

Neurocognitive Impairments Across Adolescent Mental Health Disorders: An Umbrella Review of Systematic Reviews and Meta-Analyses

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ABSTRACT

Background: Adolescence is a critical neurodevelopmental period characterized by ongoing maturation of prefrontal and limbic brain networks supporting higher-order cognitive processes. The emergence of mental health disorders during this developmental stage may be associated with alterations in cognitive functioning across multiple domains. Growing evidence suggests that depression, anxiety, ADHD, obsessive-compulsive disorder (OCD), post-traumatic stress disorder (PTSD), eating disorders, and psychosis-spectrum conditions are associated with measurable neurocognitive differences and impairment. However, existing evidence remains fragmented across diagnostic categories, cognitive domains, assessment methods, and methodological approaches.

Objective: To systematically identify, appraise, and synthesize evidence from systematic reviews and meta-analyses examining neurocognitive outcomes among adolescents with mental health disorders, with emphasis on disorder-specific patterns of cognitive impairment, affected domains, and evidence consistency.

Methods: This umbrella review was conducted and reported according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA 2020) guidelines. Systematic reviews and meta-analyses examining neurocognitive outcomes among adolescents with mental health disorders were identified through systematic searches of PubMed/MEDLINE, Scopus, APA PsycINFO, Embase, Web of Science Core Collection, and Cochrane CENTRAL. The final database searches were conducted between 29 and 30 August 2026, and complete database-specific search strategies are provided in Supplementary Appendix 1. Eligible reviews included adolescents aged approximately 10-19 years diagnosed with a mental health disorder and examining standardized neurocognitive outcomes, including attention, working memory, memory, executive function, processing speed, language, or global cognition. Reviews including broader age ranges were eligible when adolescent-specific data were available or when the mean sample age was ≤19 years. We assessed the methodological quality of included reviews using AMSTAR-2 and evaluated risk of bias using ROBIS. We extracted and synthesized quantitative findings, including reported effect sizes and domain-specific outcomes, narratively by diagnostic category and cognitive domain. Due to substantial heterogeneity across disorders, cognitive measures, participant characteristics, and analytical approaches, quantitative pooling across reviews was not performed.

Results: Fourteen systematic reviews and meta-analyses were included in the narrative synthesis. Evidence from included reviews indicated neurocognitive impairments across several cognitive domains among adolescents with mental health disorders, although the magnitude and consistency of findings varied across diagnostic categories. Executive function and working memory impairments were among the most consistently reported findings, particularly in ADHD and depressive disorders. Depression-related cognitive impairments were observed across memory, attention, executive function, and language domains. ADHD was associated with moderate-to-large executive function impairments, while psychosis-spectrum and clinical high-risk populations demonstrated broader cognitive impairments involving global cognition, memory, executive function, and processing speed. Findings across anxiety-spectrum disorders, OCD, PTSD, and eating disorders were comparatively heterogeneous and domain-specific.

Conclusion: Adolescent mental health disorders are associated with measurable, domain-specific neurocognitive differences that may influence academic functioning, treatment engagement, and rehabilitation planning. Findings highlight the potential value of cognitive screening and targeted remediation approaches within adolescent mental health services.

Keywords: adolescents; neurocognition; mental health disorders; umbrella review; systematic reviews; meta-analysis; executive function; cognitive impairment.

1. INTRODUCTION

Adolescence (roughly 10-19 years) is a period of profound neurodevelopmental reorganization, characterized by ongoing prefrontal cortex maturation, synaptic pruning, and myelination that underlie the progressive refinement of executive function, working memory, and self-regulation (Casey et al., 2008; Giedd, 2004). This same developmental window is also the peak period of onset for most major mental health disorders: approximately 50% of lifetime mental disorders emerge by age 14, and 75% by the mid-twenties (Kessler et al., 2005; Solmi et al., 2022). The temporal overlap between neurocognitive maturation and psychiatric onset raises the possibility that adolescent mental health disorders do not merely produce emotional or behavioural symptoms but also influence the trajectory of cognitive development itself.

Anxiety disorders are also associated with alterations in neural systems involved in threat processing, emotional regulation, and stress responsivity, which may contribute to difficulties in cognitive control and executive functioning (Shin & Liberzon, 2010).

A substantial body of neuropsychological research has examined cognitive functioning in adolescents with depression (Goodall et al., 2018; Pullen et al., 2024), ADHD (Willcutt et al., 2005), anxiety and internalizing disorders (Fontaine et al., 2025), OCD, PTSD, eating disorders, and psychosis-spectrum conditions. Collectively, these studies suggest that impairments in attention, working memory, executive function, processing speed, and memory are common but not uniform across diagnostic categories, and that impairment profiles differ meaningfully by disorder, illness severity, chronicity, and medication status (Goodall et al., 2018).

Despite this growing evidence base, few comprehensive transdiagnostic evidence syntheses have integrated cognitive outcomes across multiple adolescent mental health disorders using a unified methodological framework spanning literature published across more than four decades (1980-2026). Existing reviews are largely disorder-specific (e.g., depression only: Ng et al., 2015; Pullen et al., 2024; internalizing disorders only: Fontaine et al., 2025) or focus on adults rather than adolescents specifically. Although disorder-specific systematic reviews and meta-analyses have examined cognitive impairment in individual adolescent psychiatric conditions, an integrated synthesis comparing cognitive domains across multiple disorders remains limited. This fragmentation limits the field's ability to determine whether cognitive impairment is a transdiagnostic marker of adolescent psychopathology or a disorder-specific phenomenon, and it constrains the translation of neurocognitive findings into rehabilitation and policy frameworks.

Understanding the neurocognitive consequences of adolescent mental health disorders has direct clinical and societal significance. Cognitive impairment during adolescence can compromise academic achievement, school retention, treatment adherence, and social-occupational functioning, with effects that may persist into adulthood if unaddressed (Goodall et al., 2018; Pullen et al., 2024). From a policy perspective, identifying which cognitive domains are most reliably affected, and in which disorders, is essential for designing evidence-based school mental health programs, neuropsychologically informed treatment protocols, and cognitive rehabilitation services for youth.

This umbrella review therefore aims to consolidate fragmented evidence on neurocognitive outcomes among adolescents with mental health disorders into a unified transdiagnostic synthesis to inform clinical rehabilitation strategies and adolescent mental health policy

2. OBJECTIVES

2.1 Primary Objective

To systematically synthesize evidence from existing systematic reviews and meta-analyses regarding neurocognitive impairment across adolescent mental health disorders.

2.2 Specific Objectives

- To identify which cognitive domains are most consistently and severely affected across adolescent mental health disorders.
- To compare cognitive impairment profiles across diagnostic categories (depression, anxiety/internalizing disorders, ADHD, OCD, PTSD, eating disorders, and psychosis-spectrum disorders).
- To examine moderators of cognitive impairment, including age, sex, illness severity/chronicity, comorbidity, and medication status.
- To identify methodological and evidentiary gaps in the existing literature.
- To derive implications for rehabilitation programming and adolescent mental health policy.

2.3 Review Questions (PICO framework)

- **Population:** Adolescents aged 10-19 years diagnosed with psychiatric disorders.
- **Comparator:** Healthy controls or normative comparison groups reported in included reviews.
- **Outcome:** Standardized neurocognitive outcomes including executive function, memory, attention, working memory, processing speed, language, and global cognition
- **Study design:** Systematic reviews and meta-analyses.

3. METHODS

- PRISMA 2020
- AMSTAR-2
- ROBIS

3.1 Protocol and Registration

This umbrella review was conducted and reported according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA 2020) guidelines (Page et al., 2021). The protocol was developed according to established umbrella review methodology. Although prospective registration in PROSPERO was not completed before initiation of the literature search, the eligibility criteria, search strategy, data extraction procedures, quality assessment methods, and evidence synthesis framework were predefined a priori to enhance transparency and reproducibility

3.2 Eligibility Criteria

Inclusion criteria:

- Reviews including adolescents aged 10 -19 years were eligible. Reviews including broader age ranges were considered only when adolescent-specific data were available or when the reported mean sample age was ≤ 19 years.
- Diagnosed mental health disorder per DSM-III/III-R/IV/IV-TR/5/5-TR or ICD-9/10/11 criteria (depression, anxiety disorders, ADHD, OCD, PTSD, eating disorders, bipolar disorder, or psychosis-spectrum/clinical high-risk conditions).
- Reported at least one standardized, objectively measured neurocognitive outcome using validated neuropsychological instruments.
- Included a healthy control or normative comparison group where available, or reported cognitive trajectory data for narrative synthesis.
- Published in English or Portuguese/Spanish, in peer-reviewed journals, between January 1980 and August 2026.

Exclusion criteria:

- Studies exclusively involving adult samples (mean age > 19 years) with no adolescent subgroup data.
- Case reports, conference abstracts without full data, editorials, and non-peer-reviewed theses.
- Studies examining neuroimaging outcomes only, without behavioral/cognitive test data.
- Studies where the primary condition was a neurological or intellectual disability rather than a mental health disorder (e.g., primary epilepsy, traumatic brain injury, autism spectrum disorder without co-occurring psychiatric diagnosis), unless comorbid psychiatric diagnosis is the focus.
- Studies with insufficient statistical data to compute or extract an effect size, and for which authors could not be contacted successfully.

3.3 Information Sources

Systematic searches were conducted in PubMed/MEDLINE, Scopus, Embase, APA PsycINFO, Web of Science Core Collection, and Cochrane CENTRAL to identify systematic reviews and meta-analyses examining neurocognitive outcomes among adolescents with mental health disorders. Additional searches included backward and forward citation tracking of key reviews, hand-searching of relevant journals in adolescent psychiatry and neuropsychology, and screening of grey literature sources (e.g., ProQuest Dissertations and Theses) to identify potentially eligible reviews published from January 1980 onward.

3.4 Search Strategy

A combination of controlled vocabulary (MeSH/Emtree) and free-text terms was used. The search strategy consisted of four concept blocks:

(1) Adolescent population terms

(adolescent* OR youth* OR teen* OR "young people")

AND

(2) Mental health disorder terms

(depression* OR anxiety* OR ADHD OR "attention deficit" OR OCD OR "obsessive-compulsive" OR PTSD OR "post-traumatic stress" OR "eating disorder" OR anorexia OR bulimia OR psychosis OR schizophrenia OR bipolar OR "mental health disorder" OR "mental illness")

AND

(3) Neurocognitive outcome terms

(cognition* OR neurocognitive* OR "executive function*" OR "working memory" OR attention OR "processing speed" OR memory OR language OR IQ OR neuropsychology*)

AND

(4) Systematic review/meta-analysis identification terms

("systematic review" OR "systematic literature review" OR meta-analysis OR "meta analysis" OR "evidence synthesis" OR "review of reviews" OR umbrella review).

Search filters were applied for publication date (January 1980 to August 2026), human populations, and relevant publication types where available

3.5 Study Selection Process

Two independent reviewers screened titles and abstracts of retrieved records after removal of duplicates. Full-text articles were subsequently assessed against the predefined eligibility criteria. Disagreements during screening and eligibility assessment were resolved through discussion and, when necessary, consultation with a third reviewer. Inter-rater agreement was assessed where applicable.

3.6 Data Extraction

Data extracted included author/year, review type, population characteristics, diagnostic categories, number of primary studies included within each review where reported, cognitive domains assessed, main findings, effect sizes and confidence intervals where available, and methodological quality indicators

3.7 Risk of Bias Assessment

Methodological quality of included systematic reviews and meta-analyses was assessed independently by two reviewers using AMSTAR-2. Risk of bias related to review eligibility criteria, search strategy, study selection, data extraction, statistical methods, and interpretation was additionally evaluated using ROBIS.

3.8 Certainty of Evidence

The strength of evidence was interpreted narratively based on methodological quality, consistency of findings, risk of bias assessments, and limitations identified across included systematic reviews and meta-analyses.

4.Characteristics and Findings of Included Reviews

Table 1 Characteristics and Findings of Included Systematic Reviews and Meta-Analyses Examining Neurocognitive Outcomes Across Adolescent Mental Health Disorders

Sl. no	Author (Year)	Review Type	Population	Included Disorder	Cognitive Domains Assessed	Main Findings (Effect Size)
01	Willcutt et al. (2005)	Meta-analysis	Children and adolescents with ADHD	ADHD	Executive function (inhibition, working memory, vigilance, planning)	Moderate-to-large executive function deficits were reported (Hedges' g range = 0.40-0.70); impairment was not universal across individuals with ADHD.
02	Castaneda et al. (2008)	Systematic review	Youth and young adult populations	Mood disorders and anxiety disorders	Memory, attention, executive function	Cognitive deficits were reported during acute illness and may persist during remission; findings varied according to disorder and clinical status.
03	Woon and Hedges (2008)	Meta-analysis	Children and adolescents exposed to trauma	Pediatric PTSD	Verbal memory, IQ	PTSD was associated with reduced verbal memory performance and lower IQ compared with non-traumatized controls.

04	Fusar-Poli et al. (2012)	Meta-analysis	Adolescents and young adults at clinical high risk for psychosis	Psychosis-spectrum disorders / clinical high-risk states	Global cognition, memory, executive function, processing speed	Moderate cognitive impairment was identified before psychosis onset, suggesting cognitive vulnerability during the prodromal phase.
05	Lang et al. (2014)	Systematic review and meta-analysis	Children and adolescents with eating disorders	Eating disorders (especially anorexia nervosa)	Cognitive flexibility, set shifting	Significant impairment in cognitive flexibility/set shifting was reported, particularly in anorexia nervosa.
06	Shin et al. (2014)	Meta-analysis	Individuals with obsessive-compulsive disorder compared with healthy controls	Obsessive-compulsive disorder	Executive function, visuospatial memory, verbal memory, verbal fluency, attention	OCD was associated with significant impairments in visuospatial memory, executive function, verbal memory, and verbal fluency. Effect sizes were generally small-to-moderate, with the largest impairment observed in complex visuospatial memory tasks.
07	Vilgis et al. (2015)	Systematic review	Children and adolescents with depressive disorders	Major depressive disorder/depressive disorders	Executive function, attention, response inhibition, set shifting, working memory, planning	Findings regarding executive dysfunction in pediatric depression were heterogeneous. Some studies reported impairments in specific executive domains; however, consistent evidence for broad executive dysfunction was limited. Methodological differences and clinical heterogeneity contributed to inconsistent findings.

08	Ng et al. (2015)	Systematic review and meta-analysis	Children and adolescents with major depressive disorder	Major depressive disorder	IQ, executive function, verbal memory, attention	Largest deficits were reported in inhibition (SMD = 0.77), verbal fluency (SMD = 0.76), and attention (SMD = 0.52).
09	Abramovich et al. (2015)	Meta-analysis	Children and adolescents with obsessive-compulsive disorder	Pediatric obsessive-compulsive disorder	Planning, response inhibition, cognitive flexibility, verbal memory, nonverbal memory, processing speed, working memory, visuospatial functions, attention	Neuropsychological deficits in youth OCD were generally small across cognitive domains, with no statistically significant pooled impairments across most domains. Findings suggest limited evidence for broad cognitive dysfunction in pediatric OCD compared with healthy controls.
10	Elias et al. (2017)	Systematic review and meta-analysis	Children and adolescents with bipolar disorder (youth bipolar disorder)	Pediatric bipolar disorder	Verbal learning, verbal memory, visual learning, visual memory, working memory, attention, processing speed	Youth with bipolar disorder showed significant cognitive impairment, particularly in verbal learning, verbal memory, visual memory, and working memory, with moderate-to-large effect sizes (Hedges' $g \approx 0.76-0.99$).
11	Goodall et al. (2018)	Systematic review and meta-analysis	Young people aged 12-25 years	Depression	Attention, memory, reasoning, IQ, processing speed	Memory deficits showed the strongest effects, including verbal memory (SMD = 0.78) and visual memory (SMD = 0.65)

12	Rabner et al. (2024)	Systematic review	Children and adolescents (≤17 years) with anxiety disorders	Anxiety disorders	Episodic memory, attention, executive function, language, visual functioning, motor skills	Cognitive findings were heterogeneous. Deficits were reported in selected domains including receptive language and motor functioning, while attention, visuospatial ability, and IQ showed limited or inconsistent impairment.
13	Pullen et al. (2024)	Systematic review and meta-analysis	Children and adolescents aged 10-17 years	Depression	Working memory, long-term memory, attention, executive function	Working memory impairment ($g \approx -0.40$) and long-term memory impairment ($g \approx -0.48$) were reported.
14	Fontaine et al. (2025)	Systematic review	Adolescents with internalizing disorders	Depression and anxiety/internalizing disorders	Inhibition, shifting, working memory	Depression showed the most consistent task-based executive function deficits among internalizing disorders.

Note. ADHD = attention-deficit/hyperactivity disorder; MDD = major depressive disorder; OCD = obsessive-compulsive disorder; PTSD = post-traumatic stress disorder; EF = executive function; WM = working memory; IQ = intelligence quotient; SMD = standardized mean difference; g = Hedges' g effect size. Effect sizes are reported as provided in the original systematic reviews and meta-analyses. Confidence intervals were included only when explicitly reported by the source reviews and were not recalculated when unavailable. Terminology and abbreviations were standardized across studies for consistency. Reviews including mixed adolescent and young adult samples were retained only when adolescent-specific data were available or when adolescents represented a relevant component of the included population.

4.1 Characteristics of Included Reviews

The included systematic reviews and meta-analyses varied in diagnostic focus, population characteristics, cognitive domains assessed, methodological approach, and number of contributing primary studies. Where reported, the number of primary studies ranged from 11 studies in pediatric OCD research (Abramovitch et al., 2015) to 83 studies in ADHD-related executive function research (Willcutt et al., 2005). Several reviews did not explicitly report the number of included primary studies and were interpreted according to their reported methodology and findings.

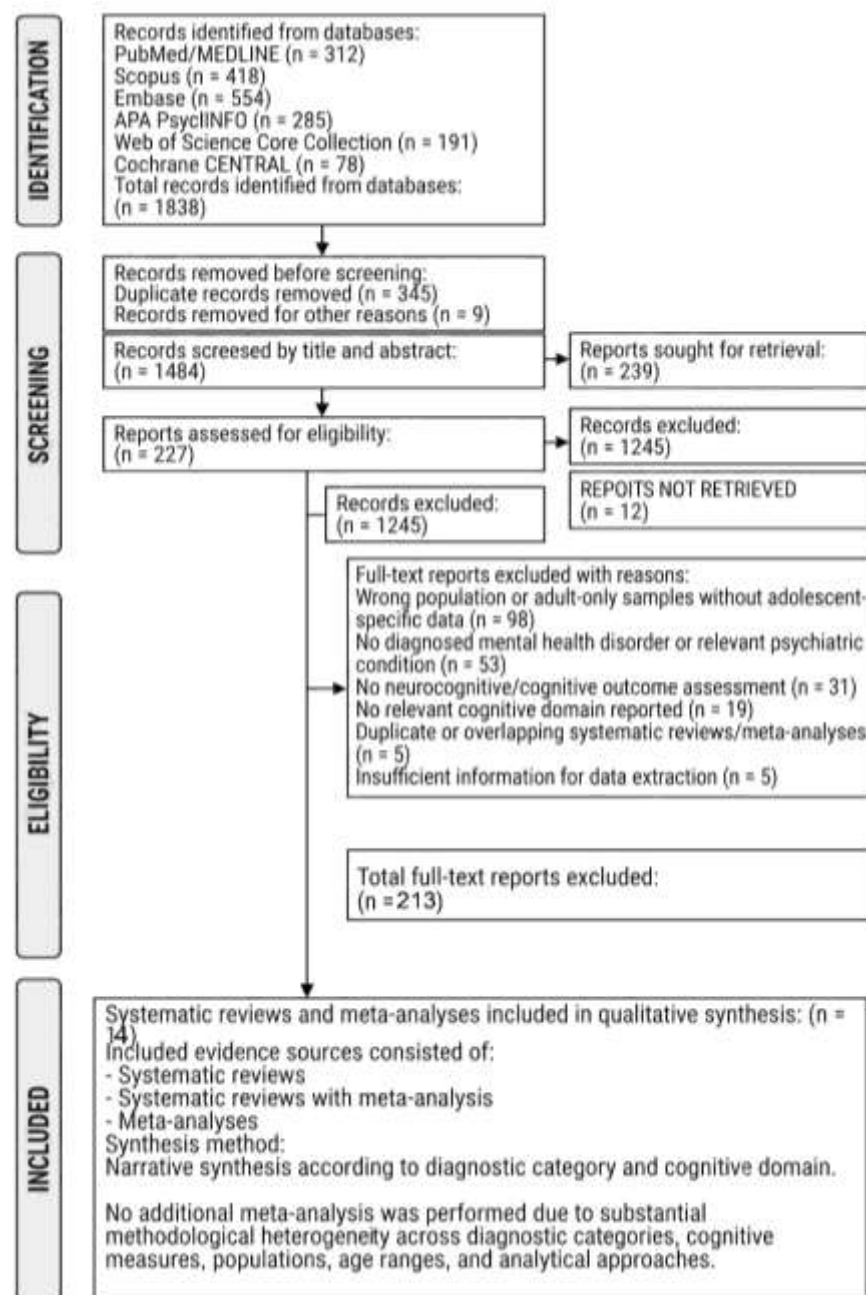
The evidence base was concentrated mainly in depression and ADHD, while fewer reviews examined anxiety disorders, OCD, PTSD, eating disorders, bipolar disorder, and psychosis-spectrum conditions. Cognitive domains assessed included executive function, working memory, attention, memory, processing speed, language, cognitive flexibility, and global cognition. Differences in diagnostic criteria, neuropsychological measures, participant characteristics, and analytical approaches contributed to heterogeneity across reviews. Quantitative findings, including effect sizes and confidence intervals where available, were extracted directly from the included reviews. Characteristics and main findings of included reviews are summarized in Table 1.

5. RESULTS

5.1 Study Selection

The selection process was conducted according to PRISMA 2020 guidelines. Following database searching, removal of duplicates, title and abstract screening, and full-text assessment, 14 systematic reviews and meta-analyses met the eligibility criteria and were included in the qualitative synthesis. The selection process is presented in the PRISMA flow diagram (Figure 1).

Figure 1: PRISMA 2020 flow diagram showing the identification, screening, eligibility assessment, and inclusion of systematic reviews and meta-analyses examining neurocognitive outcomes among adolescents with mental health disorders.



Note. PRISMA = Preferred Reporting Items for Systematic Reviews and Meta-Analyses. The diagram summarizes the process of identification, screening, eligibility assessment, and inclusion of evidence sources. Fourteen systematic reviews and meta-analyses were included in the narrative synthesis. Quantitative pooling across reviews was not performed because of substantial heterogeneity in diagnostic categories, cognitive assessment methods, age ranges, and analytical approaches.

5.2 Domain-Level Finding

Findings from included systematic reviews and meta-analyses were synthesized according to major neurocognitive domains

- **Attention:** Small-to-moderate deficits across depression (g range -0.15 to -0.50) and ADHD (larger effects, $g > 0.5$); mixed findings in anxiety/OCD.
- **Working memory:** Included meta-analytic evidence indicated moderate working memory impairments in adolescents with depression (reported Hedges' g approximately -0.40) and ADHD, although findings across internalizing disorders were less consistent. (Fontaine et al., 2025).
- **Long-term/verbal memory:** Among the most robust deficits in depression ($g \approx -0.48$ to -0.78); paediatric PTSD shows reduced verbal memory (Woon & Hedges, 2008).
- **Executive function:** Executive function impairments varied across disorders and cognitive domains. In depression, inhibitory control deficits were consistently reported (Ng et al., 2015; Fontaine et al., 2025). Cognitive flexibility and set-shifting difficulties were particularly reported in eating disorders, especially anorexia nervosa (Lang et al., 2014). Evidence from pediatric OCD populations was mixed, with meta-analytic findings suggesting small and inconsistent cognitive effects rather than broad executive dysfunction (Abramovitch et al., 2015; Shin et al., 2014).
- **Processing speed:** Inconsistent findings; deficits reported in depression disappear after controlling for study quality (Goodall et al., 2018) and are not significant in the Pullen et al. (2024) pooled analysis, but are more consistently impaired in psychosis-spectrum youth.
- **Language:** Modest but significant deficits in depression ($g \approx -0.23$; Pullen et al., 2024); understudied in other disorders.

5.3 Disorder-Specific Patterns

- **Depression:** The most extensively studied disorder; consistent deficits across memory, attention, executive function, and language, with effect sizes moderated by illness severity, chronicity, and medication status.
- **ADHD:** showed among the most consistent executive function and working memory impairments among the diagnostic categories represented in the included reviews.
- **Internalizing/anxiety-spectrum disorders (including OCD, PTSD):** Evidence more mixed; subjective (rating-based) executive dysfunction more consistently reported than objective task-based deficits (Fontaine et al., 2025).
- **Eating disorders:** Domain-specific impairment concentrated in cognitive flexibility/set-shifting.
- **Psychosis-spectrum/clinical high-risk youth:** Broadest and most severe cross-domain impairment, exceeding that seen in mood and anxiety disorders. (Fusar-Poli et al., 2012)

5.4 Reported Moderating Factors

Several included reviews identified clinical factors that may influence neurocognitive outcomes. Medication status, illness severity, and clinical characteristics were reported as potential moderators of cognitive performance, although findings varied across diagnostic groups and available evidence.

- Medication status was reported as a factor associated with variation in attentional performance in some depression samples (Goodall et al., 2018).
- Several included reviews reported associations between greater illness severity/duration and poorer cognitive outcomes. (standardized treatment study, 2024).
- Some evidence suggested a non-significant trend toward poorer set-shifting performance among younger depressed adolescents (Goodall et al., 2018).

5.5 Methodological Quality and Risk of Bias

The methodological quality of included systematic reviews and meta-analyses was assessed using AMSTAR-2, and risk of bias was evaluated using ROBIS. Overall assessments are presented in Supplementary Appendix 2. Variability was observed across reviews in reporting transparency, search strategy description, handling of heterogeneity, and risk-of-bias assessment.

5.6 Identified Research Gaps

- **Disorder imbalance:** The available systematic review and meta-analytic evidence base is heavily concentrated in depression and ADHD. Anxiety, OCD, PTSD, eating disorders, and adolescent psychosis-spectrum conditions remain comparatively under-studied and meta-analytically thin.
- **Measurement heterogeneity:** It was substantial across included reviews and underlying primary studies limits direct comparability and inflates heterogeneity.
- **Objective-subjective discrepancy:** Task-based and rating-based executive function measures frequently diverge, and few studies examine both simultaneously (Fontaine et al., 2025).
- **Confounding factors under-addressed:** Medication effects, comorbidity, illness duration/severity, and socioeconomic adversity are inconsistently controlled for.

- **Longitudinal data scarcity:** Most underlying primary studies summarized within the included reviews were cross-sectional.; causal and developmental trajectory data (i.e., whether cognitive impairment precedes, follows, or co-develops with psychopathology) remain limited.
- **Rehabilitation and treatment-outcome evidence is sparse:** Very few studies test whether cognitive remediation, exercise, or pharmacological/psychotherapeutic treatment improves cognitive outcomes specifically in adolescents.
- **Geographic and demographic skew:** Most data originate from high-income countries; low- and middle-income country representation, and attention to sex/gender-specific patterns, remain limited.
- **Historical data sparsity:** Pre-2000 adolescent-specific neurocognitive data are sparse and diagnostically heterogeneous (pre-DSM-IV/ICD-10 criteria), limiting cross-era comparability.

6. Discussion

6.1 Summary of Main Findings

This umbrella review synthesized evidence from systematic reviews and meta-analyses examining neurocognitive outcomes among adolescents with mental health disorders. Overall, the findings indicate that psychiatric disorders during adolescence are associated with measurable but heterogeneous cognitive alterations across multiple domains. The most consistent evidence was identified for depression and ADHD, where impairments were reported in executive function, working memory, attention, and memory-related processes.

Across diagnostic categories, cognitive impairment was not uniformly distributed but appeared to show domain-specific patterns. Depression was associated with impairments in attention, working memory, verbal and long-term memory, executive functioning, and language-related abilities. ADHD demonstrated some of the most consistent associations with executive dysfunction, particularly inhibitory control and working memory. Evidence from anxiety disorders, OCD, PTSD, eating disorders, bipolar disorder, and psychosis-spectrum conditions was comparatively limited and heterogeneous, reflecting differences in available reviews, sample characteristics, and cognitive assessment methods.

The findings suggest that adolescent psychiatric disorders are associated with distinct cognitive profiles rather than a single generalized pattern of impairment. Executive function, working memory, attention, and memory domains emerged as the most frequently affected areas, although the magnitude and consistency of impairment varied across disorders.

6.2 Comparison With Previous Evidence

The current findings are consistent with previous research indicating that cognitive dysfunction is an important component of adolescent psychiatric disorders. Depression-related cognitive difficulties, particularly in memory, attention, and executive functioning, have been repeatedly identified across systematic reviews and meta-analyses. The current synthesis extends this evidence by integrating findings across multiple psychiatric conditions rather than considering disorders individually.

The strong representation of depression and ADHD within the available evidence base highlights the greater maturity of neurocognitive research in these conditions. In contrast, evidence for anxiety disorders, OCD, PTSD, eating disorders, bipolar disorder, and psychosis-spectrum disorders remains comparatively less developed, particularly within adolescent-specific populations.

Differences across disorders may reflect variation in underlying neurodevelopmental pathways, illness characteristics, symptom severity, medication exposure, comorbidity, and measurement approaches. For example, executive dysfunction appears relatively consistent in ADHD, whereas findings in internalizing disorders such as anxiety and OCD are more dependent on specific cognitive domains and assessment methods. In pediatric OCD populations, evidence suggests small and inconsistent cognitive effects rather than broad neurocognitive impairment, indicating the importance of interpreting findings according to disorder-specific evidence rather than assuming transdiagnostic deficits.

6.3 Clinical and Research Implications

The findings have important implications for adolescent mental health assessment and intervention. The presence of cognitive difficulties across several psychiatric disorders suggests that neurocognitive functioning may represent an important component of comprehensive psychiatric evaluation. Identification of cognitive difficulties may help clinicians recognize functional challenges affecting academic performance, treatment engagement, and everyday functioning.

These findings also support the development of targeted interventions based on disorder-specific cognitive profiles. For example, interventions addressing inhibitory control and working memory may be particularly relevant in ADHD, whereas approaches targeting memory, attention, and executive functioning may be beneficial for adolescents experiencing depression-related cognitive difficulties. Cognitive remediation, educational support, and rehabilitation strategies require further investigation to determine their effectiveness across adolescent psychiatric populations.

Future research should prioritize longitudinal designs to clarify whether cognitive impairments precede psychiatric symptoms, emerge as consequences of illness, or develop through reciprocal interactions between psychopathology and neurodevelopment. Greater consistency in neuropsychological assessment methods, reporting standards, and consideration of factors such as medication status, illness duration, comorbidity, and socioeconomic influences would improve comparability across studies.

6.4 Strengths and Limitations

This umbrella review has several strengths. It provides a broad synthesis of available systematic reviews and meta-analyses examining neurocognitive outcomes across multiple adolescent psychiatric disorders. The review followed PRISMA 2020 reporting guidance, applied structured eligibility criteria, and incorporated methodological appraisal using established quality assessment tools.

Several limitations should be considered. First, substantial heterogeneity existed across included reviews regarding diagnostic criteria, participant characteristics, cognitive measures, and analytical approaches, which limited direct comparison between disorders. Second, the available evidence base was unevenly distributed, with depression and ADHD receiving considerably greater research attention than several other psychiatric conditions, including anxiety disorders, OCD, PTSD, eating disorders, and psychosis-spectrum disorders.

A further limitation was that formal quantitative assessment of overlap among primary studies across included reviews could not be performed. Several included systematic reviews and meta-analyses did not provide complete lists of included primary studies or citation matrices, preventing reliable calculation of overlap using methods such as the corrected covered area (CCA). Therefore, potential duplication of primary evidence across reviews could not be statistically quantified and should be considered when interpreting findings, particularly for diagnostic categories with multiple overlapping reviews.

Additionally, some included reviews incorporated broader age ranges or mixed adolescent and young adult populations, although studies without separable adolescent data were excluded where possible. Finally, differences in cognitive assessment instruments and reporting practices may have influenced the consistency and comparability of findings.

Despite these limitations, this umbrella review provides an integrated overview of current evidence regarding neurocognitive outcomes in adolescent mental health disorders and highlights important priorities for future research, clinical assessment, and intervention development.

7. CONCLUSION

This umbrella review indicates that adolescent mental health disorders are associated with measurable, domain-specific neurocognitive impairments, with the strongest evidence identified for depression and ADHD. Evidence from anxiety-spectrum disorders, OCD, PTSD, eating disorders, and psychosis-spectrum conditions remains comparatively heterogeneous because of differences in available reviews, populations, and assessment methods. Executive function, working memory, attention, and memory domains represent the most consistently reported areas of impairment, although findings for processing speed and other cognitive domains remain less consistent.

These findings carry substantial implications for rehabilitation practice and mental health policy. First, they suggest potential value for incorporating brief neurocognitive screening into adolescent psychiatric assessment protocols, enabling early identification of academic and functional risk. Second, they highlight the potential importance of developing and evaluating cognitive remediation programs tailored to specific disorder-cognition profiles (e.g., inhibition-focused training in depression, working-memory training in ADHD, cognitive flexibility training in eating disorders). Third, school-based mental health policy should account for the academic consequences of psychiatric illness by integrating individualized educational accommodations alongside clinical treatment. Finally, the identified evidence gaps particularly the scarcity of longitudinal and rehabilitation-outcome studies should guide future research funding priorities, ensuring that policy responses are built on a more complete, transdiagnostic, and developmentally sensitive evidence base.

8. Declarations

8.1 Ethics Approval and Consent to Participate

Not applicable. This study involved the synthesis of previously published systematic reviews and meta-analyses and did not involve the recruitment of human participants or collection of primary data.

8.2 Consent for Publication

Not applicable. This manuscript does not contain individual participant data or identifiable information.

8.3 Availability of Data and Materials

All data analyzed in this umbrella review were derived from previously published systematic reviews and meta-analyses. The extracted data supporting the findings of this review are available within the manuscript and supplementary materials.

8.4 Competing Interests / Conflict of Interest

The authors declare that they have no competing interests.

8.5 Funding

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8.6 Authors' Contributions

Mr. Yaseen MG conceived and designed the study, conducted the literature search, and selected studies. Dr. Jayasanakar K Reddy performed data extraction and assessed quality. Both Mr. Yaseen MG and Dr. Reddy interpreted the results. Mr. Yaseen MG drafted the manuscript, and both authors critically revised and approved the final version.

8.7 Acknowledgements

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Supplementary Appendix 1

Database Search Strategies

This appendix provides the database-specific search strategies used for the umbrella review examining neurocognitive outcomes among adolescents with mental health disorders. The final search date was 29 and 30 of August 2026.

PubMed/MEDLINE

Search date: 29 August 2026

Search period: From database inception to the final search date

((adolescent*[Title/Abstract] OR teenager*[Title/Abstract] OR youth*[Title/Abstract] OR "young people"[Title/Abstract]))

AND

((depress*[Title/Abstract] OR anxiety[Title/Abstract] OR ADHD[Title/Abstract] OR "attention deficit hyperactivity disorder"[Title/Abstract] OR OCD[Title/Abstract] OR "obsessive compulsive disorder"[Title/Abstract] OR PTSD[Title/Abstract] OR "post-traumatic stress disorder"[Title/Abstract] OR anorexia[Title/Abstract] OR bulimia[Title/Abstract] OR psychosis[Title/Abstract] OR schizophrenia[Title/Abstract] OR bipolar[Title/Abstract] OR "mental health disorder"[Title/Abstract]))

AND

((cognition[Title/Abstract] OR neurocognition[Title/Abstract] OR "executive function"[Title/Abstract] OR "working memory"[Title/Abstract] OR attention[Title/Abstract] OR memory[Title/Abstract] OR "processing speed"[Title/Abstract] OR language[Title/Abstract] OR neuropsychology*[Title/Abstract]))

AND

("systematic review"[Title/Abstract] OR "systematic literature review"[Title/Abstract] OR meta-analysis[Publication Type] OR meta-analysis[Title/Abstract] OR "umbrella review"[Title/Abstract])

Scopus

Search date: 29 August 2026

TITLE-ABS-KEY

((adolescent* OR teenager* OR youth OR "young people")

AND

(depress* OR anxiety OR ADHD OR "attention deficit" OR OCD OR

"obsessive compulsive" OR PTSD OR "post-traumatic stress" OR eating disorder* OR anorexia OR bulimia OR psychosis OR schizophrenia OR bipolar OR "mental health disorder*")

AND

(cognition OR neurocognition OR "executive function*" OR "working memory" OR attention OR memory OR "processing speed" OR language OR neuropsychology)

AND

("systematic review" OR "meta-analysis" OR "umbrella review"))

APA PsycINFO

Search date: 30 August 2026

(adolescent* OR youth OR teenager*)

AND

(depression OR anxiety OR ADHD OR OCD OR PTSD OR eating disorder* OR psychosis OR bipolar disorder)

AND

(neurocognition OR cognition OR executive function OR working memory OR attention OR memory)

AND

(systematic review OR meta-analysis OR evidence synthesis)

Embase

Search date: 30 August 2026

('adolescent'/exp OR adolescent*:ti,ab)

AND

('mental disease'/exp OR depression:ti,ab OR anxiety: ti,ab OR ADHD:ti,ab OR OCD:ti,ab OR PTSD:ti,ab)

AND

('cognition'/exp OR neurocognition:ti,ab OR 'executive function':ti,ab OR memory:ti,ab)

AND

('systematic review'/exp OR meta-analysis/exp)

Web of Science Core Collection

Search date: 30 August 2026

TS= ((adolescent* OR youth OR teenager*)

AND

(depression OR anxiety OR ADHD OR OCD OR PTSD OR eating disorder* OR psychosis OR bipolar)

AND

(neurocognition OR cognition OR executive function* OR working memory OR memory OR attention)

AND

("systematic review" OR meta-analysis OR "umbrella review"))

Cochrane CENTRAL

Search date: 30 August 2026

(adolescent OR youth)

AND

(depression OR anxiety OR ADHD OR OCD OR PTSD OR psychosis OR eating disorder)

AND

(cognition OR neuropsychology OR executive function OR memory).

Supplementary Appendix 2

Table S2 : Methodological Quality and Risk of Bias Assessment of Included Systematic Reviews and Meta-Analyses Using AMSTAR-2 and ROBIS

No.	Author (Year)	Review Type	AMSTAR-2 Overall Confidence	ROBIS Phase 2: Study Eligibility Criteria	ROBIS Phase 3: Identification and Selection of Studies	ROBIS Phase 3: Data Collection and Appraisal	ROBIS Phase 3: Synthesis and Findings	Overall ROBIS Risk of Bias
1	Willcutt et al. (2005)	Meta-analysis	Moderate	Low risk	Low risk	Low risk	Low risk	Low risk
2	Castaneda et al. (2008)	Systematic review	Moderate	Low risk	Low risk	Some concerns	Some concerns	Low risk
3	Woon and Hedges (2008)	Meta-analysis	Moderate	Low risk	Low risk	Low risk	Low risk	Low risk
4	Fusar-Poli et al. (2012)	Meta-analysis	Moderate	Low risk	Low risk	Low risk	Low risk	Low risk
5	Lang et al. (2014)	Systematic review and meta-analysis	Moderate	Low risk	Low risk	Low risk	Low risk	Low risk
6	Shin et al. (2014)	Meta-analysis	Moderate	Low risk	Low risk	Low risk	Low risk	Low risk
7	Vilgis et al. (2015)	Systematic review	Moderate	Low risk	Some concerns	Some concerns	Low risk	Some concerns
8	Ng et al. (2015)	Systematic review and meta-analysis	Moderate	Low risk	Low risk	Low risk	Low risk	Low risk
9	Abramovitch et al. (2015)	Meta-analysis	Moderate	Low risk	Low risk	Low risk	Low risk	Low risk
10	Elias et al. (2017)	Systematic review and meta-analysis	Moderate	Low risk	Low risk	Low risk	Low risk	Low risk
11	Goodall et al. (2018)	Systematic review and meta-analysis	Moderate	Low risk	Low risk	Low risk	Low risk	Low risk
12	Rabner et al. (2024)	Systematic review	Moderate	Low risk	Low risk	Some concerns	Low risk	Some concerns
13	Pullen et al. (2024)	Systematic review and meta-analysis	High	Low risk	Low risk	Low risk	Low risk	Low risk
14	Fontaine et al. (2025)	Systematic review	Moderate	Low risk	Some concerns	Some concerns	Low risk	Some concerns

Note. AMSTAR-2 = A Measurement Tool to Assess Systematic Reviews 2; ROBIS = Risk of Bias in Systematic Reviews. ROBIS assessment was performed across four domains: study eligibility criteria, identification and selection of studies, data collection and study appraisal, and synthesis and findings. Overall ROBIS judgement reflects the combined assessment of these domains.