

## INTRODUCTION

- Children diagnosed with a neurodevelopmental disorder often have one or more other neurodevelopmental conditions<sup>1</sup>
- Commonly co-occurring conditions include autism spectrum disorder (ASD), developmental coordination disorder (DCD), and attention deficit hyperactivity disorder (ADHD)
- While altered brain development is suspected across conditions, how the brain differs between conditions has not been systematically evaluated

## OBJECTIVES

- To explore similarities and differences in brain structure and function in children with ASD, DCD, and/or ADHD

## METHODS

### Study Design:

- systematic review methodology

### Databases:

- MEDLINE, EMBASE, CINAHL, CENTRAL, and PsycINFO from the earliest record up to August 2020

### Inclusion criteria :

- peer-reviewed studies and case reports published in a scientific journal;
- children ≤ 18 years of age with one or more diagnoses of ASD, DCD, and/or ADHD compared to children with one or more of these neurodevelopmental conditions
- brain MRI involving structural MRI, diffusion tensor imaging (DTI), and/or resting-state fMRI

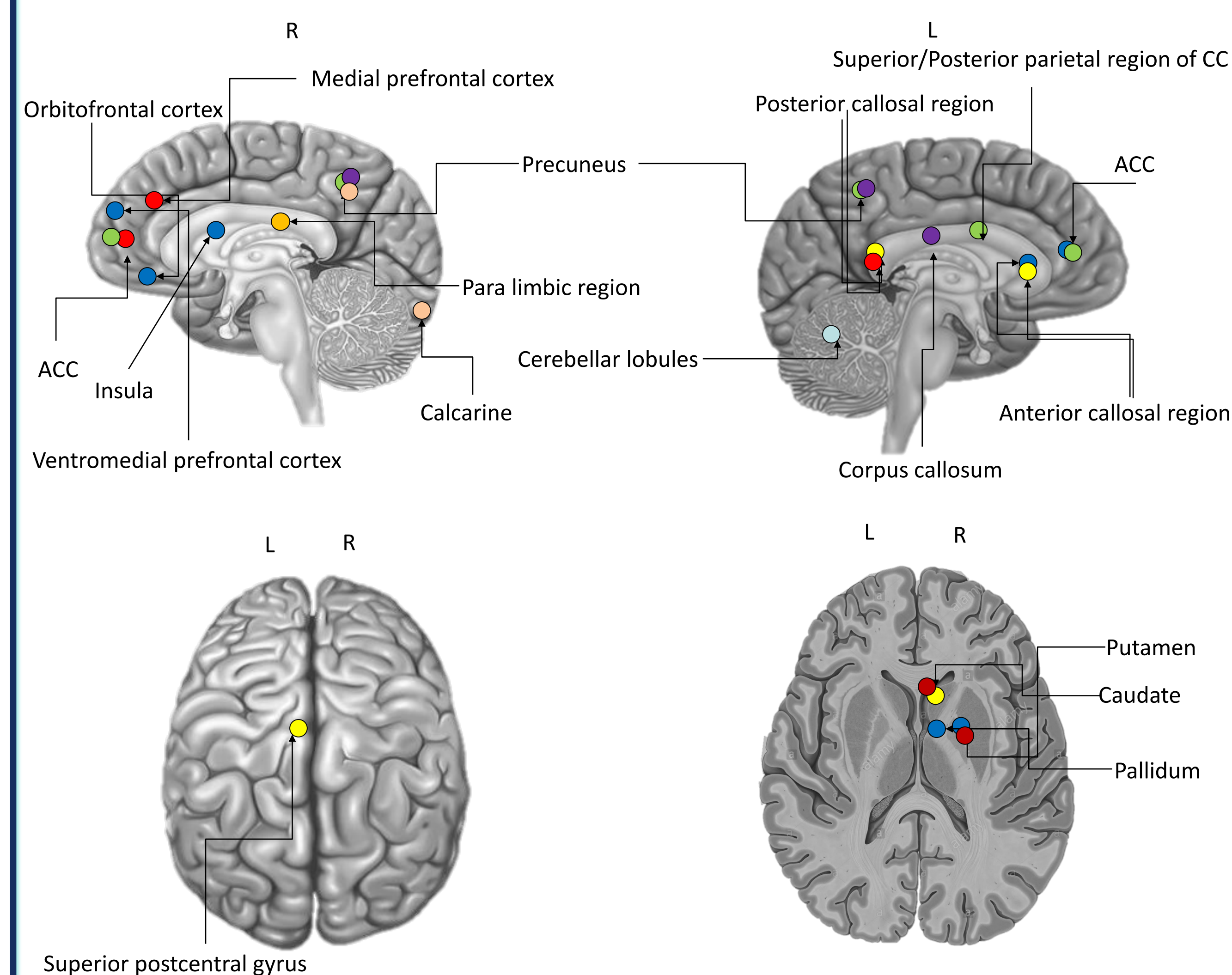
### Quality assessment:

- 29 studies met the inclusion criteria
- Two independent reviewers assessed study quality the Appraisal tool for Cross-Sectional Studies (AXIS)<sup>3</sup>

## RESULTS

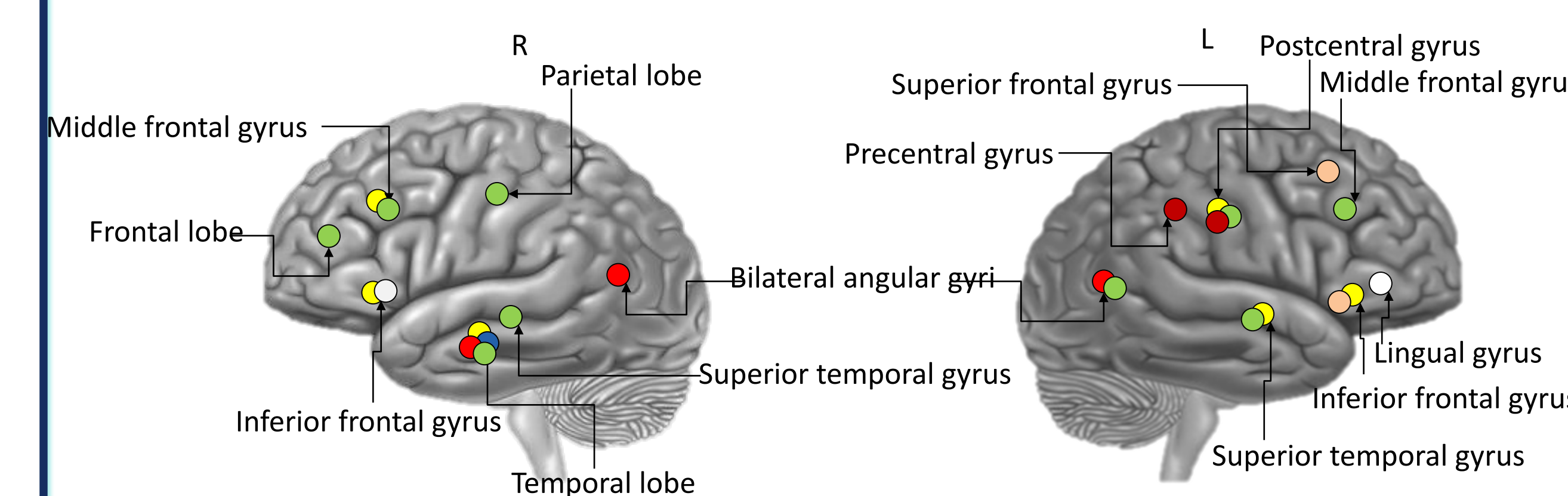
**Table 1. Study characteristics**

Diagnostic Groups	Total Number	MRI Modality	N
DCD and/or ADHD	6	Structural	2
		DTI	1
		Resting-state	3
DCD and/or ASD	1	Structural	1
ASD and/or ADHD	7	Structural	3
		DTI	1
		Resting-state	3
ASD vs ADHD	15	Structural	8
		DTI	2
		Resting-state	2
		Multi-modalities	3



- Shared neural correlates in DCD+ADHD & ADHD
- Shared neural correlates in DCD+ADHD & DCD
- Shared neural correlate in DCD and ADHD alone
- Unique neural correlate in DCD+ADHD

## RESULTS cont'd



- Shared neural correlates in DCD+ASD & ASD
- Unique neural correlates in DCD+ASD
- Shared neural correlates in ASD & ADHD alone
- Unique neural correlates in ASD+ADHD
- Shared neural correlates in ASD+ADHD & ASD
- Shared neural correlates in ASD+ADHD & ADHD

## CONCLUSIONS

- While neurodevelopmental disorders often result from altered brain development, findings suggest that brain structure and function differ across disorders.
- The neural correlates of the co-occurring conditions were more widespread and distinct compared to a single diagnosis.

## REFERENCES

1. Scandurra et al. Neurodevelopmental disorders and adaptive functions: A study of children with autism spectrum disorders (ASD) and/or attention deficit hyperactivity disorder (ADHD). *Front Psychiatry*. 2019;10:Article 673.
2. Caçola et al. Behavioral comparisons in autism spectrum disorder and developmental coordination disorder: A systematic literature review. *Res Autism Spectr Disord*. 2017; 38: 6-18.
3. Downes et al. Development of a critical appraisal tool to assess the quality of cross-sectional studies (AXIS). *BMJ Open*. 2016;6(12):Article e011458

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