contributing to impulsivity and hyperactivity (Alderson et al., 2012; Craig et al., 2016; Rapport et al., 2009; Antshel and Russo, 2019). Individuals with co-occurring autism and ADHD may have more severe executive dysfunctions, especially in flexibility, inhibition, and attention (Benallie et al., 2021).

ER refers to the ability to monitor, evaluate, and modulate emotional experiences in response to internal or external/environmental stimuli, as well as how they are processed and expressed (Carver and Johnson, 2018; Gross, 2015). ER contributes to the organisation of cognitive activity, emotional responses, and overt behaviour (Gioia et al., 2002; Zelazo and Cunningham, 2007). It is important to note that ER strategies are neither inherently adaptive nor maladaptive, but depend on flexibility and contextual appropriateness (Gross, 2015). Individuals with NDDs often have difficulty using ER strategies flexibly, which can result in heightened emotional reactivity, tantrums, irritability, or aggressive behaviour (Mazefsky et al., 2013; Graziano and Garcia, 2016).

Altered ER ability has been linked to key processes during development in both autism (Cai et al., 2019; Conner et al., 2020; Reyes et al., 2020) and ADHD (Barkley, 2010; Faraone et al., 2019; Groves et al., 2020; Shaw et al., 2014), particularly in relation to social maladjustment, language (Çiray et al., 2022; Jaisle et al., 2023), and behavioural problems (Röll et al., 2012; Tse, 2020). For example, Tye et al. (2014) found that autistic, ADHD and autistic/ADHD children (8–13 years) showed atypical emotion processing: autism showed reduced early responses to anger, ADHD altered contextual processing for fear and joy, and co-occurring autism/ADHD combined difficulties. These results suggest ER difficulties may underlie social challenges, especially in autism/ADHD (Walter et al., 2023).

EF and ER are closely linked across the lifespan in non-clinical populations (Hendricks and Buchanan, 2016; Schweizer et al., 2017; Sperduti et al., 2017; Wante et al., 2017). Neuroanatomically, ER is associated with activation in the prefrontal cortex and anterior cingulate cortex, regions also involved in EF (Buhle et al., 2014; Kohn et al., 2014; Niendam et al., 2012). This overlap supports models suggesting that EF is central to emotional modulation (Makowski et al., 2015; Ochsner et al., 2012; Ochsner and Gross, 2005). As both EF and ER depend on the maturation of the prefrontal and subcortical-cortical regions, which is often disrupted in NDDs, this disruption may account for the observed difficulties (Shaw et al., 2014). Inhibition and flexibility difficulties have been related to maladaptive ER strategies and emotional dysregulation in both autism (Mazefsky et al., 2013) and ADHD (Banaschewski et al., 2012). Likewise, in autism/ADHD, poorer cognitive functioning has been associated with maladaptive ER strategies and pronounced functional impairments (Rao and Landa, 2014).

Overall, the evidence suggests that EF and ER are dynamically interconnected processes that jointly influence social adjustment and mental health outcomes (Hendricks and Buchanan, 2016; Nigg, 2017). EF appears to provide the cognitive control necessary for implementing ER strategies, and ER can, in turn, modulate the efficient use of EF resources (Camacho et al., 2025; Bridgett et al., 2013). Therefore, clarifying how these domains interact in autism, ADHD, and autism/ADHD is crucial to understanding the mechanisms underlying shared socio-emotional and behavioural difficulties. Building on this, research in clinical populations has proposed EF and ER as potential transdiagnostic mechanisms that are particularly relevant in the context of autism, ADHD and their co-occurrence (Astle et al., 2022; England-Mason, 2020). Thus, understanding the relationship between EF and ER may contribute to a more integrated model of neurodevelopmental functioning that moves beyond categorical diagnostic boundaries towards dimensional, mechanism-based frameworks (Insel et al., 2010; Cuthbert, 2014).

Furthermore, identifying the nature and strength of the association between EF and ER in autism, ADHD, and autism/ADHD has significant implications for clinical practice. Identifying similarities and differences in these associations and outlining potential cognitive–emotional profiles, may help clinicians differentiate between autism, ADHD, and their overlap. This could facilitate differential diagnosis, reduce the number of clinical hypotheses, and shorten the diagnostic process. An accurate and timely diagnosis is also essential for accessing appropriate interventions, which can prevent more severe behavioural and emotional difficulties (Ozonoff, 2015; Simon et al., 2023). An early diagnosis has been shown to lead to better functional independence, cognition, and adaptation in autism (Pickles et al., 2016) and ADHD (Agnew-Blais et al., 2018). In contrast, delayed identification can limit access to support and has been linked to negative psychosocial outcomes, including loneliness, lower self-esteem, or substance use (Gabbay-Dizdar et al., 2022). Examining shared and distinct cognitive–emotional profiles across autism and/or ADHD can therefore enhance diagnostic precision and support the development of more personalised and effective early interventions.

1. Current study

This study aimed to comprehensively investigate the relationship between executive function and emotion regulation in autism, ADHD, and co-occurring autism/ADHD and answer the following research questions: 1) How does executive functioning relate to emotion regulation in autism?, 2) How does executive functioning relate to emotion regulation in ADHD?, and 3) How does executive functioning relate to emotion regulation in autism/ADHD co-occurrence?

2. Method

The methods and protocol for the present systematic review were established and registered in PROSPERO (CRD420250652223) prior to the implementation of this study. We followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist guidelines (Moher et al., 2015) to conduct this systematic review.

2.1. Literature search strategy

The electronic databases PubMed, Web of Science, PsychInfo and Scopus were searched for empirical articles published in English between January 2013 (to reflect the latest diagnostic criteria for autism and ADHD, as the DSM-5 was published this year) and October 2024. The following search terms were used: (("autism" OR "autistic" OR "asd" OR "autism spectrum disorder" OR "asperger") OR ("attention deficit hyperactivity disorder" OR "adhd") AND ("executive functions" OR "executive functioning" OR "updating" OR "working memory" OR "planification" OR "planning" OR "shifting" OR "cognitive flexibility" OR "inhibitory control" OR "inhibit*" OR "decision making") AND ("emotion dysregulation" OR "emotional dysregulation" OR "emotion regulation" OR "emotional regulation" OR "emotion control" OR "emotional control")). Studies were considered if they i) enrolled people with a diagnosis of ASD, autism or Asperger's syndrome, and/or ADHD, according to the International Statistical Classification of Diseases and Related Health Problems, 10th (ICD-10) and 11th (ICD-11) revisions or the American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders, 4th Edition, Text Revision (DSM-IV-TR), 5th Edition (DSM-5) or 5 t^{h} Edition Text Revision (DSM-5-TR) diagnostic criteria; and ii) focused on the association between EF and ER in ASD, ADHD, and/or ASD/ADHD.

Titles and abstracts were screened for eligible studies. The full text of the selected studies was then examined according to the inclusion and exclusion criteria, as described below. The eligibility of all records (title and abstract and full texts) was assessed independently by two researchers. Cohen's kappa coefficient was calculated at each stage to measure interrater reliability and ensure that the included data accurately reflected the assessed variables (McHugh, 2012). Any discrepancies or doubts were resolved at a consensus meeting conducted by a third researcher who acted as a consultant in case of conflict. It should be noted that a manual search of the reference lists of the included studies was conducted to identify further studies. However, this search did not result in the inclusion of any additional studies.

2.2. Procedure and eligibility criteria

The initial database search resulted in 1593 articles of which 713 were duplicated. Hence, the title and abstract of 880 articles were screened for the inclusion criteria (k = 0.67). Studies were excluded based on the following exclusion criteria: i) different format than empirical paper (i.e., book chapters, congress abstracts, letters to the editor, meta-analysis or reviews) (n = 272), ii) not using human samples (n = 5), iii) not focused on ASD, Asperger's diagnosis and/or ADHD (n = 280), iv) not focused on the study of executive functions and/or emotional regulation (n = 137). Two additional studies were excluded as they were written in languages other than English.

Thus, the title and abstract screening resulted in 184 potentially relevant articles. After a thorough and comprehensive examination of the full text of these articles for inclusion criteria, 162 were additionally excluded (k = 0.76). The following eligibility/selection criteria were applied i) participants with a diagnosis of ASD, autism, Asperger's syndrome and/or ADHD according to the ICD-10, ICD-11, DSM-IV-TR, DSM-5 or DSM-5-TR, or whose diagnosis has been confirmed by a standardised ASD questionnaire or diagnostic interview (Autism Diagnostic Interview-Revised [ADI-R; Rutter et al., 2003], Autism Diagnostic Observational Schedule-2 [ADOS-2; Lord et al., 2012]) or by a standardised ADHD questionnaire or diagnostic interviews (Kiddie--Schedule for Affective Disorders and Schizophrenia - Present and Lifetime DSM-5 Version [K-SADS-PL; Kaufman et al., (2016)], ADHD Rating Scale - IV [ADHD-RS-IV; DuPaul et al., (1998)], ADHD-RS-5 (DuPaul et al., 2016), Adult ADHD Self-Report Scale [ASRS; Kessler et al., (2005)]) (n = 57); and ii) studies analysing the relationship between EF and ER in autism, ADHD and/or autism/ADHD (n = 104). In addition, one study (Sáez-Suanes et al., 2020b) was excluded because it reported the same results regarding EF and ER associations as another earlier study – Sáez-Suanes et al. (2020a), the latter being included in this review.

A total of 22 articles were included in this review. These articles were divided into three groups according to the diagnosis of the participants: autism (participants with a diagnosis of ASD, autism or Asperger Syndrome only), ADHD (participants with a diagnosis of ADHD only), and autism/ADHD (participants with a co-occurring diagnosis of ASD, autism or Asperger and ADHD). Four articles were included in the autism group, 16 in the ADHD group, and two in the autism/ADHD group. Fig. 1 depicts the flowchart of the selection procedure.

2.3. Data selection and extraction

In addition to study descriptors (e.g. authors, year of publication), the following information was extracted from the full-text documents: i) sample size, ii) age of participants, iii) gender distribution, iv) diagnosis, v) instruments used to assess EF and ER, and vi) results regarding the association between EF and ER. The quality and risk of bias of the included studies were assessed using the Joanna Briggs Institute (JBI) critical appraisal checklist for cross-sectional analytical studies (Moola et al., 2017). Supplementary Material Table 1 provides information on the quality of the studies. Interrater reliability was excellent (k = 0.95).

3. Results

Table 1 summarises the methodological characteristics and results of the studies included in this review. Results are presented according to the three groups: autism, ADHD and autism/ADHD.

3.1. EF and ER in Autism

Four studies reporting on the relationship between EF and ER in autism were included.

Sáez-Suanes et al. (2020a) used informant-report questionnaires to assess both EF and ER in autistic individuals aged 18–62 years with co-occurring intellectual disability (ID) – the Dysexecutive Questionnaire (DEX) to assess EF, and the Emotional Regulation Checklist (ERC; Shields and Cicchetti, 1997) to assess ER. The DEX is a general measure of executive dysfunction assessed through 20 items rated on a 5-point Likert-scale. The ERC is a 24-item questionnaire comprising two subscales: emotion regulation (assessing the appropriate expression and modulation of emotions) and lability/negativity (measuring emotional dysregulation characterised by rapid and intense mood fluctuations). The lability/negativity subscale was used as an indicator of emotional dysregulation. Therapists completed the questionnaires as participants had limited ability to independently complete them, attributed to their co-occurring ID. Results indicated that executive dysfunction was positively and significantly associated with emotional dysregulation (r = 0.648, $p < .01$).

DeLucia et al. (2022) and Jahromi et al. (2019) used the Day/Night Task to assess inhibitory control in autistic and non-autistic (i.e., control group) preschoolers. In this task two types of cards are shown with the illustration of a sun or a moon and stars. Children were then asked to say "day" if a moon and stars card was shown, and "night" if a sun card was shown. In addition to the Day/Night Task, Jahromi et al. (2019) assessed inhibitory control also using the Hand Game Task, which required children to initially mimic the experimenter's hand movements and

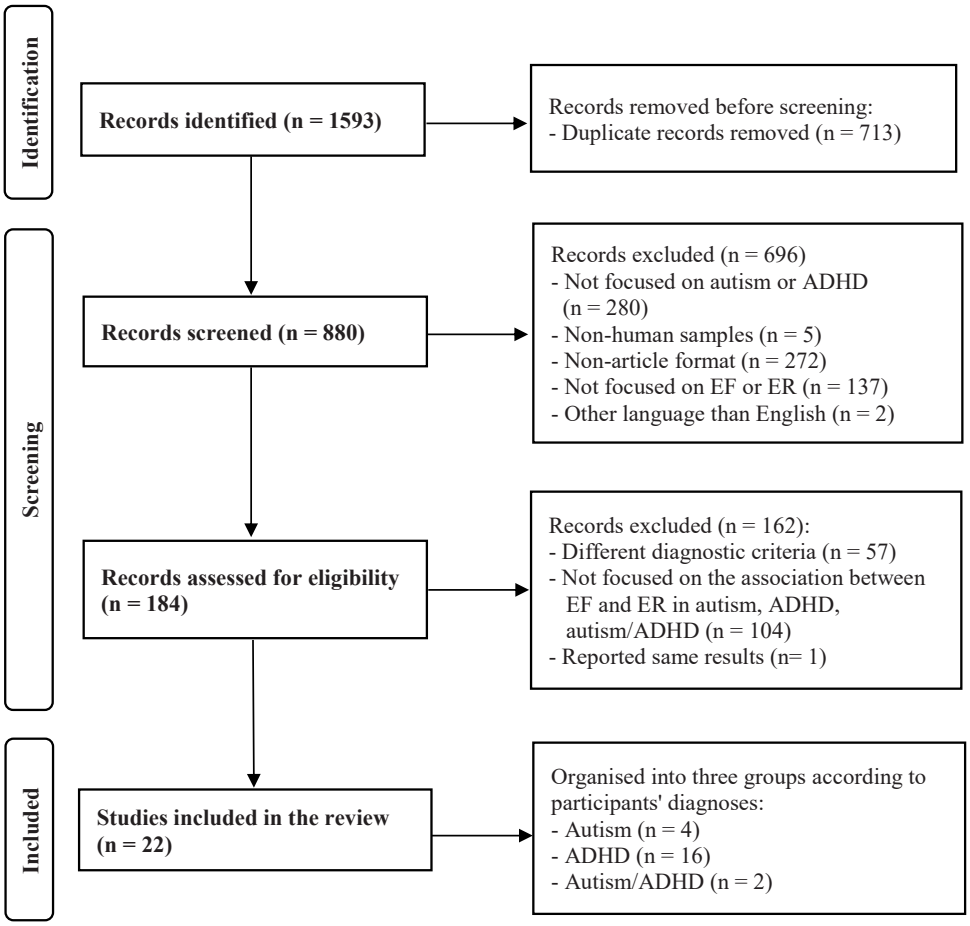


Fig. 1. Search strategy following PRISMA guidelines.

subsequently perform the opposite movement following a rule change. In addition, effortful control (i.e., ability to focus attention on task-relevant information and switching between tasks, while inhibiting unwanted responses; Chevalier, 2018) was measured using the Children's Behaviour Questionnaire–Short Form (CBQ-SF; Putnam and Rothbart, 2006; Rothbart et al., 2001), a parent-reported instrument assessing temperament, with effortful control scores derived from subscales measuring inhibitory control, low-intensity pleasure, perceptual sensitivity, and attention focusing. Both studies assessed ER abilities using the parent-report ERC, with Jahromi et al. (2019) also using observation to rate behaviours during a gratification delay task, with positive and negative affect behaviour being rated on a 7-point scale (1- 'no negative/positive emotion displayed'; 7- 'three or more intense, heightened, or prolonged displays of negative/positive emotion').

DeLucia et al. (2022) found no significant relationships between inhibitory control, measured by the Day/Night Task, and the Lability/Negativity or Emotion Regulation subscales of the ERC, in autistic preschool children aged 4–6 years and in the non-autistic comparison group. Similarly, Jahromi et al. (2019) found no significant associations between inhibitory control, assessed using the Day/Night Task or Hand Game Task, and the ERC or the observed behaviours (i.e., reflecting negative or positive affect) in autistic and non-autistic children aged 40–77 months. However, the authors observed that ER was significantly associated with effortful control ($r = 0.58$, $p < .05$) in the autistic group. In contrast, in the non-autistic group, ER was significantly related to joint attention ($r = 0.51$, $p < .05$).

Finally, Zantinge et al. (2017) assessed EF using the parent-report (preschool questionnaire) version of the Behaviour Rating Inventory of Executive Function (BRIEF; Gioia et al., 2002). This questionnaire assesses EF across nine clinical scales – Inhibit, Self-Monitor, Shift, Emotional Control, Initiate, Working Memory, Plan/Organise, Organisation of Materials, and Monitor – which are further grouped into three high-level executive domains, each represented by a regulatory index: behavioural, emotional, and cognitive regulation. ER was evaluated using the Locked Box task, a performance-based task from the preschool Laboratory Temperament Assessment Battery (Lab-TAB). This task was aimed at inducing frustration by denying children access to a chosen toy for 4 min using incorrect keys, followed by 1 min of playing after unlocking the box giving access to the toy. While performing this task, the authors observed the behaviour of 43- to 79-month-old preschoolers, measured their physiological arousal (i.e., heart rate activity), and categorised their emotional coping strategies as constructive, venting, and avoidance. The results showed no statistically significant association between EF (inhibitory control or shifting abilities) and ER strategies in autistic children. The study also included a group of non-autistic preschoolers but did not report on the association between EF and ER strategies in this group.

3.2. EF and ER in ADHD

Sixteen studies reporting on the relationship between EF and ER in ADHD were included.

Three studies used questionnaires to assess EF and ER (Al-Yagon et al., 2020; Biederman et al., 2020; Marques et al., 2024). They used the BRIEF, either the parent (Marques et al., 2024), teacher (Al-Yagon et al., 2020), or self-report (Biederman et al., 2020) versions to assess EF. To measure ER, Al-Yagon et al. (2020) used the self-report version of the Negative Mood Regulation, a 30-item questionnaire that measures the capacity to manage negative moods. Biederman et al. (2020) used the Barkley Emotional Dysregulation Scale, a subset of eight questions

Table 1
Summary of the data extracted from the included studies, presented according to the diagnosis of the participants: autism, ADHD, and autism/ADHD.

Autism			
Study	**Sample Size (Gender)** **Age range (mean ± SD)**	**Measures**	**Results**
Zantinge et al. (2017)	27 autistic preschoolers (2 girls) 43–79 months (M = 59.5 ± 10.4)	- LBT (Lab-TAB; assessing ER). - BRIEF (assessing EF; parent report version)	No significant association between EF (inhibition and cognitive flexibility) and ER
(Jahromi et al. 2019)	18 autistic preschoolers (no gender distribution specified) 40–77 months (M = 57.6 ± 11.3)	- D/NT and HGT (assessing EF; performance-based tasks) - ERC (assessing ER) - CBQ-SF (assessing effortful control) - Behavioral observation (positive and negative effect during a gratification delay task)	Significant and positive relationship between effortful control (CBQ-SF) and ER (emotion regulation subscale of the ERC)
Sáez-Suanes et al. (2020)(a)	121 autistic individuals (40 women) 18–62 years (M = 35.46 ± 9.5)	Informant-report questionnaires completed by the therapist: - DEX (assessing EF) - ERC (assessing ER)	Positive and significant association between executive dysfunction and emotional dysregulation
DeLucia et al. (2022)	24 autistic preschoolers (6 girls) 4–6 years (M = 5.3 ± 1)	- D/NT (assessing EF; performance-based task) - ERC (assessing ER; parent-report version)	No significant association between inhibition and ERC (emotion regulation or lability/negativity subscales)
ADHD			
Study	**Sample Size (gender)** **Age range (mean ± SD)**	**Measures**	**Results**
Van Cauwenberge et al. (2015)	29 school-age children with ADHD (9 girls) 8–15 years (M = 11 ± 2.7)	- E-n-back (assessing ER and EF; performance-based task)	Emotional valence in background pictures did not affect working memory performance in children with ADHD
Cavallet et al. (2016)	16 adults with ADHD (only males) 20–33 years (M = 26 ± 4.3)	- ASCT (assessing EF and ER; performance-based task)	Different reaction times in ADHD group, with faster responses in emotional blocks, but no reaction time variations observed for neutral stimuli
Jensen et al. (2018)	41 children with ADHD (11 girls) 8–12 years (M = 9.65 ± 1.2)	- LNS, backward conditions of digits and spatial span (assessing EF; performance-based tasks) - BRIEF (assessing ER; parent-report version)	Statistically significant negative association between verbal working memory and emotional lability
Sjöwall and Thorell, (2019)	52 children with ADHD (12 girls) 48–72 months (M = 71 ± 6.7)	- Performance-based tasks: FPT, FT, GDT, GNG, and Digits (assessing EF) and ERT, DP, PCT, and ILT (assessing ER) - Report measures: CHEXI (assessing EF) and EQ (assessing ER)	A positive and significant relation was found between deficits in ER and EF in the laboratory measures as well as in the teachers' report
Al-Yagon et al. (2020)	50 children with ADHD (no gender distribution specified) 11–12 years (M = 11.45 ± 0.50 years)	- BRIEF (assessing EF; teacher-report version) - NMR (assessing ER; self-report version)	Inhibitory and shifting problems predicted ER difficulties
Biederman et al. (2020)	441 adults with ADHD (246 women), categorised according to DERS: 250 low-level DERS (145 women) 18–55 years (M = 34.5 ± 13.5) 191 high-level DERS (101 women) 18–55 years (M = 32.5 ± 11.4)	- BRIEF-A (assessing EF; self-report version) - CBS-SR (assessing ER; self-report version)	High-level DERS individuals with ADHD showed worse EF compared to participants with low-level DERS
Dir et al. (2020)	57 children with ADHD (+ DBD) (with and without suicidal ideation; 21 girls) 11–12 years (M = 11.9 ± 0.5)	- BART (assessing EF; performance-based task) - ERC (assessing ER; parent-report version).	No statistically significant associations between decision-making and ER in any group
Imanipour et al. (2021)	25 children with ADHD (14 girls) 7–12 years	- Digit Span, LNS, arithmetic test (assessing EF; performance-based task) - ERQ-CA (assessing ER; self-report version)	There was no significant association between working memory and ER
Tarle et al. (2021)	36 children with ADHD (17 % female) 8–12 years (M = 9.8 ± 1.7)	- PHWMT (assessing EF; performance-based task) - ER coding (assessing ER; observational measure)	Total emotional expression (emotional ventilation and self-criticism) was higher during tasks with increased working memory demands
Colonna et al. (2022)	219 adolescents with ADHD (13 girls) 10–18 years (M = 14 ± 1.9)	- CPT, CxR, GNG, TDT, UG (assessing EF; performance-based task) and WCST (assessing EF; cognitive assessment test) - CAPA (assessing ER; parent-report version)	No significant associations between irritability and hot (perseveration and impulsivity) or cool (inhibition and set shifting) EF
Linca et al. (2022)	241 school-age children with ADHD (87 girls) 72–120 months (M = 97.5 ± 1)	- NEPSY (assessing EF; performance-based task) - ER self-created task (assessing ER; performance-based task)	ER was significantly associated with problem-solving and working memory abilities, which impacted school performance in children with ADHD
Anker et al. (2022)	418 adults with ADHD (188 women) 18–65 years (M = 36.6 ± 11.5)	- Arithmetic, Digits, DS-C, LNS and Symbol Search (assessing EF; performance-based tasks) - CBS-SR (assessing ER; self-report measure)	No statistically significant associations between emotional dysregulation and working memory or processing speed
Leib et al. (2023)	739 children and adolescents with ADHD (244 girls) 6–16 years (M = 9.6 ± 3.5) Categorised as emotionally averaged (n = 458) and emotionally dysregulated (n = 281)	- Digits and PS (assessing EF; performance-based tasks) - Emotional control scale of the BRIEF-2 (assessing ER; parent, teacher and self-report version)	Higher scores on working memory were negatively correlated with difficulties ER when it was reported by parents but not by teachers
Zhang et al. (2023)	55 children with ADHD (11 girls) 7–11 years (M = 8.8 ± 1.1)	- WCST-128 (assessing EF; cognitive assessment test) - EPQ (assessing ER; self-report measure)	There is a positive correlation between impaired ER (measured as neurotic personality traits) in ADHD and cognitive flexibility
Inci Izmir et al. (2024)	176 children with ADHD (+ CDS) (84 girls) 8–12 years (M = 10 ± 1.52)	- CNSVS (assessing EF; performance-based task) - DERS (assessing ER; self-report measure)	EF negatively impacted emotional dysregulation

(*continued on next page*)

Table 1 (*continued*)

Autism			
Study	**Sample Size (Gender) Age range (mean ± SD)**	**Measures**	**Results**
Marques et al. (2024)	38 children with ADHD (8 girls) 7–10 years (M = 9)	- BRIEF (assessing EF; parent-report version) - ERC (assessing ER; parent-report version)	Significant and positive associations between inhibition and lability/negativity and emotional dysregulation composite score
Autism/ADHD			
Study	**Sample Size (gender) Age range (mean ± SD)**	**Measures**	**Results**
Conner et al. (2023)	57 autistic adolescents and young adults (11 girls; 10 autistic/ADHD) 16–25 years (M = 18.6 ± 2)	- D-KEFS (assessing EF; performance-based task). - Report measures: DERS (assessing ER; self-report measure)	No significant associations were found between EF and ER, except for inhibition, which was related to the Goal subscale of the DERS
Barnes et al. (2025)	94 autistic children and adolescents (23 girls; 23 autistic/ADHD) 5–18 years (M = 11.1 ± 3.2)	- EDI (assessing ER; caregiver-report measure) and FS-R (assessing EF; parent-report measure)	There is a positive relationship between cognitive inflexibility and emotional dysregulation in both groups when controlling for age, sex and autistic traits

Legend: ASCT: Affective Spatial Compatibility Task; AWMA: Automated Working Memory Assessment; BADS: Behavioural Assessment of the Dysexecutive Syndrome; BART: Balloon analog risk task; BRIEF: The Behavior Rating Inventory of Executive Function; BRIEF-2: The Behavior Rating Inventory of Executive Function-2nd Edition; BRIEF-A: The Behavior Rating Inventory of Executive Function-Adult version; BRIEF-P: The Behavior Rating Inventory of Executive Function-Parent; BRIEF-PV: Behavior Rating Inventory of Executive Functions-Preschool Version; BRIEF-T: The Behavior Rating Inventory of Executive Function-Teacher; CAPA: Child and Adolescent Psychiatric Assessment; CBS-SR: Current Behaviour Scale–Self-Report; CDS: Cognitive disengagement syndrome; CHEXI: Childhood Executive Functioning Inventory; CNSVS: CNS Vital Signs; CPT: Card Playing Task; CxR: Choice per Risk Task; DBD: Disruptive behavior disorder; DERS: Difficulties in Emotion Regulation Scale; DEX: Dysexecutive questionnaire of the behavioral assessment of the dysexecutive syndrome; D-KEFS: Delis-Kaplan Executive Function System; D/NT: Day/Night task; DP: The Disappointment Paradigm; DS-C: Digit Symbol-Coding; EDI: Emotion Dysregulation Inventory; EF: Executive Function; E-n-back: Emotional n-back task; EPQ: Eysenck Personality Questionnaire; EQ: Emotion Questionnaire; ER: Emotional Regulation; ERC: Emotion Regulation Checklist; ERT: Emotion Recognition Task; ERQ-CA: Emotion Regulation Questionnaire for Children and Adolescents; FPT: Find the Phone Task; FRT: Frustration task; FS-R: Flexibility Scale-Revised; FT: Flower Task; GDT: The Gift Delay Task; GNG: Go/No-Go task; HGT: Hand Game task; HTKS: Head-Toes-Knees-Shoulders task; ILT: The Impossible Lego Task; Lab-TAB: Laboratory temperament assessment battery; LBT: Locked Box Task; LNS: Letter–Number Sequencing; NEPSY: Child Neuropsychological Battery; NMR: Negative Mood Regulation; PCT: The Puzzle Cheating Task; PHWMT: Phonological Working Memory Task; PS: Picture Span; SI-: Non-suicidal; SI+ : Suicidal; TDT: Temporal Discounting Task; UG: Ultimatum Game; WCST: Wisconsin Card Sorting Test.

extracted from the Current Behaviour Scale (CBS), to assess deficient emotional self-regulation, and categorised the participants into two groups - high (more difficulties) and low (less difficulties) deficient emotional self-regulation. Marques et al. (2024) used the ECR questionnaire, which provides the emotion regulation and lability/negative subscales.

Al-Yagon et al. (2020) examined EF-ER relationship in 11- and 12-year-old children with and without ADHD using a regression model that explained 35 % of the variance in negative ER. Lower ER scores were associated with belonging to the ADHD group, insecure attachment to either parent, and greater behavioural and EF impairments. Additional regression analysis showed that children's difficulties in regulating negative emotional states were being explained in part by reduced EF. In contrast, those having fewer global EF difficulties had greater ability to regulate their negative emotions. Biederman et al. (2020) observed that adults with ADHD aged 18–55 years with high-level of emotional self-regulation difficulties exhibited poorer EF performance than those with less ER difficulties. Marques et al. (2024) reported that difficulties in inhibitory control were significantly associated with lability/negative emotionality subscale of the ERC ($r = 0.678$, $p < .001$) in children with ADHD aged 7–10. Additionally, these inhibition difficulties were related to the composite score of emotional dysfunctions ($r = 0.69$, $p < .001$), which the authors computed by combining the lability/negative emotionality and ER subscales of the ERC and the emotional control subscale from the BRIEF. For comparison, an age-matched group without ADHD was included, revealing greater cognitive and emotional difficulties in the ADHD group. However, the relationship between EF and ER was only examined within the ADHD group.

Two studies used a single performance-based task to assess both EF and ER (Cavallet et al., 2016; Van Cauwenberge et al., 2015). Van Cauwenberge et al. (2015) used an Emotional n-back task to measure EF and ER in children aged 8–15 years with and without ADHD. This task consisted of a pseudorandom sequence of letters that were presented to children who were asked to respond to a pre-specified letter, assessing working memory abilities. Two memory load conditions were created: a 0-back condition (that required no working memory) and a 1-back condition (which required a response when the same letter was presented in two successive trials). In each memory load condition, four different backgrounds with different pictures were used – a black screen (no picture), a neutral (e.g., spoon), an emotionally positive (e.g., chocolate), and an emotionally negative (e.g., snake). Children were asked to ignore the pictures presented in the background, while performing the task. Although children with ADHD exhibited slower reaction times (treated as proxy for emotional interference in the working memory task) to both negative and positive images compared to neutral stimuli, these differences did not reach statistical significance. In addition, a greater interference effect was observed for ADHD when comparing neutral to no picture conditions ($F(1,62) = 4.35$, $p = .041$). Accordingly, these results suggested a general difficulty in managing emotional interference while performing the working memory task in ADHD, indicating a relationship between emotional dysregulation and poorer working memory performance. A non-ADHD group was included for comparison purposes. The ADHD group showed longer response times, and the relationship between EF and ER was only observed in this group.

Cavallet et al. (2016) assessed inhibitory control and ER in adults aged 20–33 years with and without ADHD. Participants were asked to respond to stimuli distinguishing between favorite (positive), rival (negative), and fake (neutral) soccer teams. Participants were asked to respond based on their assigned team while attending to the stimulus location. Trials were classified as either congruent or incongruent, depending on both the stimulus position and its type (positive, negative, or neutral). The results indicated significant reaction time differences within the ADHD group, with faster responses in the favourite-compatible/rival-incompatible blocks compared to the rival-compatible/favourite-incompatible block, suggesting greater difficulty in processing negative emotional reactions, which interfered with inhibitory control abilities. This difference was not observed for neutral stimuli, as no reaction time variations were found between compatible and incompatible blocks. No significant differences across conditions were observed in the non-ADHD group, which indicated a relationship between ER and inhibitory control in both ADHD and non-ADHD. Moreover, the findings revealed an interaction between group and

mapping rule, suggesting a more pronounced emotional effect only in the ADHD group, as inhibitory control performance differences emerged in the presence of emotional stimuli (favourite and rival soccer teams) but not in the presence of neutral stimuli (fake team).

One study (Colonna et al., 2022) used a clinical interview to assess ER and a performed-based task to assess EF, and another study (Linca et al., 2022) used a performance-based task to assess ER and neuropsychological tests to measure EF. Colonna et al. (2022) assessed the relationship between irritability (treated as an indicative of enhanced emotionality and thus as a proxy of poorer ER) and cool (processes such as working memory or inhibition) and hot (processes such as delay aversion or risky decision making) EF in ADHD adolescents aged 10–18 years. Irritability was measured using a composite score derived from five items of the Child and Adolescent Psychiatric Assessment interview. Cool EFs were assessed using the Wisconsin Card Sorting Test (WCST), which measures set-shifting by requiring participants to categorise cards based on evolving rules, and a Go/No-Go task, which assesses motor inhibition by instructing participants to respond to "go" stimuli while suppressing responses to "no-go" stimuli. Hot EFs were examined through the Card Playing Task, which evaluates perseverance under loss conditions; the Temporal Discounting Task, which measures impulsivity by presenting choices between immediate and delayed rewards; the Choice under Risk Task assesses risk-taking and impulsivity by evaluating an individual's tendency to opt for short-term gains despite potential long-term benefits; and the Ultimatum Game, an economic decision-making paradigm in which participants respond to monetary split proposals, often rejecting unfair offers due to emotional responses, despite the potential financial gain. The authors observed that irritability was not associated with hot or cool EFs in adolescents with ADHD.

Linca et al. (2022) investigated the moderating role of ER in the relationship between problem-solving abilities (along with visuomotor precision and visuospatial integration) and school results in children aged 72–120 months with and without ADHD. In this study, the authors measured problem-solving and working memory abilities, using the Tower task and the Face Memory task, respectively, both part of the Neuropsychological Development Assessment. ER was assessed using an imaging system of pictures and children were asked to identify the facial expressions, emotions and emotional responses. Results showed that ER significantly moderated the relationship between school outcomes and both problem-solving (ADHD group: $Z = 9.07$, SE = 9.93), $p < .01$; non-ADHD group: $Z = 4.46$, SE = 0.001, $p < .01$), and working memory (ADHD group: $Z = 10.9$, SE = 6.08, $p < .05$; non-ADHD group: $Z = 3.53$, SE = 0.001, $p < .01$) in both groups. Stronger effects were observed in the ADHD group.

Seven studies used performance-based tasks to assess EF and informant-report questionnaires to assess ER (Anker et al., 2022; Dir et al., 2020; Imanipour et al., 2021; Inci Izmir et al., 2024; Jensen et al., 2018; Tarle et al., 2021; Zhang et al., 2023). Jensen et al. (2018) used the parent-report version of the Emotional Control subscale of the BRIEF to measure ER, conceptualising this subscale as a measure of emotional lability, and the Shift subscale of the BRIEF, as well as the backward conditions of the Digit Span and Spatial Span tasks, along with the Letter-Number Sequencing subtest from the Wechsler Intelligence Scale for Children – Fourth Edition (WISC-IV), to measure EF in children aged 8–12 years with and without ADHD. These tests have been widely used to assess working memory abilities as participants are required to recall sequences of digits, block figures, and number-letter combinations, respectively, in reverse order. Results showed a negative correlation between children's working memory, as assessed by the letter–number sequencing task, and parent-reported emotional lability, indicating that lower working memory scores (i.e., more impairments) were associated with heightened emotional lability symptoms (i.e., greater ER difficulties; $r = -0.37$, $p < .01$). This association was consistent across children with and without ADHD, suggesting that diagnostic status did not affect the relationship.

Dir et al. (2020), comparing school-aged children aged 11–12 years with ADHD and co-occurring Disruptive Behaviour Disorder with and without suicidal ideation, used the parent-report version of the ERC to assess ER, and the Balloon Analogue Risk Task (BART) to measure decision-making abilities. The BART task involves participants to inflate a virtual balloon to earn increasing rewards while balancing the growing risk of the balloon exploding. The authors did not find a significant relationship between ER and decision-making in both groups.

Anker et al. (2022) assessed working memory and processing speed using corresponding indices from the third edition of the Wechsler Adult Intelligence Scale in adults aged 18–65 years with ADHD. Working memory was measured through the Arithmetic, Digit Span, and Letter–Number Sequencing tests, while processing speed was evaluated using Digit Symbol-Coding and Symbol Search tests. Emotional dysregulation was assessed using the CBS. The authors did not find associations between self-reported emotional dysregulation severity and performance-based working memory or processing speed.

Zhang et al. (2023) used the WCST to assess set-shifting and the Attention Network Test for attentional capacity and inhibition by requiring children aged 7–11 years to redirect their gaze away from a stimulus rather than follow its trajectory. Emotional dysregulation was measured in relation to neuroticism, assessed by the Eysenck Personality Questionnaire (EPQ). EPQ is a self-reported questionnaire consisting of 88 items that assesses three dimensions of personality, psychoticism, extraversion, and neuroticism. Neuroticism was conceptualised as a variable related to emotional dysregulation or a diminished capacity for ER (Gross and John, 2003; Wang et al., 2009). This study compared cognitive flexibility and ER difficulties, as measured by neuroticism in children with and without ADHD. Children with ADHD demonstrated more significant impairments in both areas, along with significant correlations between the two. Specifically, neuroticism was significantly positively associated with perseverative responses (B = 1.115, β = 0.305, $p < .05$), perseverative errors (B = 1.151, $\beta = 0.320$, $p < .05$), and significantly negatively associated with the number of categories completed on the WCST (B = −0.120, $\beta = -0.327$, $p < .05$), suggesting that higher neuroticism scores or greater ER challenges were linked to increased difficulties in cognitive flexibility in ADHD children.

Tarle et al. (2021) used an observational approach to measure ER strategies or behaviours during a phonological working memory task and a control task, which involved drawing in Microsoft Paint, in children aged 8–12 years with and without ADHD. ER behaviours were coded according to the following - Self-Praise/Positive Self-Talk, Self-Criticism/Negative Self-Talk, Solicitations, Emotion Ventilation, Positive Emotion Expression, Shuts Down, and Total Emotion Expression. The Phonological Working Memory Task required children to reorder numbers and place a letter at the end of the sequence. The findings indicated that increased working memory demands generally heightened emotional expression in children. However, the effect was more pronounced in those with ADHD than in their non-ADHD peers ($F(1,66) = 26.56$, $p < .001$, $\eta p^2 = 0.29$). Specifically, children with ADHD experienced more difficulty with ER under higher cognitive load, particularly in the form of increased self-criticism ($t(42.24) = -2.91$, $p = .006$, $d = 0.69$) and heightened positive emotion expression ($t(66) = -2.62$, $p = .011$, $d = 0.64$).

Inci Izmir et al. (2024) assessed ER using the Difficulties in Emotion Regulation Scale (DERS), a 36-item self-report questionnaire, and EF using the CNS Vital Signs (CNSVS) in children aged 8–12 years with ADHD. CNSVS is a battery of seven tests that assesses visual and verbal memory with Figure and Word Recognition task; motor speed and visuomotor skills with the Finger Tapping Test; psychomotor speed associating symbols with numbers in the Symbol Digit Coding Test; reaction times and processing speed responding to text-colour discrepancies in the Stroop Test; cognitive flexibility alternating between different instructions in the Shifting Attention Test; and sustained attention responding to target stimuli while ignoring distractors in the Continuous Performance Test. The authors found a negative association between EF and emotional dysregulation ($r = -0.163$, $p < .05$) in

children with ADHD. The study indicated that lower EF levels were associated with heightened emotional dysregulation ($F(1174) = 4.78$, $p < .05$), with EFs accounting for about 3 % of the variation in ER difficulties ($R^2 = 0.0267$).

Imanipour et al. (2021) assessed ER using the 10-item Emotion Regulation Questionnaire for Children and Adolescents (ERQ-CA). This questionnaire evaluates the tendency to regulate emotions according to two strategies: cognitive reappraisal, generally considered to be adaptive, and expressive suppression, generally considered to be maladaptive. Working memory was measured using the Digit Span, Letter–Number Sequencing, and Arithmetic subtests of the Working Memory Index of the WISC-IV. The study included children aged 7–12 years with an ADHD diagnosis, as well as an age- and sex-matched group without an ADHD diagnosis. The authors reported no significant association between working memory and ER in either group.

One study (Leib et al., 2023) assessed EF using both performance-based and informant-reported tasks in children and adolescents aged 6–16 years with ADHD. The authors used the BRIEF Emotional Control and Shift subscales (parent and teacher versions) to assess ER, and two tasks of the Wechsler Intelligence Scale for Children – Fifth Edition, the forward and backward conditions of the digit span, and the Picture Span Task, which involves observing a sequence of images and recalling them in the presented order to assess working memory – to measure EF. Participants were then categorised as emotionally averaged or emotionally dysregulated, based on the Emotional Control subscale scores of the BRIEF. The results revealed a negative association between higher working memory performance (better-developed working memory) and elevated parent-reported ER difficulties (Digit Span, $r = -0.08$, $p < .05$; Picture Span, $r = -0.11$, $p < .001$). However, this relationship was not observed in teacher-reported measures of ER. These findings suggest that poorer working memory abilities are associated with greater ER impairments in children with ADHD.

Lastly, the study of Sjöwall and Thorell (2019) used both performance-based and informant-reported tasks to assess both EF and ER in children aged 48–72 months with ADHD. The authors used a Go/No-Go task to measure inhibitory control and, to assess working memory, the authors used the digit span task and the Find the Phone task, which measures spatial memory by requiring participants to sequence phones that had rung. To assess delay aversion, the authors used the Flower task, and quantified the frequency of selecting between rewards, and the Gift Delay task, to assess self-regulation by observing whether children waited to receive a reward. Additionally, teacher-reported EFs were assessed using the Childhood Executive Functioning Inventory, a 24-item questionnaire measuring working memory and inhibition. To measure ER, four performance-based tasks were used: the Facial Emotion Recognition task; the Deception Paradigm, which evaluated emotional expressions following a simulated disappointment; the Puzzle Cheating Task and the Impossible Lego Task, which assessed self-regulation during frustration when failing to complete a puzzle or a figure. Teacher-reported ER was assessed using the Emotion Questionnaire, a 40-item instrument rated on a 5-point Likert scale. The authors reported significant positive associations between ER and EF, as assessed using performance-based tasks ($r = 0.45$, $p < .001$) or parent/teacher reports ($r = 0.75$, $p < .001$). This suggests that greater EF impairment was linked to increased difficulties in ER.

3.3. EF and ER in Autism/ADHD

Two studies reporting on the relationship between EF and ER in autism/ADHD were included.

Barnes et al. (2025) used informant-report questionnaires to assess EF and ER – the Flexibility Scale-Revised, a 29-item parent-report questionnaire measuring daily cognitive flexibility and the Emotional Dysregulation Inventory a 13-item parent-report questionnaire designed to assess dysfunctional ER, in autistic/ADHD and non-autistic/ADHD children and adolescents aged 5–18 years. Results revealed a significant effect of cognitive inflexibility on emotional dysregulation in both groups (autistic/ADHD: $\beta = 0.62$, $p = .000$; non-autistic: $\beta = 0.88$, $p = .000$).

Conner et al. (2023) used a self-report questionnaire to assess ER and performance-based tasks to measure EFs, in autistic/ADHD adolescents and young adults aged 16–25 years. The authors used the DERS to assess ER, while EF was measured using three tests of the Delis-Kaplan Executive Function System: the Number-Letter Switching task of the Trail-Making Test, which evaluates cognitive flexibility by alternating between numbers and letters; the Colour-Word Interference Test, which assesses inhibition through discrepancies between text and colour; and the Card Sorting Test, which examines cognitive flexibility and conceptual reasoning through repeated sorting based on different characteristics. No significant associations were observed between cognitive flexibility, inhibition, and the total DERS score or any of its subscales, except for the relationship observed between inhibitory control and the DERS Goals subscale.

4. Discussion

This systematic review aimed to formally investigate the relationship between executive function (EF) and emotional regulation (ER) in neurodevelopmental disorders, specifically autism, ADHD, and autism/ADHD co-occurrence. We systematically analysed studies published since 2013 that examined this relationship in autistic, ADHD, and autism/ADHD individuals.

4.1. Executive functions and emotional regulation in autism

Of the four studies that examined the relationship between EF and ER in autism, three focused on preschool children, and one investigated autistic adults with intellectual disability. The findings were mixed. While two studies reported an association between EF difficulties and ER problems (Sáez-Suanes et al., 2020a; Jahromi et al., 2019), the other two found no significant relationship (DeLucia et al., 2022; Zantinge et al., 2017).

The broader literature highlights a strong association between autistic traits – such as restricted behaviours and socialisation difficulties – and emotional dysregulation (Berkovits et al., 2017; Samson et al., 2014), as well as significant EF difficulties (Demetriou et al., 2018; Jones et al., 2018; Lopez et al., 2005; Leung et al., 2016; Pugliese et al., 2016). Executive dysfunction impacts cognitive development, language abilities (Ellis Weismer et al., 2018), and academic performance (Dijkhuis et al., 2020). Emotional dysregulation is also linked to social difficulties and behavioural problems (Berkovits et al., 2017; Mazefsky et al., 2013). According to Cai et al. (2018c), the use of both regulatory strategies and flexibility in their application are crucial for ER in autism, with adaptive strategies serving as protective factors for psychological well-being (Cai et al., 2018a, 2018b). However, difficulties in regulating emotions flexibly may be related to reduced attentional shifting and working memory, which are associated with cognitive reappraisal and rumination (Beckwé et al., 2014; McRae et al., 2012). The findings of Sáez-Suanes et al. (2020a) and Jahromi et al. (2019) align with this evidence, showing that greater EF dysfunction is linked to more maladaptive ER strategies (e.g., lability/negativity). Additionally, higher effortful control (i.e., cognitive control) is associated with greater ER abilities, but only when assessed through informant reports (parents or therapists).

However, when EF are assessed using task-based measures, this relationship is not observed. For example, DeLucia et al. (2022) and Jahromi et al. (2019), using the Day/Night task, and Zantinge et al. (2017), using the Laboratory Temperament Assessment Battery (Lab-TAB), did not find a significant relationship between EF and ER. A potential explanation for these discrepancies is the reliance on verbal instructions in EF tasks, which may pose challenges for autistic preschoolers, who often exhibit communication difficulties (Petrolo et al.,

2025). For instance, the Day/Night task has been questioned as a reliable measure of inhibition in autistic children, as it requires verbal responses. Therefore, observed difficulties may reflect challenges in using internal language for self-regulation rather than true challenges in inhibition (Jahromi et al., 2013; Russell et al., 1999). Additionally, the ERC, used in these studies, has been validated for children aged 6–12 years (Shields and Cicchetti, 1997), a developmental period in which ER mechanisms are still maturing (Riediger and Bellingtier, 2022; Silvers, 2022). Studies suggest that ER strategies are less effective in preschool-aged children than in older children, improving progressively into adulthood (Schäfer et al., 2017). Consequently, the assessment of ER in children aged 3–6 years may not fully capture the relationship between these processes. Although task characteristics may have contributed to the absence of significant relationships between the EF and ER, the lack of significant findings cannot be attributed to a potential floor effect in the measurement of the constructs. This is because the scores reported by DeLucia et al. (2022) and Jahromi et al. (2019) were not near the lower bound of the possible scoring range for either autistic or non-autistic participants. Moreover, the three included studies (also Zantinge et al., 2017, which used parent-report measurements) found no significant associations between EF and ER in either autistic or non-autistic preschoolers. This pattern suggests that the absence of a relationship may reflect a lack of association between these processes in young children, regardless of diagnostic status.

The studies of autistic individuals have used neuropsychological tasks and informant measures to assess cognitive and emotional processes. Christoforou et al. (2023) identified distinct EF impairments patterns across different types of assessment, particularly in working memory and planning. Similarly, Demetriou et al. (2018) reported greater executive dysfunction in informant ratings than in task performance. Comparable discrepancies in methodology have also been observed in self-regulation measures (Eisenberg et al., 2019). These inconsistencies likely arise because performance-based tasks are conducted under structured conditions that enable children with NDDs to perform optimally, thereby reducing ecological validity (Toplak et al., 2013). In contrast, informant-based assessments capture difficulties observed in real-life contexts, which may explain why greater severity is often reported than is reflected in task performance (Hendry et al., 2016; Sjöwall and Thorell, 2019). Therefore, combining multiple assessment methods can provide a more comprehensive and ecologically valid evaluation of these processes. This approach leverages the strengths of each method while compensating for their limitations.

Moreover, these methodological differences highlight the importance of considering the potential influence of shared measurement sources on the observed associations. For example, in studies that rely solely on parent-report questionnaires, the consistent correlations between EF and ER may partly reflect shared method variance. This is a bias that occurs when data on two or more variables are obtained from the same source and/or using the same measurement method (Karimi and Meyer, 2019). This issue may partly explain why significant associations are more frequently observed in informant-report measures, particularly parent-report, than in task-related assessments. Therefore, using multiple assessment methods can help to confirm the presence of genuine relationships and prevent overestimation or underestimation due to task-specific methodological biases, particularly in domains where inconsistent findings have been reported.

It is also important to consider the wide age range of autistic participants across the included studies. While three studies focused on preschool-aged children (DeLucia et al., 2022; Jahromi et al., 2019), only one study (Sáez-Suanes et al., 2020a) examined autistic adults. This age variability limits the ability to identify consistent patterns of EF and ER across development, as childhood and adolescence are critical periods marked by substantial changes in executive and emotional processes (Berkovits et al., 2017; Best and Miller, 2010; Cibralic et al., 2019; Van Den Bergh et al., 2014), which may influence the association between EF and ER. Future research should address underrepresented age groups, particularly middle childhood and adolescence, and ideally employ longitudinal designs to track EF and ER trajectories in autism over time. This approach could help identify sensitive periods for intervention and target specific cognitive–emotional profiles at stage of development.

Taken together, factors such as participant age and methodological differences (task-based vs. report-based assessments) may limit the identification of clear relationships between EF and ER. However, findings from informant-based measures consistently indicate that autistic individuals – both children and adults – with greater EF difficulties also exhibit poorer ER abilities, suggesting that these difficulties persist across the lifespan.

4.2. *Executive functions and emotional regulation in ADHD*

Of the 16 included studies on ADHD, 12 examined children, three focused on adults, and one investigated adolescents. While four studies did not find significant associations between EF and ER, ten reported links between greater EF difficulties and poorer ER outcomes. These associations were observed across both task-based and report-based measures in children and adults with ADHD.

The relationship between EF and ER is well-established in the literature, with EF problems recognised as a core feature of ADHD. Impairments in inhibitory control, cognitive flexibility, and working memory have been linked to emotional impulsivity and heightened emotional reactivity – hallmark features of ADHD (Kooij et al., 2019) – with significant implications for social functioning (Bullard et al., 2024; Tamm et al., 2021).

Difficulties in inhibitory control hinder the regulation of immediate emotional reactions, often leading to impulsive emotional outbursts, challenges in delaying gratification, and struggles in suppressing inappropriate emotional expressions in social contexts (Singh et al., 2023). Accordingly, it has been suggested that reduced inhibitory control disrupts the ability to regulate emotional responses, which affects behaviour and in turn contributes to increased emotional lability (Sonuga-Barke, 2003). Similarly, impaired cognitive flexibility affects the ability to adapt to changing social environments, contributing to emotional difficulties (Roshani et al., 2020). This is particularly evident in children, who often experience heightened frustration and anger, leading to interpersonal conflicts (Aydın et al., 2022; Groves et al., 2022). Additionally, working memory difficulties may impair the ability to recall and apply previously learned coping strategies, contributing to emotional dysregulation (Zhao and Zhang, 2024; Marx et al., 2011).

Four studies did not find an association between EF and ER. Anker et al. (2022) specifically investigated the relationship between ER and working memory in adults with ADHD. Similarly, Imanipour et al. (2021) found no association between ER and working memory in children with or without ADHD. This suggests that the absence of a relationship is not specific to ADHD. However, this finding contrasts with the results of other studies, which reported significant associations between these constructs in ADHD (Jensen et al., 2018; Linca et al., 2022; Tarle et al., 2021). Of note, all of these studies assessed working memory using performance-based tasks, which may limit the detection of difficulties in everyday functioning. This may reflect challenges related to the ecological validity of these assessments, as traditional neuropsychological tasks often fail to capture real-world variability in executive performance (Chaytor and Schmitter-Edgecombe, 2003). Age differences may also contribute, as working memory difficulties tend to become less pronounced as individuals with ADHD mature (Ramos et al., 2020). Similarly, Dir et al. (2020) and Colonna et al. (2022) did not find a significant relationship between EF and ER. Dir et al. (2020) assessed decision-making in children with ADHD, a cognitive process known to be influenced by age. Research indicates that older individuals demonstrate more effective and deliberative decision-making strategies (Paulsen et al., 2011; Peters et al., 2007), suggesting that the absence of a significant association with ER in this study may be due to the ongoing

development of decision-making processes in children. On the other hand, Colonna et al. (2022) examined this relationship in adolescents but used irritability as a proxy for ER. This may have limited their findings, as irritability may not fully capture ER difficulties in this population. For instance, while school-aged children with ADHD often exhibit ER difficulties through aggressive behaviours and irritability, such as kicking or pinching (King and Waschbusch, 2010), adolescents with ADHD tend to display more hostility-driven behaviours (Yoo et al., 2021). These developmental differences highlight the importance of selecting appropriate ER measures across different age groups.

The inclusion of a control group in some studies revealed that the associations between cognitive and emotional dimensions were present in participants with and without ADHD, suggesting a pattern independent of diagnostic status (Jensen et al., 2018; Linca et al., 2022). However, other studies have indicated diagnostic specificity, showing that these associations are stronger, or only significant, among individuals with ADHD (Al-Yagon et al., 2020; Cavallet et al., 2016; Tarle et al., 2021; Van Cauwenberge et al., 2015).

Of the included studies, seven have used self-report measures, particularly to assess ER (Al-Yagon et al., 2020; Anker et al., 2022; Biederman et al., 2020; Imanipour et al., 2021; Inci Izmir et al., 2024; Leib et al., 2023; Zhang et al., 2023). Only one study has also used self-reports to evaluate EF (Biederman et al., 2020). The results should be interpreted with caution and ideally contrasted with those from other sources (e.g., caregiver reports), since individuals with ADHD often overestimate their academic, cognitive, and social abilities. This phenomenon is known as 'positive illusory bias' (Evangelista et al., 2008; Hoza et al., 2004, 2013; Swanson, Owens, and Hinshaw, 2012). This bias reflects a discrepancy between self-perceived and actual performance and has been associated with the psychosocial challenges commonly experienced by individuals with ADHD (Jia et al., 2016; Ohan and Johnston, 2011). EF may partly explain this discrepancy, as lower EF has been associated with less accurate self-assessment, even in individuals without ADHD, suggesting that EF difficulties may amplify this bias in ADHD (Chan and Martinussen, 2016). Similarly, Beer (2012) proposed that EF integrate positive and negative information to form a realistic self-concept. Thus, executive dysfunction may lead to inaccurate self-knowledge. While no studies have directly examined this bias in relation to ER, existing evidence suggests that EF difficulties could distort such self-evaluations.

Two of the included studies used self-reports with adult participants (Anker et al., 2022; Biederman et al., 2020), in which this bias appears to be less evident. However, Nelson (2013) found that young adults with ADHD also tend to overestimate their self-concept. Studies using self-reports in children or adolescents (Al-Yagon et al., 2020; Imanipour et al., 2021; Inci Izmir et al., 2024; Leib et al., 2023; Zhang et al., 2023) should also be interpreted cautiously due to the greater likelihood of this bias. Therefore, future research should carefully select assessment tools that consider the possible influence of this bias. Ideally these tools should combine self-reports with informant-based measures to validate the reliability of responses provided by individuals with ADHD, as Leib et al. (2023) did.

Overall, despite some studies not supporting this line of evidence, the broader body of research indicates a robust association between EF and ER difficulties in individuals with ADHD across various developmental stages.

4.3. *Executive Functions and Emotional Regulation in Autism/ADHD*

Only two studies examining the relationship between EF and ER in individuals with autism/ADHD co-occurrence were included. Barnes et al. (2025) reported a significant association between cognitive flexibility challenges and poorer ER abilities in both autistic and non-autistic children and adolescents. This pattern was observed regardless of diagnostic status, suggesting that the relationship between these constructs is not specific to autism. In contrast, Conner et al. (2023) found no significant relationship between EF (specifically shifting and inhibition) and ER in adolescents and young adults.

These discrepancies may be due to methodological differences. Barnes et al. (2025) relied on parent-report measures, whereas Conner et al. (2023) used self-reports for ER and task-based assessments for EF. As seen in autism and ADHD research, parent-reported measures tend to show stronger associations between EF and ER than performance-based tasks. Contextual factors may play a role, as symptom severity often varies across different settings (Hwang-Gu et al., 2021), and parents may perceive greater impairments due to the disruptive nature of behaviours in daily life (Hartman et al., 2007). However, the association between the EF and ER reported by Barnes et al. (2025) should be interpreted with caution, given that a single informant was used to assess both constructs.

While findings align with the broader autism and ADHD literature, conclusions should be drawn cautiously due to the limited number of studies. Nonetheless, current evidence suggests that reduced cognitive flexibility is associated with ER difficulties in co-occurring autism/ADHD, highlighting the need for further research in this area.

5. General discussion

This systematic review highlights the complex relationship between EF and ER in autism, ADHD, and autism/ADHD co-occurrence. Across these neurodevelopmental conditions, EF and ER appear to be closely related, yet the strength and nature of this association seem to vary depending on methodological approaches and developmental factors.

A key dimension that may be influencing findings is age. The relationship between EF and ER in autism is less consistently observed in preschool-aged children, possibly due to ongoing neurodevelopmental maturation and the limitations of verbal task-based assessments. In contrast, in ADHD, EF difficulties appear to be linked to ER difficulties across childhood and adulthood, with emotional impulsivity emerging as a core feature of the condition. Limited research on autism/ADHD co-occurrence suggests that cognitive flexibility plays a crucial role in ER difficulties, particularly in children and adolescents, but further studies are needed to clarify these associations across different life stages.

Methodological differences may also be contributing to inconsistencies in findings. Informant-based measures, such as parent reports, tend to reveal a stronger association between EF and ER than task-based assessments, suggesting that real-world executive difficulties may be more predictive of ER challenges than standardised cognitive tests (Rosenthal et al., 2013). Additionally, EF tasks that rely on verbal instructions may not accurately capture the executive profiles of autistic individuals, particularly in early childhood, when language difficulties are common. These factors underlie the importance of using multimodal assessments that integrate performance-based and ecological measures when examining EF and ER relationships.

Despite these methodological and developmental considerations, some patterns emerge across conditions. Both autism and ADHD are characterised by executive dysfunction and emotional dysregulation, but the nature of these difficulties differs. In autism, ER challenges appear to be often linked to cognitive rigidity, difficulties in attentional control, and a reliance on maladaptive regulatory strategies, potentially associated with impairments in cognitive flexibility and working memory. However, the limited number of studies may reflect the fact that research on ER is still in its early stages within this population. To date, most research has focused on broader behavioural processes, such as irritability, anxiety and depressive symptoms, and social difficulties (Kim et al., 2024; Macintosh and Dissanayake, 2006; Mayes et al., 2011; McGuire et al., 2016), rather than investigating the underlying capacity to regulate emotions directly, which may contribute to these behavioural challenges. In ADHD, emotional impulsivity, heightened reactivity, and difficulties in inhibitory control seem to be a key contributor to ER dysfunction, reflecting a more immediate and reactive emotional dysregulation profile. The limited evidence on autism/ADHD

co-occurrence suggests that these individuals may experience heightened EF and ER difficulties, particularly in flexibility-related domains, although findings remain inconclusive. Importantly, these differences in the associations between EF and ER may be partly explained by the increased attention given to ADHD in the last decade, which seems to be supported by the unbalanced number of articles included in the autism (n = 4), ADHD (n = 16), and co-occurring autism/ADHD (n = 2) sections of this review. In fact, the prevalence of ADHD has increased over the years, due to the broadening of the diagnostic criteria for ADHD over time, and to increased awareness of the condition by clinicians and the public, particularly among underrepresented minorities (Abdelnour et al., 2022).

Overall, this review highlights the need for further research to address the relationship between EF and ER across these conditions, particularly in autistic individuals and those with co-occurring autistic/ADHD, where evidence is limited. Future studies should prioritise longitudinal designs, incorporate diverse assessment methods, and consider developmental trajectories to provide a more comprehensive understanding of the relationship between EF problems and ER difficulties in neurodivergent populations.

5.1. Limitations of the included studies

The limitations of the included studies can be broadly categorised into three domains: generalisability, comorbidities, and methodological issues.

Generalisability is limited by the small sample sizes commonly reported in studies on autism (DeLucia et al., 2022; Jahromi et al., 2019; Zantinge et al., 2017), ADHD (Cavallet et al., 2016; Dir et al., 2020; Imanipour et al., 2021; Jensen et al., 2018; Marques et al., 2024; Tarle et al., 2021; Van Cauwenberge et al., 2015), and autism/ADHD (Barnes et al., 2025; Conner et al., 2023). Small samples reduce statistical power and hinder the extrapolation of findings to broader clinical populations. This limitation is further compounded by the underrepresentation of females. Some studies excluded women entirely (Cavallet et al., 2016), while others presented marked gender imbalances in autism (DeLucia et al., 2022; Zantinge et al., 2017), ADHD (Colonna et al., 2022; Jensen et al., 2018; Leib et al., 2023; Linca et al., 2022; Marques et al., 2024; Sjöwall and Thorell, 2019; Tarle et al., 2021; Van Cauwenberge et al., 2015; Zhang et al., 2023), and co-occurring autism/ADHD (Barnes et al., 2025; Conner et al., 2023). Additionally, two studies (Al-Yagon et al., 2020; Jahromi et al., 2019) did not report participants' sex/gender distribution, further constraining the interpretation and comparability of results.

Comorbidities also represent a major challenge. Several studies included participants with additional diagnoses such as ID (Sáez-Suanes et al., 2020a), Disruptive Behaviour Disorders (DBD, e.g., oppositional defiant or conduct disorder) (Dir et al., 2020; Tarle et al., 2021; Van Cauwenberge et al., 2015), cognitive disconnection syndrome (Inci Izmir et al., 2024), or specific learning disorders (Tarle et al., 2021). These co-occurring conditions likely amplified cognitive and emotional difficulties, particularly in cases involving DBD, which have been consistently linked to increased irritability and emotional dysregulation (APA, 2022), as well as greater executive impairments (Flores et al., 2022). Consistent with this, Hernandez et al. (2024) found that children with ADHD with co-occurring DBD exhibited more pronounced emotional problems than those with ADHD alone.

Methodological limitations further constrain interpretation. Many studies relied solely on caregiver-reported questionnaires, which, although ecologically valid (Diercks et al., 2022; Wallisch et al., 2018), would benefit from the inclusion of multiple informants to strengthen reliability and provide a more comprehensive perspective (Al-Yagon et al., 2020; Barnes et al., 2025; Marques et al., 2024). Likewise, studies using self-report measures (Al-Yagon et al., 2020; Anker et al., 2022; Biederman et al., 2020; Inci Izmir et al., 2024; Leib et al., 2023; Zhang et al., 2023) could be complemented with additional sources to minimise self-perception bias. Another frequent limitation is the absence of control groups, reported in studies on autism (Sáez-Suanes et al., 2020a), ADHD (Anker et al., 2022; Biederman et al., 2020; Colonna et al., 2022; Dir et al., 2020; Inci Izmir et al., 2024; Leib et al., 2023), and autism/ADHD (Conner et al., 2023). While the present review focuses on within-diagnosis associations between cognitive and emotional dimensions, including control groups would clarify whether such relationships are disorder-specific or reflect general developmental patterns.

Finally, intellectual functioning was not consistently controlled across studies. Some works on autism (DeLucia et al., 2022; Jahromi et al., 2019) and ADHD (Al-Yagon et al., 2020; Biederman et al., 2020; Marques et al., 2024) did not account for intelligence quotient (IQ), whereas others used it for sample characterisation, inclusion/exclusion criteria, or as a covariate for cognitive and emotional functioning (Jensen et al., 2018; Linca et al., 2022; Van Cauwenberge et al., 2015; Zhang et al., 2023). For example, Zantinge et al. (2017) found that autistic participants had a lower IQ, which was linked to greater reliance on avoidance strategies. Similarly, Jensen et al. (2018) found significant differences in IQ between ADHD and control groups, which could explain poorer performance in working memory (Antshel et al., 2010; Jepsen et al., 2009). Conner et al. (2023) found that, in autistic/ADHD participants, higher IQ was linked to poorer ER but better EF. Together, these findings suggest that IQ may act as a moderating factor in the relationship between EF and ER, influencing the strength and direction of their association by shaping individuals' cognitive resources and capacity to implement effective ER strategies.

5.2. Limitations and Future Directions

Despite providing valuable insights into the relationship between EF and ER in autism, ADHD, and co-occurring autism/ADHD, this review has several limitations.

The included studies varied widely in methodological approaches, particularly in how EF and ER were assessed. Studies using informant-reported measures (e.g., parent or teacher questionnaires) generally found associations between EF and ER compared to those using task-based measures. This discrepancy may be due to the ecological validity of standardised tasks, which often fail to capture real-world EF and ER challenges (Chaytor and Schmitter-Edgecombe, 2003). Future research should prioritise standardising EF and ER questionnaires and performance tasks to increase reporting consistency and improve the reliability of results, thereby facilitating data integration across studies. Using standardised methodologies would also allow for more accurate, potentially quantitative, comparisons of these relationships across diagnostic groups. From a methodological perspective, it is possible that the findings of studies that used a single informant to assess both constructs were influenced by shared method variance (Barnes et al., 2025; Marques et al., 2024; Sáez-Suanes et al., 2020a). Therefore, to reduce the potential bias introduced by this method-related effect and increase the reliability of the results, it is recommended that future research use multiple informants. In addition, given the key role that age seems to play in the association between EF and ER, longitudinal studies are needed to clearly understand the developmental trajectory of EF and ER interactions over time, to clarify whether early EF difficulties predict later ER challenges.

The small number of studies investigating autism and co-occurring autism/ADHD limits the ability to draw conclusions about the interaction between EF and ER in these populations. In autism, the relationship between EF and ER appears to vary across studies. In the case of autism/ADHD, however, evidence suggests that the association between altered cognitive flexibility and ER problems may be particularly pertinent. A possible explanation for the limited number of studies examining this relationship in autism/ADHD is that simultaneous diagnosis of both conditions only became permissible following the publication of the DSM-5, as previous diagnostic frameworks did not allow for this (APA,

2013; Harris, 2014). This has likely contributed to the scientific literature predominantly focusing on examining each condition separately. Indeed, the proportion of participants with dual diagnoses in the two studies included in this review was very small. This represents a significant limitation that restricts the validity and generalisability of their findings. Consequently, the current evidence is insufficient to clearly understand the relationship between EF and ER in individuals with co-occurring autism and ADHD. Addressing this gap should be a priority for future research, as this could inform the development of more targeted and effective clinical interventions. Additionally, more research is needed to understand how the overlapping and distinct characteristics of autism and ADHD influence these processes, given the high rates of co-occurrence between these conditions. Moreover, further studies are required to determine whether additional factors, such as the presence of camouflaging behaviours, may influence the nature of this relationship.

In conclusion, although the current review highlights the critical role of EF and ER relationship difficulties among autistic, ADHD and autistic/ADHD individuals, further investigation is essential to clarify both the shared and distinct patterns of this relationship across these diagnostic profiles. Considering this association as a potential transdiagnostic mechanism offers important clinical implications. This systematic review provides a valuable synthesis of the literature that can inform everyday practice, particularly in the domains of assessment, differential diagnosis, and intervention planning. Recognising how EF difficulties may underlie ER challenges can facilitate the early identification of neurodevelopmental conditions and support the implementation of targeted cognitive interventions. These may promote emotional self-regulation, adaptive functioning, and overall therapeutic outcomes. In this context, developing a deeper understanding of the shared and disorder-specific cognitive and emotional characteristics is essential for creating more personalised and effective treatment approaches. Additionally, a broader neuropsychological profile of the autism/ADHD co-occurrence group could lead to more precise and individualised treatment approaches, ultimately contributing to more effective clinical decision-making.

CRediT authorship contribution statement

All authors read and approved the final manuscript. M.P-R: Conceptualization, Data curation, Investigation, Writing – original draft, Writing – review & editing. S.C: Conceptualization, Data curation, Investigation, Writing – original draft, Writing – review & editing; S.C-P.Z: Data curation, Investigation and Writing – review & editing. A.C: Funding acquisition, Investigation, Project administration, Supervision, Writing – review & editing. M.T-F: Data curation, Investigation and Writing – review & editing. M.F-P: Conceptualization, Investigation, Methodology, Project administration, Supervision, Writing – original draft, Writing – review & editing.

Funding

This work is supported by Fundación María José Jove. This investigation has received financial support from: Instituto de Salud Carlos III (ISCIII) through the project PI22/00025 and co-funded by the European Regional Development Fund (ERDF); and Xunta de Galicia (Centro de investigación de Galicia accreditation 2024–2027 ED431G-2023/02). S.C-P.Z. and M.P-R. are supported by a predoctoral fellowship by Xunta de Galicia. S.C. is supported by national funds through FCT – Fundação para a Ciência e Tecnologia, I.P., under the R&D Unit: UID/04810/2025 – William James Centre for Research.

Declaration of Competing Interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.neubiorev.2026.106570.

Data availability

No data was used for the research described in the article.

References

Abdelnour, E., Jansen, M.O., Gold, J.A., 2022. ADHD diagnostic trends: Increased recognition or overdiagnosis? Mo. Med. 119 (5), 467–473.

Agnew-Blais, J.C., Polanczyk, G.V., Danese, A., Wertz, J., Moffitt, T.E., Arseneault, L., 2018. Young adult mental health and functional outcomes among individuals with remitted, persistent and late-onset ADHD. Br. J. Psychiatry 213 (3), 526–534. https://doi.org/10.1192/bjp.2018.97.

Alderson, R.M., Rapport, M.D., Kasper, L.J., Sarver, D.E., Kofler, M.J., 2012. Hyperactivity in boys with attention deficit/hyperactivity disorder (ADHD): The association between deficient behavioral inhibition, attentional processes, and objectively measured activity. Child Neuropsychol. 18 (5), 487–505. https://doi.org/10.1080/09297049.2011.631905.

Al-Yagon, M., Forte, D., Avrahami, L., 2020. Executive functions and attachment relationships in children with ADHD: Links to externalizing/internalizing problems, social skills, and negative mood regulation. J. Atten. Disord. 24 (13), 1876–1890. https://doi.org/10.1177/1087054717730608.

American Psychiatric Association, 2013. Diagnostic and statistical manual of mental disorders, 5th ed.. American Psychiatric Association, Washington, DC.

American Psychiatric Association, 2022. Diagnostic and statistical manual of mental disorders, 5th ed. revised version. American Psychiatric Association, Washington, DC.

Anker, E., Ogrim, G., Heir, T., 2022. Verbal working memory and processing speed: correlations with the severity of attention deficit and emotional dysregulation in adult ADHD. J. Neuropsychol. 16 (1), 211–235. https://doi.org/10.1111/jnp.12260.

Antshel, K.M., Russo, N., 2019. Autism spectrum disorders and ADHD: Overlapping phenomenology, diagnostic issues, and treatment considerations. Curr. Psychiatry Rep. 21 (5), 34. https://doi.org/10.1007/s11920-019-1020-5.

Antshel, K.M., Faraone, S.V., Maglione, K., Doyle, A.E., Fried, R., Seidman, L.J., Biederman, J., 2010. Executive functioning in high-IQ adults with ADHD. Psychol. Med. 40 (11), 1909–1918. https://doi.org/10.1017/S0033291709992273.

Astle, D.E., Holmes, J., Kievit, R., Gathercole, S.E., 2022. The transdiagnostic revolution in neurodevelopmental disorders. J. Child Psychol. Psychiatry Allied Discip. 63 (4), 397–417. https://doi.org/10.1111/jcpp.13481.

Aydın, O., Balıkçı, K., Sönmez, İ., Ünal-Aydın, P., Spada, M.M., 2022. Examining the roles of cognitive flexibility, emotion recognition, and metacognitions in adult Attention Deficit and Hyperactivity Disorder with predominantly inattentive presentation. Clin. Psychol. Psychother. 29 (2), 542–553. https://doi.org/10.1002/cpp.2645.

Banaschewski, T., Jennen-Steinmetz, C., Brandeis, D., Buitelaar, J.K., Kuntsi, J., Poustka, L., Sergeant, J.A., Sonuga-Barke, E.J., Frazier-Wood, A.C., Albrecht, B., Chen, W., Uebel, H., Schlotz, W., van der Meere, J.J., Gill, M., Manor, I., Miranda, A., Mulas, F., Oades, R.D., Roeyers, H., Asherson, P., 2012. Neuropsychological correlates of emotional lability in children with ADHD. J. Child Psychol. Psychiatry 53 (11), 1139–1148. https://doi.org/10.1111/j.1469-7610.2012.02596.x.

Barkley, R.A., 2010. Deficient emotional self-regulation: A core component of attention-deficit/hyperactivity disorder. J. ADHD Relat. Disord. 1, 5–37.

Barnes, G.L., Ozsivadjian, A., Baird, G., Absoud, M., Hollocks, M.J., 2025. Investigating the effects of transdiagnostic processes on anxiety and depression symptoms in autistic young people: The mediating role of emotion dysregulation. J. Autism Dev. Disord. 55 (3), 969–980. https://doi.org/10.1007/s10803-024-06246-0.

Beckwé, M., Deroost, N., Koster, E.H., De Lissnyder, E., De Raedt, R., 2014. Worrying and rumination are both associated with reduced cognitive control. Psychol. Res. 78 (5), 651–660. https://doi.org/10.1007/s00426-013-0517-5.

Beer, J.S., 2012. This time with motivation: The implications of social neuroscience for research on motivated self-and other-perception (and vice versa). Motiv. Emot. 36 (1), 38–45. https://doi.org/10.1007/s11031-011-9259-0.

Benallie, K.J., McClain, M.B., Bakner, K.E., Roanhorse, T., Ha, J., 2021. Executive functioning in children with ASD+ ADHD and ASD+ ID: A systematic review. Res. Autism Spectr. Disord. 86, 101807. https://doi.org/10.1016/j.rasd.2021.101807.

Berenguer, C., Roselló, B., Colomer, C., Baixauli, I., Miranda, A., 2018. Children with autism and attention deficit hyperactivity disorder. Relationships between symptoms and executive function, theory of mind, and behavioral problems. Res. Dev. Disabil. 83, 260–269. https://doi.org/10.1016/j.ridd.2018.10.001.

Berkovits, L., Eisenhower, A., Blacher, J., 2017. Emotion regulation in young children with autism spectrum disorders. J. Autism Dev. Disord. 47 (1), 68–79. https://doi.org/10.1007/s10803-016-2922-2.

Best, J.R., Miller, P.H., 2010. A developmental perspective on executive function. Child Dev. 81 (6), 1641–1660. https://doi.org/10.1111/j.1467-8624.2010.01499.x.

Biederman, J., DiSalvo, M., Woodworth, K.Y., Fried, R., Uchida, M., Biederman, I., Spencer, T.J., Surman, C., Faraone, S.V., 2020. Toward operationalizing deficient

emotional self-regulation in newly referred adults with ADHD: A receiver operator characteristic curve analysis. Eur. Psychiatry 63 (1), e21. https://doi.org/10.1192/j.eurpsy.2019.11.
Bottema-Beutel, K., Kapp, S.K., Lester, J.N., Sasson, N.J., Hand, B.N., 2021. Avoiding ableist language: Suggestions for autism researchers. Autism Adulthood 3 (1), 18–29, 10.1089/aut.2020.0014.
Bridgett, D.J., Oddi, K.B., Laake, L.M., Murdock, K.W., Bachmann, M.N., 2013. Integrating and differentiating aspects of self-regulation: Effortful control, executive functioning, and links to negative affectivity. Emotion 13 (1), 47–63. https://doi.org/10.1037/a0029536.
Buhle, J.T., Silvers, J.A., Wager, T.D., Lopez, R., Onyemekwu, C., Kober, H., Weber, J., Ochsner, K.N., 2014. Cognitive reappraisal of emotion: a meta-analysis of human neuroimaging studies. Cereb. Cortex 24 (11), 2981–2990. https://doi.org/10.1093/cercor/bht154.
Bullard, C.C., Alderson, R.M., Roberts, D.K., Tatsuki, M.O., Sullivan, M.A., Kofler, M.J., 2024. Social functioning in children with ADHD: an examination of inhibition, self-control, and working memory as potential mediators. Child Neuropsychol. 30 (7), 987–1009. https://doi.org/10.1080/09297049.2024.2304375.
Burgess, G.C., Depue, B.E., Ruzic, L., Willcutt, E.G., Du, Y.P., Banich, M.T., 2010. Attentional control activation relates to working memory in attention-deficit/hyperactivity disorder. Biol. Psychiatry 67 (7), 632–640. https://doi.org/10.1016/j.biopsych.2009.10.036.
Cai, R.Y., Richdale, A.L., Foley, K.R., Trollor, J., Uljarević, M., 2018b. Brief report: Cross-sectional interactions between expressive suppression and cognitive reappraisal and its relationship with depressive symptoms in autism spectrum disorder. Res. Autism Spectr. Disord. 45, 1–8. https://doi.org/10.1016/j.rasd.2017.10.002.
Cai, R.Y., Richdale, A.L., Uljarević, M., Dissanayake, C., Samson, A.C., 2018c. Emotion regulation in autism spectrum disorder: Where we are and where we need to go. Autism Res. 11 (7), 962–978. https://doi.org/10.1002/aur.1968.
Cai, R.Y., Richdale, A.L., Dissanayake, C., Uljarević, M., 2018a. Brief Report: Inter-relationship between emotion regulation, intolerance of uncertainty, anxiety, and depression in youth with autism spectrum disorder. J. Autism Dev. Disord. 48 (1), 316–325. https://doi.org/10.1007/s10803-017-3318-7.
Cai, R.Y., Richdale, A.L., Dissanayake, C., Trollor, J., Uljarević, M., 2019. Emotion regulation in autism: Reappraisal and suppression interactions. Autism 23 (3), 737–749. https://doi.org/10.1177/1362361318774558.
Camacho, M.C., Deshpande, E., Perino, M.T., 2025. The Cognitive–Affective Social Processing and Emotion Regulation (CASPER) model. Neuropsychopharmacol. https://doi.org/10.1038/s41386-025-02224-x.
Carver, C.S., Johnson, S.L., 2018. Impulsive reactivity to emotion and vulnerability to psychopathology. Am. Psychol. 73 (9), 1067. https://doi.org/10.1037/amp0000387.
Cavallet, M., Chaim-Avancini, T.M., Biazoli, C.E., Jr, Bazán, P.R., da Silva, M.A., Cunha, P.J., Miguel, C.S., Busatto, G.F., Louzã, M.R., Gawryszewski, L.G., 2016. Influence of emotional stimulus valence on inhibitory control in adults with and without ADHD. Exp. Brain Res. 234 (11), 3213–3223. https://doi.org/10.1007/s00221-016-4719-0.
Chan, T., Martinussen, R., 2016. Positive illusions? The accuracy of academic self-appraisals in adolescents with ADHD. J. Pediatr. Psychol. 41 (7), 799–809. https://doi.org/10.1093/jpepsy/jsv116.
Chaytor, N., Schmitter-Edgecombe, M., 2003. The ecological validity of neuropsychological tests: a review of the literature on everyday cognitive skills. Neuropsychol. Rev. 13 (4), 181–197. https://doi.org/10.1023/b:nerv.0000009483.91468.fb.
Chevalier, N., 2018. Willing to think hard? The subjective value of cognitive effort in children. Child Dev. 89 (4), 1283–1295. https://doi.org/10.1111/cdev.12805.
Chiang, H.L., Gau, S.S., 2014. Impact of executive functions on school and peer functions in youths with ADHD. Res. Dev. Disabil. 35 (5), 963–972. https://doi.org/10.1016/j.ridd.2014.02.010.
Christoforou, M., Jones, E.J.H., White, P., Charman, T., 2023. Executive function profiles of preschool children with autism spectrum disorder and attention-deficit/hyperactivity disorder: A systematic review. JCPP Adv. 3 (1), e12123. https://doi.org/10.1002/jcv2.12123.
Cibralic, S., Kohlhoff, J., Wallace, N., McMahon, C., Eapen, V., 2019. A systematic review of emotion regulation in children with Autism Spectrum Disorder. Res. Autism Spectr. Disord. 68, 101422. https://doi.org/10.1016/j.rasd.2019.101422.
Çiray, R.O., Özyurt, G., Turan, S., Karagöz, E., Ermiş, Ç., Öztürk, Y., Akay, A., 2022. The association between pragmatic language impairment, social cognition and emotion regulation skills in adolescents with ADHD. Nord. J. Psychiatry 76 (2), 89–95. https://doi.org/10.1080/08039488.2021.1938211.
Cleaton, M.A.M., Kirby, A., 2018. Why do we find it so hard to calculate the burden of neurodevelopmental disorders? J. Child. Dev. Disord. 4 (3), 10. https://doi.org/10.4172/2472-1786.100073.
Colonna, S., Eyre, O., Agha, S.S., Thapar, A., van Goozen, S., Langley, K., 2022. Investigating the associations between irritability and hot and cool executive functioning in those with ADHD. BMC Psychiatry 22 (1), 166. https://doi.org/10.1186/s12888-022-03818-1.
Conner, C.M., White, S.W., Scahill, L., Mazefsky, C.A., 2020. The role of emotion regulation and core autism symptoms in the experience of anxiety in autism. Autism 24 (4), 931–940. https://doi.org/10.1177/1362361320904217.
Conner, C.M., Elias, R., Smith, I.C., White, S.W., 2023. Emotion regulation and executive function: Associations with depression and anxiety in autism. Res. Autism Spectr. Disord. 101, 102103. https://doi.org/10.1016/j.rasd.2023.102103.
Craig, F., Margari, F., Legrottaglie, A.R., Palumbi, R., de Giambattista, C., Margari, L., 2016. A review of executive function deficits in autism spectrum disorder and attention-deficit/hyperactivity disorder. Neuropsychiatr. Dis. Treat. 12, 1191–1202. https://doi.org/10.2147/NDT.S104620.
Cruz, S., Zubizarreta, S.C., Costa, A.D., Araújo, R., Martinho, J., Tubío-Fungueiriño, M., Sampaio, A., Cruz, R., Carracedo, A., Fernández-Prieto, M., 2024. Is there a bias towards males in the diagnosis of autism? A systematic review and meta-analysis. Neuropsychol. Rev. 35 (1), 153–176. https://doi.org/10.1007/s11065-023-09630-2.
Cuthbert, B.N., 2014. The RDoC framework: facilitating transition from ICD/DSM to dimensional approaches that integrate neuroscience and psychopathology. World Psychiatry 13 (1), 28–35. https://doi.org/10.1002/wps.20087.
DeLucia, E.A., McKenna, M.P., Andrzejewski, T.M., Valentino, K., McDonnell, C.G., 2022. A pilot study of self-regulation and behavior problems in preschoolers with ASD: Parent broader autism phenotype traits relate to child emotion regulation and inhibitory control. J. Autism Dev. Disord. 52 (10), 4397–4411. https://doi.org/10.1007/s10803-021-05322-z.
Demetriou, E.A., Lampit, A., Quintana, D.S., Naismith, S.L., Song, Y.J.C., Pye, J.E., Hickie, I., Guastella, A.J., 2018. Autism spectrum disorders: a meta-analysis of executive function. Mol. Psychiatry 23 (5), 1198–1204. https://doi.org/10.1038/mp.2017.75.
Diamond, A., 2013. Executive functions. Annu. Rev. Psychol. 64 (1), 135–168. https://doi.org/10.1146/annurev-psych-113011-143750.
Diercks, C.M., Gunther, K.E., Teti, D.M., Lunkenheimer, E., 2022. Ecological validity in measuring parents' executive function. Child Dev. Perspect. 16 (4), 208–214. https://doi.org/10.1111/cdep.12464.
Dijkhuis, R., de Sonneville, L., Ziermans, T., Staal, W., Swaab, H., 2020. Autism symptoms, executive functioning and academic progress in higher education students. J. Autism Dev. Disord. 50 (4), 1353–1363. https://doi.org/10.1007/s10803-019-04267-8.
Dir, A.L., Allebach, C.L., Hummer, T.A., Adams, Z.W., Aalsma, M.C., Finn, P.R., Nurnberger, J.I., Hulvershorn, L.A., 2020. Atypical cortical activation during risky decision making in disruptive behavior disordered youths with histories of suicidal ideation. Biol. Psych. Cogn. Neurosci. Neuroimg. 5 (5), 510–519. https://doi.org/10.1016/j.bpsc.2019.10.016.
DuPaul, G.J., Power, T.J., Anastopoulos, A.D., Reid, R., 1998. ADHD Rating Scale—IV: Checklists, norms, and clinical interpretation. The Guilford Press.
DuPaul, G.J., Power, T.J., Anastopoulos, A.D., Reid, R., 2016. ADHD Rating Scale–5 for children and adolescents: Checklists, norms, and clinical interpretation. Guilford Press, New York, NY.
Eisenberg, I.W., Bissett, P.G., Zeynep Enkavi, A., Li, J., MacKinnon, D.P., Marsch, L.A., Poldrack, R.A., 2019. Uncovering the structure of self-regulation through data-driven ontology discovery. Nat. Commun. 10 (1), 2319. https://doi.org/10.1038/s41467-019-10301-1.
Ellis Weismer, S., Kaushanskaya, M., Larson, C., Mathée, J., Bolt, D., 2018. Executive function skills in school-age children with autism spectrum disorder: Association with language abilities. J. Speech Lang. Hear. Res. 61 (11), 2641–2658. https://doi.org/10.1044/2018_JSLHR-L-RSAUT-18-0026.
England-Mason, G., 2020. Emotion regulation as a transdiagnostic feature in children with neurodevelopmental disorders. Curr. Dev. Disord. Rep. 7, 130–138. https://doi.org/10.1007/s40474-020-00200-2.
Evangelista, N.M., Owens, J.S., Golden, C.M., Pelham Jr, W.E., 2008. The positive illusory bias: do inflated self-perceptions in children with ADHD generalize to perceptions of others? J. Abnorm. Child Psychol. 36 (5), 779–791. https://doi.org/10.1007/s10802-007-9210-8.
Faraone, S.V., Rostain, A.L., Blader, J., Busch, B., Childress, A.C., Connor, D.F., Newcorn, J.H., 2019. Practitioner review: Emotional dysregulation in attention-deficit/hyperactivity disorder - implications for clinical recognition and intervention. J. Child Psychol. Psychiatry Allied Discip. 60 (2), 133–150. https://doi.org/10.1111/jcpp.12899.
Flores, R.E.U., Sánchez, R.D., De La Peña, F.R., Sciutto, M.F.R., Cruz, L.P., Villa, P.M., 2022. Executive functioning in children and adolescents with ADHD and disruptive behavior disorders. Innov. Clin. Neurosci. 19 (10-12), 16–18.
Friedman, N.P., Miyake, A., 2017. Unity and diversity of executive functions: Individual differences as a window on cognitive structure. Cortex 86, 186–204. https://doi.org/10.1016/j.cortex.2016.04.023.
Gabbay-Dizdar, N., Ilan, M., Meiri, G., Faroy, M., Michaelovski, A., Flusser, H., Menashe, I., Koller, J., Zachor, D.A., Dinstein, I., 2022. Early diagnosis of autism in the community is associated with marked improvement in social symptoms within 1-2 years. Autism 26 (6), 1353–1363. https://doi.org/10.1177/13623613211049011.
García-Molina, A., 2018. EvaluaciónN. De. las Func. ejecutivas. Madr. Síntesis.
Gioia, G.A., Isquith, P.K., Kenworthy, L., Barton, R.M., 2002. Profiles of everyday executive function in acquired and developmental disorders. Child Neuropsychol. 8 (2), 121–137. https://doi.org/10.1076/chin.8.2.121.8727.
Graziano, P.A., Garcia, A., 2016. Attention-deficit hyperactivity disorder and children's emotion dysregulation: A meta-analysis. Clin. Psychol. Rev. 46, 106–123. https://doi.org/10.1016/j.cpr.2016.04.011.
Gross, J.J., 2015. Emotion regulation: Current status and future prospects. Psychol. Inq. 26 (1), 1–26. https://doi.org/10.1080/1047840X.2014.940781.
Gross, J.J., John, O.P., 2003. Individual differences in two emotion regulation processes: implications for affect, relationships, and well-being. J. Personal. Soc. Psychol. 85 (2), 348. https://doi.org/10.1037/0022-3514.85.2.348.
Groves, N.B., Kofler, M.J., Wells, E.L., Day, T.N., Chan, E.S.M., 2020. An examination of relations among working memory, ADHD symptoms, and emotion regulation. J. Abnorm. Child Psychol. 48 (4), 525–537. https://doi.org/10.1007/s10802-019-00612-8.
Groves, N.B., Wells, E.L., Soto, E.F., Marsh, C.L., Jaisle, E.M., Harvey, T.K., Kofler, M.J., 2022. Executive functioning and emotion regulation in children with and without

ADHD. Res. Child Adolesc. Psychopathol. 50 (6), 721–735. https://doi.org/10.1007/s10802-021-00883-0.
Hansen, B.H., Oerbeck, B., Skirbekk, B., Petrovski, B.É., Kristensen, H., 2018. Neurodevelopmental disorders: prevalence and comorbidity in children referred to mental health services. Nord. J. Psychiatry 72 (4), 285–291. https://doi.org/10.1080/08039488.2018.1444087.
Harris, J.C., 2014. New classification for neurodevelopmental disorders in DSM-5. Curr. Opin. Psychiatry 27 (2), 95–97. https://doi.org/10.1097/YCO.0000000000000042.
Hartman, C.A., Rhee, S.H., Willcutt, E.G., Pennington, B.F., 2007. Modeling rater disagreement for ADHD: are parents or teachers biased? J. Abnorm. Child Psychol. 35 (4), 536–542. https://doi.org/10.1007/s10802-007-9110-y.
Hendricks, M.A., Buchanan, T.W., 2016. Individual differences in cognitive control processes and their relationship to emotion regulation. Cogn. Emot. 30 (5), 912–924. https://doi.org/10.1080/02699931.2015.1032893.
Hendry, A., Jones, E.J., Charman, T., 2016. Executive function in the first three years of life: Precursors, predictors and patterns. Dev. Rev. 42, 1–33. https://doi.org/10.1016/j.dr.2016.06.005.
Hernandez, M.L., Garcia, A.M., Spiegel, J.A., Dick, A.S., Graziano, P.A., 2024. Multimodal assessment of emotion dysregulation in children with and without ADHD and disruptive behavior disorders. J. Clin. Child Adolesc. Psychol. 53 (3), 444–459. https://doi.org/10.1080/15374416.2024.2303706.
Hoza, B., Gerdes, A.C., Hinshaw, S.P., Arnold, L.E., Pelham, W.E., Jr, Molina, B.S., Abikoff, H.B., Epstein, J.N., Greenhill, L.L., Hechtman, L., Odbert, C., Swanson, J.M., Wigal, T., 2004. Self-perceptions of competence in children with ADHD and comparison children. J. Consult. Clin. Psychol. 72 (3), 382–391. https://doi.org/10.1037/0022-006X.72.3.382.
Hoza, B., McQuade, J.D., Murray-Close, D., Shoulberg, E., Molina, B.S., Arnold, L.E., Swanson, J., Hechtman, L., 2013. Does childhood positive self-perceptual bias mediate adolescent risky behavior in youth from the MTA study? J. Consult. Clin. Psychol. 81 (5), 846–858. https://doi.org/10.1037/a0033536.
Hwang-Gu, S.L., Ni, H.C., Liang, S.H., Lin, H.Y., Tsao, L., Lin, C.F., Gau, S.S., 2021. Contextual factors impact the variability in ADHD symptoms in preschoolers with situational hyperactivity. J. Atten. Disord. 25 (13), 1834–1846. https://doi.org/10.1177/1087054720938864.
Imanipour, S., Sheikh, M., Shayestefar, M., Baloochnejad, T., 2021. Deficits in working memory and theory of mind may underlie difficulties in social perception of children with ADHD. Neurol. Res. Int. 2021, 3793750. https://doi.org/10.1155/2021/3793750.
Inci Izmir, S.B., Aktan, Z.D., Ercan, E.S., 2024. Assessing the mediating relationships between psychological factors in children with attention deficit hyperactivity disorder and cognitive disengagement syndrome. Appl. Neuropsychol. Child 1–17. https://doi.org/10.1080/21622965.2024.2341251.
Insel, T., Cuthbert, B., Garvey, M., Heinssen, R., Pine, D.S., Quinn, K., Sanislow, C., Wang, P., 2010. Research domain criteria (RDoC): toward a new classification framework for research on mental disorders. Am. J. Psychiatry 167 (7), 748–751. https://doi.org/10.1176/appi.ajp.2010.09091379.
Jahromi, L.B., Bryce, C.I., Swanson, J., 2013. The importance of self-regulation for the school and peer engagement of children with high-functioning autism. Res. Autism Spectr. Disord. 7 (2), 235–246. https://doi.org/10.1016/j.rasd.2012.08.012.
Jahromi, L.B., Chen, Y., Dakopolos, A.J., Chorneau, A., 2019. Delay of gratification in preschoolers with and without autism spectrum disorder: Individual differences and links to executive function, emotion regulation, and joint attention. Autism 23 (7), 1720–1731. https://doi.org/10.1177/1362361319828678.
Jaisle, E.M., Groves, N.B., Black, K.E., Kofler, M.J., 2023. Linking ADHD and ASD symptomatology with social impairment: The role of emotion dysregulation. Res. Child Adolesc. Psychopathol. 51 (1), 3–16. https://doi.org/10.1007/s10802-022-00982-6.
Jensen, D.A., Høvik, M.F., Monsen, N.J.N., Eggen, T.H., Eichele, H., Adolfsdottir, S., Plessen, K.J., Sørensen, L., 2018. Keeping emotions in mind: The influence of working memory capacity on parent-reported symptoms of emotional lability in a sample of children with and without ADHD. Front. Psychol. 9, 1846. https://doi.org/10.3389/fpsyg.2018.01846.
Jepsen, J.R., Fagerlund, B., Mortensen, E.L., 2009. Do attention deficits influence IQ assessment in children and adolescents with ADHD? J. Atten. Disord. 12 (6), 551–562. https://doi.org/10.1177/1087054708322996.
Jia, M., Jiang, Y., Mikami, A.Y., 2016. Positively biased self-perceptions in children with ADHD: Unique predictor of future maladjustment. J. Abnorm. Child Psychol. 44 (3), 575–586. https://doi.org/10.1007/s10802-015-0056-1.
Jones, C.R.G., Simonoff, E., Baird, G., Pickles, A., Marsden, A.J.S., Tregay, J., Happé, F., Charman, T., 2018. The association between theory of mind, executive function, and the symptoms of autism spectrum disorder. Autism Res. 11 (1), 95–109. https://doi.org/10.1002/aur.1873.
Karimi, L., Meyer, D., 2019. An evaluation of common method variance-bias in psychology. Int. J. Psychol. Stud. 11 (3), 83–94. https://doi.org/10.5539/ijps.v11n3p83.
Kaufman, J., Birmaher, B., Axelson, D., Perepletchikova, F., Brent, D., 2016. Kiddie Schedule for Affective Disorders and Schizophrenia for School-Age Children – Present and Lifetime Version (K-SADS-PL DSM-5). University of Pittsburgh.
Kenny, L., Hattersley, C., Molins, B., Buckley, C., Povey, C., Pellicano, E., 2016. Which terms should be used to describe autism? Perspectives from the UK autism community. Autism 20 (4), 442–462. https://doi.org/10.1177/1362361315588200.
Kessler, R.C., Adler, L., Ames, M., Demler, O., Faraone, S., Hiripi, E., Howes, M.J., Jin, R., Secnik, K., Spencer, T., Ustun, T.B., Walters, E.E., 2005. The World Health Organization adult ADHD self-report scale (ASRS): a short screening scale for use in the general population. Psychol. Med. 35 (2), 245–256. https://doi.org/10.1017/s0033291704002892.
Khachadourian, V., Mahjani, B., Sandin, S., Kolevzon, A., Buxbaum, J.D., Reichenberg, A., Janecka, M., 2023. Comorbidities in autism spectrum disorder and their etiologies. Transl. Psychiatry 13 (1), 71. https://doi.org/10.1038/s41398-023-02374-w.
Kim, H., Kim, J.H., Yi, J.H., Kim, J.Y., Solmi, M., Cortese, S., Smith, L., Koyanagi, A., Shin, J.I., Cheon, K.A., 2024. Correlations between sleep problems, core symptoms, and behavioral problems in children and adolescents with autism spectrum disorder: a systematic review and meta-analysis. Eur. Child Adolesc. Psychiatry 33 (5), 1539–1549. https://doi.org/10.1007/s00787-023-02253-1.
King, S., Waschbusch, D.A., 2010. Aggression in children with attention-deficit/hyperactivity disorder. Expert Rev. Neurother. 10 (10), 1581–1594. https://doi.org/10.1586/ern.10.146.
Klefsjö, U., Kantzer, A.K., Gillberg, C., Billstedt, E., 2021. The road to diagnosis and treatment in girls and boys with ADHD - gender differences in the diagnostic process. Nord. J. Psychiatry 75 (4), 301–305. https://doi.org/10.1080/08039488.2020.1850859.
Kohn, N., Eickhoff, S.B., Scheller, M., Laird, A.R., Fox, P.T., Habel, U., 2014. Neural network of cognitive emotion regulation — An ALE meta-analysis and MACM analysis. NeuroImage 87, 345–355. https://doi.org/10.1016/j.neuroimage.2013.11.001.
Kooij, J.J.S., Bijlenga, D., Salerno, L., Jaeschke, R., Bitter, I., Balázs, J., Thome, J., Dom, G., Kasper, S., Nunes Filipe, C., Stes, S., Mohr, P., Leppämäki, S., Casas, M., Bobes, J., Mccarthy, J.M., Richarte, V., Kjems Philipsen, A., Pehlivanidis, A., Niemela, A., Asherson, P., 2019. Updated European Consensus Statement on diagnosis and treatment of adult ADHD. Eur. Psychiatry 56, 14–34. https://doi.org/10.1016/j.eurpsy.2018.11.001.
Leib, S.I., Miller, S.A., Chin, E., 2023. Latent structure of working memory and emotion regulation in pediatric ADHD. Child Neuropsychol. 29 (4), 644–665. https://doi.org/10.1080/09297049.2022.2107626.
Leung, R.C., Vogan, V.M., Powell, T.L., Anagnostou, E., y, Taylor, M.J., 2016. The role of executive functions in social impairment in Autism Spectrum Disorder. Child Neuropsychol. 22 (3), 336–344. https://doi.org/10.1080/09297049.2015.1005066.
Linca, F.I., Budisteanu, M., Popovici, D.V., Cucu, N., 2022. The moderating role of emotional regulation on the relationship between school results and personal characteristics of pupils with attention deficit/hyperactivity disorder. Children 9 (11), 1637. https://doi.org/10.3390/children9111637.
Lopez, B.R., Lincoln, A.J., Ozonoff, S., Lai, Z., 2005. Examining the relationship between executive functions and restricted, repetitive symptoms of Autistic Disorder. J. Autism Dev. Disord. 35 (4), 445–460. https://doi.org/10.1007/s10803-005-5035-x.
Lord, C., Rutter, M., DiLavore, P.C., et al., 2012. Autism diagnostic observation schedule, 3rd ed.). Western Psychological Services, Torrance, CA.
Macintosh, K., Dissanayake, C., 2006. Social skills and problem behaviours in school aged children with high-functioning autism and Asperger's disorder. J. Autism Dev. Disord. 36 (8), 1065–1076. https://doi.org/10.1007/s10803-006-0139-5.
Makowski, D., Sperduti, M., Blanchet, S., Nicolas, S., Piolino, P., 2015. Régulation émotionnelle face au déclin cognitif dans le vieillissement: un faux paradoxe ? [Emotion regulation and the cognitive decline in aging: beyond the paradox]. Geriatr. Et. Psychol. Neuropsychiatr. du Vieil. 13 (3), 301–308. https://doi.org/10.1684/pnv.2015.0561.
(*) Marques, S., Correia-de-Sá, T., Guardiano, M., Sampaio-Maia, B., Ferreira-Gomes, J., 2024. Emotion dysregulation and depressive symptoms mediate the association between inhibitory control difficulties and aggressive behaviour in children with ADHD. Front. Psychiatry 15, 1329401. https://doi.org/10.3389/fpsyt.2024.1329401.
Marx, I., Domes, G., Havenstein, C., Berger, C., Schulze, L., Herpertz, S.C., 2011. Enhanced emotional interference on working memory performance in adults with ADHD. World J. Biol. Psychiatry 12 (1), 70–75. https://doi.org/10.3109/15622975.2011.599213.
Mayes, S.D., Calhoun, S.L., Murray, M.J., Ahuja, M., Smith, L.A., 2011. Anxiety, depression, and irritability in children with autism relative to other neuropsychiatric disorders and typical development. Res. Autism Spectr. Disord. 5 (1), 474–485. https://doi.org/10.1016/j.rasd.2010.06.012.
Mazefsky, C.A., Herrington, J., Siegel, M., Scarpa, A., Maddox, B.B., Scahill, L., White, S.W., 2013. The role of emotion regulation in autism spectrum disorder. J. Am. Acad. Child Adolesc. Psychiatry 52 (7), 679–688. https://doi.org/10.1016/j.jaac.2013.05.006.
McGuire, K., Fung, L.K., Hagopian, L., Vasa, R.A., Mahajan, R., Bernal, P., Silberman, A.E., Wolfe, A., Coury, D.L., Hardan, A.Y., Veenstra-VanderWeele, J., Whitaker, A.H., 2016. Irritability and problem behavior in autism spectrum disorder: A practice pathway for pediatric primary care. Pediatrics 137 (ement 2), S136–S148. https://doi.org/10.1542/peds.2015–2851 L.
McHugh, M.L., 2012. Interrater reliability: the kappa statistic. Biochem. Med. 22 (3), 276–282.
McRae, K., Jacobs, S.E., Ray, R.D., John, O.P., Gross, J.J., 2012. Individual differences in reappraisal ability: Links to reappraisal frequency, well-being, and cognitive control. J. Res. Personal. 46 (1), 2–7. https://doi.org/10.1016/j.jrp.2011.10.003.
Miyake, A., Friedman, N.P., Emerson, M.J., Witzki, A.H., Howerter, A., y, Wager, T.D., 2000. The unity and diversity of executive functions and their contributions to complex "Frontal Lobe" tasks: a latent variable analysis. Cogn. Psychol. 41 (1), 49–100. https://doi.org/10.1006/cogp.1999.0734.
Moher, D., Shamseer, L., Clarke, M., Ghersi, D., Liberati, A., Petticrew, M., Shekelle, P., Stewart, L.A., 2015. Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015 statement (PRISMA-P Group). Syst. Rev. 4 (1), 1. https://doi.org/10.1186/2046-4053-4-1.

Moola, S., Munn, Z., Tufanaru, C., Aromataris, E., Sears, K., Sfetcu, R., Currie, M., Lisy, K., Qureshi, R., Mattis, P., Mu, P.F., 2017. Systematic reviews of etiology and risk. Joanna Briggs Inst. Rev. 'S. Man. 5, 217–269.
Moriguchi, Y., Hiraki, K., 2013. Prefrontal cortex and executive function in young children: a review of NIRS studies. Front. Hum. Neurosci. 7, 867. https://doi.org/10.3389/fnhum.2013.00867.
Nelson, J.M., 2013. Self-concept of college students with ADHD: discordance between self- and parent-reports. J. Atten. Disord. 17 (2), 163–170. https://doi.org/10.1177/1087054711430331.
Niendam, T.A., Laird, A.R., Ray, K.L., Dean, Y.M., Glahn, D.C., Carter, C.S., 2012. Meta-analytic evidence for a superordinate cognitive control network subserving diverse executive functions. Cogn. Affect. Behav. Neurosci. 12 (2), 241–268. https://doi.org/10.3758/s13415-011-0083-5.
Nigg, J.T., 2017. On the relations among self-regulation, self-control, executive functioning, effortful control, cognitive control, impulsivity, risk-taking, and inhibition for developmental psychopathology. J. Child Psychol. Psychiatry Allied Discip. 58 (4), 361–383. https://doi.org/10.1111/jcpp.12675.
Nylander, L., Holmqvist, M., Gustafson, L., Gillberg, C., 2013. Attention-deficit/hyperactivity disorder (ADHD) and autism spectrum disorder (ASD) in adult psychiatry. A 20-year register study. Nord. J. Psychiatry 67 (5), 344–350. https://doi.org/10.3109/08039488.2012.748824.
Ochsner, K.N., Gross, J.J., 2005. The cognitive control of emotion. Trends Cogn. Sci. 9 (5), 242–249. https://doi.org/10.1016/j.tics.2005.03.010.
Ochsner, K.N., Silvers, J.A., Buhle, J.T., 2012. Functional imaging studies of emotion regulation: a synthetic review and evolving model of the cognitive control of emotion. Ann. N. Y. Acad. Sci. 1251, E1–E24. https://doi.org/10.1111/j.1749-6632.2012.06751.x.
Ohan, J.L., Johnston, C., 2011. Positive illusions of social competence in girls with and without ADHD. J. Abnorm. Child Psychol. 39 (4), 527–539. https://doi.org/10.1007/s10802-010-9484-0.
Ozonoff, S., 2015. Early detection of mental health and neurodevelopmental disorders: the ethical challenges of a field in its infancy. J. Child Psychol. Psychiatry 56 (9), 933–935. https://doi.org/10.1111/jcpp.12452.
Parenti, I., Rabaneda, L.G., Schoen, H., Novarino, G., 2020. Neurodevelopmental disorders: from genetics to functional pathways. Trends Neurosci. 43 (8), 608–621. https://doi.org/10.1016/j.tins.2020.05.004.
Paulsen, D.J., Platt, M.L., Huettel, S.A., Brannon, E.M., 2011. Decision-making under risk in children, adolescents, and young adults. Front. Psychol. 2, 72. https://doi.org/10.3389/fpsyg.2011.00072.
Peters, E., Hess, T.M., Västfjäll, D., Auman, C., 2007. Adult age differences in dual information processes: implications for the role of affective and deliberative processes in older adults' decision making. Perspect. Psychol. Sci. 2 (1), 1–23. https://doi.org/10.1111/j.1745-6916.2007.00025.x.
Petrolo, E., Guerrera, S., Logrieco, M.G., Casula, L., Vicari, S., Valeri, G., 2025. The role of executive functions in preschool children with autism spectrum disorder: A short narrative review. Res. Dev. Disabil. 157, 104905. https://doi.org/10.1016/j.ridd.2024.104905.
Pickles, A., Le Couteur, A., Leadbitter, K., Salomone, E., Cole-Fletcher, R., Tobin, H., Gammer, I., Lowry, J., Vamvakas, G., Byford, S., Aldred, C., Slonims, V., McConachie, H., Howlin, P., Parr, J.R., Charman, T., Green, J., 2016. Parent-mediated social communication therapy for young children with autism (PACT): long-term follow-up of a randomised controlled trial. Lancet 388 (10059), 2501–2509. https://doi.org/10.1016/S0140-6736(16)31229-6.
Pugliese, C.E., Anthony, L.G., Strang, J.F., Dudley, K., Wallace, G.L., Naiman, D.Q., Kenworthy, L., 2016. Longitudinal examination of adaptive behavior in autism spectrum disorders: Influence of executive function. J. Autism Dev. Disord. 46 (2), 467–477. https://doi.org/10.1007/s10803-015-2584-5.
Putnam, S.P., Rothbart, M.K., 2006. Development of short and very short forms of the Children's Behavior Questionnaire. J. Personal. Assess. 87 (1), 102–112. https://doi.org/10.1207/s15327752jpa8701_09.
Ramos, A.A., Hamdan, A.C., Machado, L., 2020. A meta-analysis on verbal working memory in children and adolescents with ADHD. Clin. Neuropsychol. 34 (5), 873–898. https://doi.org/10.1080/13854046.2019.1604998.
Rao, P.A., Landa, R.J., 2014. Association between severity of behavioral phenotype and comorbid attention deficit hyperactivity disorder symptoms in children with autism spectrum disorders. Autism 18 (3), 272–280. https://doi.org/10.1177/1362361312470494.
Rapport, M.D., Bolden, J., Kofler, M.J., Sarver, D.E., Raiker, J.S., Alderson, R.M., 2009. Hyperactivity in boys with attention-deficit/hyperactivity disorder (ADHD): a ubiquitous core symptom or manifestation of working memory deficits? J. Abnorm. Child Psychol. 37 (4), 521–534. https://doi.org/10.1007/s10802-008-9287-8.
Reyes, N.M., Factor, R., Scarpa, A., 2020. Emotion regulation, emotionality, and expression of emotions: A link between social skills, behavior, and emotion problems in children with ASD and their peers. Res. Dev. Disabil. 106, 103770. https://doi.org/10.1016/j.ridd.2020.103770.
Riediger, M., Bellingtier, J.A., 2022. Emotion regulation across the lifespan. Oxf. Handb. Emot. Dev. 92–109.
Röll, J., Koglin, U., Petermann, F., 2012. Emotion regulation and childhood aggression: longitudinal associations. Child Psychiatry Hum. Dev. 43 (6), 909–923. https://doi.org/10.1007/s10578-012-0303-4.
Rong, Y., Yang, C.J., Jin, Y., Wang, Y., 2021. Prevalence of attention-deficit/hyperactivity disorder in individuals with autism spectrum disorder: A meta-analysis. Res. Autism Spectr. Disord. 83, 101759. https://doi.org/10.1016/j.rasd.2021.101759.
Rosenthal, M., Wallace, G.L., Lawson, R., Wills, M.C., Dixon, E., Yerys, B.E., Kenworthy, L., 2013. Impairments in real-world executive function increase from childhood to adolescence in autism spectrum disorders. Neuropsychology 27 (1), 13–18. https://doi.org/10.1037/a0031299.
Roshani, F., Piri, R., Malek, A., Michel, T.M., Vafaee, M.S., 2020. Comparison of cognitive flexibility, appropriate risk-taking and reaction time in individuals with and without adult ADHD. Psychiatry Res. 284, 112494. https://doi.org/10.1016/j.psychres.2019.112494.
Rothbart, M.K., Ahadi, S.A., Hershey, K.L., Fisher, P., 2001. Investigations of temperament at three to seven years: the Children's Behavior Questionnaire. Child Dev. 72 (5), 1394–1408. https://doi.org/10.1111/1467-8624.00355.
Russell, J., Jarrold, C., Hood, B., 1999. Two intact executive capacities in children with autism: implications for the core executive dysfunctions in the disorder. J. Autism Dev. Disord. 29 (2), 103–112. https://doi.org/10.1023/a:1023084425406.
Rutter, M., Le Couteur, A., Lord, C., 2003. ADI-R. Autism Diagnostic Interview Revised Manual. Los Angel. West. Psychol. Serv.
Sáez-Suanes, G.P., García-Villamisar, D., del Pozo Armentia, A., Dattilo, J., 2020b. Emotional dysregulation and uncertainty intolerance as transdiagnostic mediators of anxiety in adults with autism spectrum disorders and intellectual disability. Res. Dev. Disabil. 106, 103784. https://doi.org/10.1016/j.ridd.2020.103784.
Sáez-Suanes, G.P., García-Villamisar, D., del Pozo Armentia, A., Dattilo, J., 2020a. Emotion regulation as a mediator between depressive symptoms and autism spectrum disorder (ASD) in adults with ASD and intellectual disabilities. Res. Autism Spectr. Disord. 78, 101654. https://doi.org/10.1016/j.rasd.2020.101654.
Samson, A.C., Phillips, J.M., Parker, K.J., Shah, S., Gross, J.J., Hardan, A.Y., 2014. Emotion dysregulation and the core features of autism spectrum disorder. J. Autism Dev. Disord. 44 (7), 1766–1772. https://doi.org/10.1007/s10803-013-2022-5.
Schäfer, J.Ö., Naumann, E., Holmes, E.A., Tuschen-Caffier, B., Samson, A.C., 2017. Emotion regulation strategies in depressive and anxiety symptoms in youth: A meta-analytic review. J. Youth Adolesc. 46 (2), 261–276. https://doi.org/10.1007/s10964-016-0585-0.
Schweizer, S., Samimi, Z., Hasani, J., Moradi, A., Mirdoraghi, F., Khaleghi, M., 2017. Improving cognitive control in adolescents with post-traumatic stress disorder (PTSD). Behav. Res. Ther. 93, 88–94. https://doi.org/10.1016/j.brat.2017.03.017.
Shaw, P., Stringaris, A., Nigg, J., Leibenluft, E., 2014. Emotion dysregulation in attention deficit hyperactivity disorder. Am. J. Psychiatry 171 (3), 276–293. https://doi.org/10.1176/appi.ajp.2013.13070966.
Shields, A., Cicchetti, D., 1997. Emotion regulation among school-age children: the development and validation of a new criterion Q-sort scale. Dev. Psychol. 33 (6), 906–916. https://doi.org/10.1037//0012-1649.33.6.906.
Sibley, M.H., Swanson, J.M., Arnold, L.E., Hechtman, L.T., Owens, E.B., Stehli, A., Abikoff, H., Hinshaw, S.P., Molina, B.S.G., Mitchell, J.T., Jensen, P.S., Howard, A.L., Lakes, K.D., Pelham, W.E., 2017. Defining ADHD symptom persistence in adulthood: optimizing sensitivity and specificity (MTA Cooperative Group). J. Child Psychol. Psychiatry 58 (6), 655–662. https://doi.org/10.1111/jcpp.12620.
Silvers, J.A., 2022. Adolescence as a pivotal period for emotion regulation development. Curr. Opin. Psychol. 44, 258–263. https://doi.org/10.1016/j.copsyc.2021.09.023.
Simon, J., Hyde, C., Saravanapandian, V., Wilson, R., Schneider, B., Distefano, C., Besterman, A., Jeste, S., 2023. Correction: The diagnostic journey of genetically defined neurodevelopmental disorders. J. Neurodev. Disord. 15 (1), 38. https://doi.org/10.1186/s11689-023-09509-6.
Singh, A.D., Bedard, A.C.V., Andrade, B.F., 2023. Inhibitory control mediates the association between emotion dysregulation and symptoms of ADHD and ODD in children with disruptive behavior. Adv. Neurodev. Disord. 7 (4), 579–590. https://doi.org/10.1007/s41252-023-00324-7.
Sjöwall, D., Thorell, L.B., 2019. A critical appraisal of the role of neuropsychological deficits in preschool ADHD. Child Neuropsychol. 25 (1), 60–80. https://doi.org/10.1080/09297049.2018.1447096.
Sonuga-Barke, E.J., 2003. The dual pathway model of AD/HD: an elaboration of neuro-developmental characteristics. Neurosci. Biobehav. Rev. 27 (7), 593–604. https://doi.org/10.1016/j.neubiorev.2003.08.005.
Sperduti, M., Makowski, D., Arcangeli, M., Wantzen, P., Zalla, T., Lemaire, S., Dokic, J., Pelletier, J., Piolino, P., 2017. The distinctive role of executive functions in implicit emotion regulation. Acta Psychol. 173, 13–20. https://doi.org/10.1016/j.actpsy.2016.12.001.
Swanson, E.N., Owens, E.B., Hinshaw, S.P., 2012. Is the positive illusory bias illusory? Examining discrepant self-perceptions of competence in girls with ADHD. J. Abnorm. Child Psychol. 40 (6), 987–998. https://doi.org/10.1007/s10802-012-9615-x.
Tamm, L., Loren, R.E.A., Peugh, J., Ciesielski, H.A., 2021. The association of executive functioning with academic, behavior, and social performance ratings in children with ADHD. J. Learn. Disabil. 54 (2), 124–138. https://doi.org/10.1177/0022219420961338.
Tarle, S.J., Alderson, R.M., Arrington, E.F., Roberts, D.K., 2021. Emotion regulation and children with attention-deficit/hyperactivity disorder: The effect of varying phonological working memory demands. J. Atten. Disord. 25 (6), 851–864. https://doi.org/10.1177/1087054719864636.
Tillman, C., Eninger, L., Forssman, L., Bohlin, G., 2011. The relation between working memory components and ADHD symptoms from a developmental perspective. Dev. Neuropsychol. 36 (2), 181–198. https://doi.org/10.1080/87565641.2010.549981.
Toplak, M.E., West, R.F., Stanovich, K.E., 2013. Practitioner review: do performance-based measures and ratings of executive function assess the same construct? J. Child Psychol. Psychiatry Allied Discip. 54 (2), 131–143. https://doi.org/10.1111/jcpp.12001.
Tse, A.C.Y., 2020. Brief report: Impact of a physical exercise intervention on emotion regulation and behavioral functioning in children with autism spectrum disorder. J. Autism Dev. Disord. 50 (11), 4191–4198. https://doi.org/10.1007/s10803-020-04418-2.

Tye, C., Battaglia, M., Bertoletti, E., Ashwood, K.L., Azadi, B., Asherson, P., Bolton, P., McLoughlin, G., 2014. Altered neurophysiological responses to emotional faces discriminate children with ASD, ADHD and ASD+ADHD. Biol. Psychol. 103, 125–134. https://doi.org/10.1016/j.biopsycho.2014.08.013.

Van Cauwenberge, V., Sonuga-Barke, E.J., Hoppenbrouwers, K., Van Leeuwen, K., Wiersema, J.R., 2015. "Turning down the heat": Is poor performance of children with ADHD on tasks tapping "hot" emotional regulation caused by deficits in "cool" executive functions? Res. Dev. Disabil. 47, 199–207. https://doi.org/10.1016/j.ridd.2015.09.012.

Van Den Bergh, S.F., Scheeren, A.M., Begeer, S., Koot, H.M., Geurts, H.M., 2014. Age related differences of executive functioning problems in everyday life of children and adolescents in the autism spectrum. J. Autism Dev. Disord. 44 (8), 1959–1971. https://doi.org/10.1007/s10803-014-2071-4.

Wallisch, A., Little, L.M., Dean, E., Dunn, W., 2018. Executive function measures for children: a scoping review of ecological validity. OTJR Occup. Particip. Health 38 (1), 6–14. https://doi.org/10.1177/1539449217727118.

Walter, A., Martz, E., Weibel, S., Weiner, L., 2023. Tackling emotional processing in adults with attention deficit hyperactivity disorder and attention deficit hyperactivity disorder + autism spectrum disorder using emotional and action verbal fluency tasks. Front. Psychiatry 14, 1098210. https://doi.org/10.3389/fpsyt.2023.1098210.

Wang, L., Shi, Z., Li, H., 2009. Neuroticism, extraversion, emotion regulation, negative affect and positive affect: The mediating roles of reappraisal and suppression. Soc. Behav. Personal. 193–194. https://doi.org/10.2224/sbp.2009.37.2.193.

Wante, L., Mezulis, A., Van Beveren, M.L., Braet, C., 2017. The mediating effect of adaptive and maladaptive emotion regulation strategies on executive functioning impairment and depressive symptoms among adolescents. Child Neuropsychol. 23 (8), 935–953. https://doi.org/10.1080/09297049.2016.1212986.

Yoo, H.J., Han, J.M., Kim, K., Song, G., Yee, J., Chung, J.E., Lee, K.E., Gwak, H.S., 2021. Association between attention deficit hyperactivity disorder and aggression subscales in adolescents. Brain Behav. 11 (3), e02030. https://doi.org/10.1002/brb3.2030.

Zantinge, G., van Rijn, S., Stockmann, L., Swaab, H., 2017. Physiological arousal and emotion regulation strategies in young children with autism spectrum disorders. J. Autism Dev. Disord. 47 (9), 2648–2657. https://doi.org/10.1007/s10803-017-3181-6.

Zelazo, P.D., Cunningham, W.A., 2007. Executive function: Mechanisms underlying emotion regulation. In: Gross, In.J.J. (Ed.), Handbook of Emotion Regulation. The Guilford Press, pp. 135–158.

Zhang, X., Wang, S., Liu, Q., Wu, C., Du, Y., Wang, Y., Fang, J., 2023. Alerting network, cognitive flexibility in children with attention deficit hyperactivity disorder and the moderating effect of neuroticism. Medicine 102 (41), e35583. https://doi.org/10.1097/MD.0000000000035583.

Zhao, D., Zhang, J., 2024. The effects of working memory training on attention deficit, adaptive and non-adaptive cognitive emotion regulation of Chinese children with Attention Deficit/Hyperactivity Disorder (ADHD). BMC Psychol. 12 (1), 59. https://doi.org/10.1186/s40359-024-01539-6.