The Relationship Between Neurodevelopmental and Psychiatric Disorders and Aggression: A Comprehensive Review

1. Introduction

Aggression is a multifaceted behavior frequently observed in individuals with neurodevelopmental and psychiatric disorders, including autism spectrum disorder (ASD), attention-deficit/hyperactivity disorder (ADHD), intellectual disability, conduct disorder, and various personality disorders. Research consistently demonstrates elevated rates of aggression in these populations compared to neurotypical peers, with significant implications for clinical management, family dynamics, and societal outcomes (Gohari et al., 2024; Vos et al., 2024; Tsiouris et al., 2011; Fitzpatrick et al., 2016; Bardoloi, 2023). The mechanisms underlying this association are complex, involving genetic, neurobiological, cognitive, and environmental factors (Van Goozen et al., 2021; Blair & Blair, 2001; Lesch et al., 2012; Martin et al., 2024; Kolla et al., 2023; Cupaioli et al., 2020). Aggression manifests in both reactive (impulsive) and proactive (planned) forms, each linked to distinct neural circuits and risk profiles (Murray et al., 2020; Blair & Blair, 2001; Martin et al., 2024; Speyer et al., 2021). Comorbidity among neurodevelopmental disorders and other psychiatric conditions further complicates the clinical picture, often amplifying aggressive tendencies (Vos et al., 2024; Radwan & Coccaro, 2020; Hofvander et al., 2011; Billstedt et al., 2017). This review synthesizes recent findings on the prevalence, mechanisms, subtypes, comorbidities, and intervention strategies related to aggression in neurodevelopmental and psychiatric disorders.

Are neurodevelopmental and psychiatric disorders associated with increased aggression? N = 37

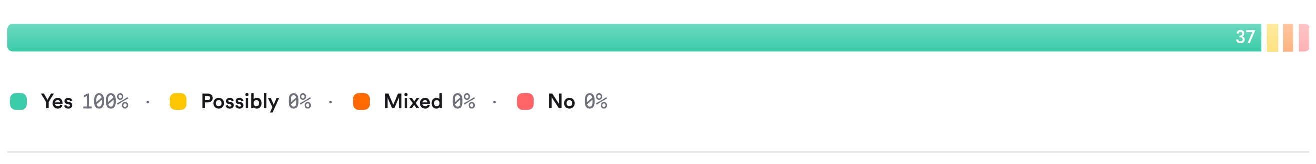

FIGURE 1 Consensus meter visualizing research agreement on the link between neurodevelopmental/psychiatric disorders and aggression.

2. Methods

A comprehensive literature search was conducted across over 170 million research papers indexed in Consensus, including Semantic Scholar and PubMed. The search strategy targeted foundational frameworks, terminology diversity, mechanistic pathways, contrasting perspectives, interdisciplinary insights, and comorbidity/overlap regarding aggression in neurodevelopmental and psychiatric disorders. In total, 2,600,648 papers were identified; after multi-phase filtering for relevance and quality (including citation graph traversal), 50 papers were included in this review.

Search Strategy

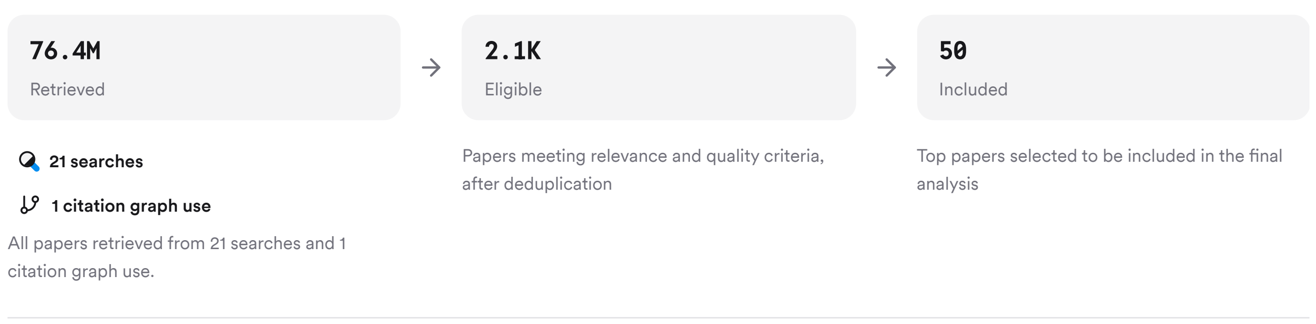

FIGURE 2 Flow diagram of paper selection process for this review.

Six unique search groups were executed to ensure broad coverage of theoretical models, mechanistic studies, comorbidity patterns, critiques/null findings, interdisciplinary perspectives (e.g., criminology), and overlapping risk factors.

3. Results

3.1 Prevalence of Aggression Across Disorders

Aggression is highly prevalent among individuals with ASD (up to 69% during school age) (Gohari et al., 2024), ADHD (Murray et al., 2020; Speyer et al., 2021), intellectual disability (Tsiouris et al., 2011), conduct disorder (Van Goozen et al., 2021), antisocial personality disorder (Blair & Blair, 2001), borderline personality disorder (Kolla et al., 2023), Fetal Alcohol Spectrum Disorder (FASD) (Joseph et al., 2022), Noonan syndrome (Naylor et al., 2023), and early psychosis (López-García et al., 2019). Rates vary by cognitive ability—those with lower IQ or adaptive skills show higher persistent aggression (Gohari et al., 2024).

3.2 Mechanisms Underlying Aggression

Multiple mechanisms contribute to aggression:

- **Genetic/familial factors:** Substantial shared heritability exists between neurodevelopmental problems and aggressive behavior; genetic variants such as MAOA are implicated (Vos et al., 2024; Koyama et al., 2024; Neri et al., 2024).
- **Neurobiological pathways:** Dysfunctions in prefrontal cortex-amygdala circuits underlie impulsive/reactive aggression; serotonergic/dopaminergic imbalances modulate risk (Blair & Blair, 2001; Lesch et al., 2012; Martin et al., 2024; Kolla et al., 2023; Santin, 2025; Cupaioli et al., 2020).
- **Cognitive/emotional deficits:** Impaired executive function, emotion regulation difficulties, sensory sensitivities (especially in ASD/NDDs), and poor social cognition increase vulnerability to aggression (Gohari et al., 2024; Van Goozen et al., 2021; Bardoloi, 2023).
- **Environmental influences:** Early adversity (e.g., maltreatment), birth complications, substance use comorbidity amplify risk for both internalizing/externalizing problems including aggression (Raine, 2018; López-García et al., 2019; Li et al., 2025).

3.3 Subtypes of Aggression

Aggression is commonly divided into:

- **Reactive/impulsive:** Emotionally driven responses to perceived threat or frustration; strongly linked to ADHD symptoms and certain personality disorders (Murray et al., 2020; Martin et al., 2024; Speyer et al., 2021; Coccaro et al., 2011).
- **Proactive/instrumental:** Planned or goal-directed aggression; more associated with conduct disorder/psychopathy (Blair & Blair, 2001).

3.4 Comorbidity & Overlap

Comorbidity is frequent: ADHD often co-occurs with disruptive behavior disorders (DBDs) like ODD/CD as well as intermittent explosive disorder (IED), amplifying impulsive aggression risk (Vos et al., 2024; Radwan & Coccaro, 2020). Overlap between ASD traits and aggressive behaviors is also documented; however, autistic traits may inversely correlate with aggression outside forensic settings (Hofvander et al., 2011). Young violent offenders show high rates of multiple NDDs—ADHD being most common—often with earlier onset of antisocial/aggressive behaviors than non-NDD peers (Billstedt et al., 2017).

3.5 Intervention Strategies & Clinical Implications

Behavioral interventions (functional assessment/training), pharmacological treatments (antipsychotics; α2 agonists), neuromodulation approaches (deep brain stimulation for refractory cases), as well as tailored nursing guidelines have shown varying degrees of efficacy in managing aggression among these populations (Fitzpatrick et al., 2016; Santin, 2025; Bardoloi, 2023; Kato et al., 2025). However, treatment remains challenging due to heterogeneity in etiology/mechanisms.

Results Timeline

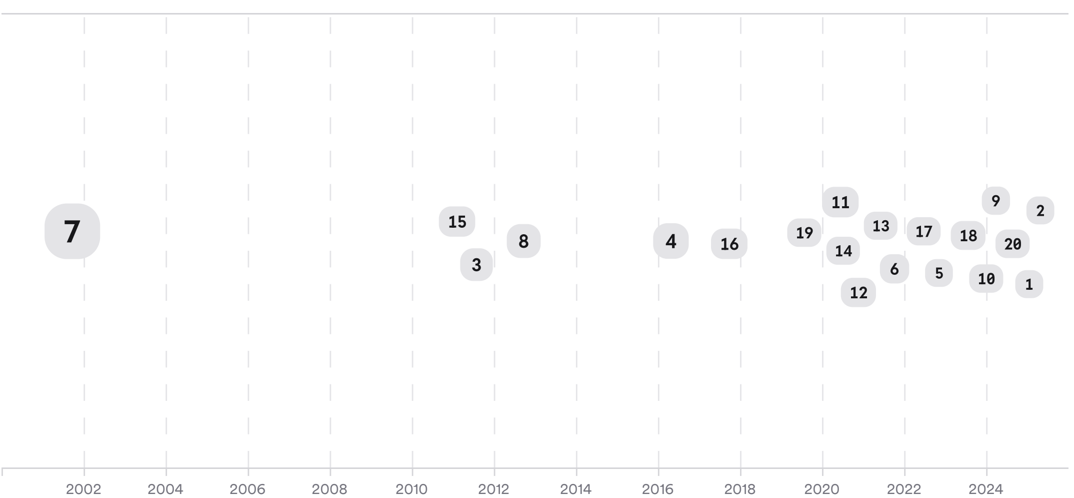

FIGURE 3 Timeline showing publication trends on the relationship between neurodevelopmental/psychiatric disorders and aggression. Larger markers indicate more citations.

Top Contributors

Type	Name	Papers
Author	K. Lesch	(Blair & Blair, 2001; Kato et al., 2025; Abu-Akel & Bo, 2018)
Author	B. Hofvander	(Hoptman, 2015; Kent et al., 2021)
Author	E. Billstedt	(Kent et al., 2021)
Journal	*Psychiatry research*	(Hoptman, 2015; Kent et al., 2021)
Journal	*Journal of Neurology*	(Fitzpatrick et al., 2016; Koyama et al., 2024)
Journal	*Translational Psychiatry*	(Radwan & Coccaro, 2020; Holz et al., 2022)

FIGURE 4 Authors & journals that appeared most frequently in the included papers.

4. Discussion

The literature robustly supports a strong association between neurodevelopmental/psychiatric disorders and increased risk of aggressive behavior across the lifespan (Gohari et al., 2024; Vos et al., 2024; Tsiouris et al., 2011). This relationship is mediated by a complex interplay of genetic predisposition (e.g., MAOA polymorphisms), neurobiological circuit dysfunctions (notably prefrontal-limbic systems), cognitive/emotional deficits (executive dysfunctions; emotion dysregulation), environmental adversity (childhood maltreatment; birth complications), as well as comorbid substance use or additional psychiatric diagnoses (Van Goozen et al., 2021; Blair & Blair, 2001; Lesch et al., 2012; Raine, 2018; López-García et al., 2019).

Evidence strength varies: large-scale epidemiological studies confirm familial aggregation/co-aggregation patterns for NDDs/aggression but highlight weaker associations with substance use compared to internalizing/externalizing symptoms like anxiety/depression (Vos et al., 2024). Longitudinal studies demonstrate that early-onset disruptive/aggressive behaviors are persistent without intervention—often progressing from childhood ODD/CD through adolescence into adult antisocial personality disorder or psychopathy if unaddressed (Van Goozen et al., 2021).

Despite advances in understanding neural circuitry—such as amygdala/prefrontal involvement in impulsivity/reactivity—heterogeneity remains a challenge for both diagnosis/treatment development. There is growing recognition that subtyping aggression by mechanism/reactivity may improve intervention targeting but requires further research validation across diverse populations/settings (Martin et al., 2024; Kolla et al., 2023).

Claims & Evidence Table

Claim	Evidence Strength	Reasoning	Papers
Neurodevelopmental/psychiatric disorders are associated with increased rates of aggression	Strong	Supported by large-scale epidemiological studies across multiple diagnoses/populations	(Gohari et al., 2024; Vos et al., 2024; Tsiouris et al., 2011)
Genetic/familial factors contribute substantially to co-occurrence of NDDs/aggression	Strong	Family/twin/genetic studies show moderate-to-high heritability/shared familiality	(Vos et al., 2024; Koyama et al., 2024)
Distinct neural circuits underlie reactive vs proactive aggression	Strong	Neuroimaging/neurocognitive models differentiate subtypes by brain region involvement	(Blair & Blair, 2001; Martin et al., 2024)
Early adversity/birth complications increase later risk for aggressive behavior	Moderate	Longitudinal/cohort studies link perinatal/neurodevelopmental insults to later violence	(Raine, 2018; López-García et al., 2019)
Behavioral/pharmacologic interventions can reduce aggression but efficacy varies by etiology/subtype	Moderate	Clinical trials/guidelines support some benefit but highlight need for individualized approaches	(Fitzpatrick et al., 2016; Santin, 2025)
Autistic traits may inversely correlate with aggression outside forensic settings	Weak	Some outpatient data suggest lower self-directed/outward aggression among those with ASD traits except in forensic samples	(Hofvander et al., 2011)

FIGURE Key claims and support evidence identified in these papers.

5. Conclusion

There is strong evidence that individuals with neurodevelopmental or psychiatric disorders face an elevated risk of aggressive behavior due to intertwined genetic vulnerabilities, brain circuit dysfunctions—especially involving prefrontal-limbic systems—and environmental stressors/adversity. Subtyping by mechanism/reactivity offers promise for targeted interventions but requires further validation.

Research Gaps

Despite substantial progress in mapping prevalence/mechanisms/comorbidities of aggression within these populations, gaps remain regarding longitudinal trajectories beyond adolescence/adulthood transitions; cross-cultural generalizability; effectiveness/safety of novel interventions; sex/gender differences; integration of dimensional vs categorical diagnostic frameworks.

Research Gaps Matrix

Topic/Outcome	Childhood/Adolescents	Adults	Genetic Studies	Neuroimaging Studies	Intervention Trials
Prevalence	12	6	2	2	2
Mechanisms	8	6	6	8	GAP
Comorbidity	7	6	4	GAP	GAP
Subtype Differentiation	6	2	GAP	2	GAP
Treatment Efficacy	2	2	GAP	GAP	6

FIGURE Matrix showing where research on prevalence/mechanisms/comorbidity/subtypes/interventions is concentrated or lacking across age groups/methodologies.

Open Research Questions

Future research should focus on clarifying developmental trajectories into adulthood; disentangling sex/gender/cultural moderators; validating mechanism-based subtyping for personalized intervention; integrating dimensional diagnostic models.

Question	Why
How do developmental trajectories of aggression differ from childhood through adulthood across specific neurodevelopmental diagnoses?	Understanding long-term patterns will inform prevention/intervention strategies tailored by diagnosis/age group.
What are the neural circuit differences underlying reactive versus proactive aggression across diagnostic categories?	Identifying distinct brain mechanisms can guide targeted therapies based on subtype rather than diagnosis alone.
How effective are mechanism-based interventions compared to standard care for reducing persistent aggression?	Comparative trials will clarify whether targeting specific biological/cognitive pathways improves outcomes over usual care.

FIGURE Open questions highlighting future directions for research on mechanisms/interventions.

In summary: Neurodevelopmental and psychiatric disorders confer a substantial increase in risk for aggressive behavior via complex genetic-neurobiological-environmental interactions; ongoing research should prioritize longitudinal designs/mechanism-based interventions/personalized care approaches to reduce burden on individuals/families/society.

These search results were found and analyzed using Consensus, an AI-powered search engine for research. Try it at https://consensus.app. © 2026 Consensus NLP, Inc. Personal, non-commercial use only; redistribution requires copyright holders' consent.

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