# INPLASY PROTOCOL

To cite: Stuart et al. The Neuropsychological Correlates of Cognitive Disengagement Syndrome as Distinct from ADHD: A Systematic Review and Meta-analysis Protocol. Inplasy protocol 202280102. doi: 10.37766/inplasy2022.8.0102

Received: 28 August 2022

Published: 28 August 2022

**Corresponding author:**
**Nicole Stuart**

**nicoleestuart@gmail.com**

**Author Affiliation:**
**University of Western Australia**

**Support:** **None.**

**Review Stage at time of this submission:** **Formal screening of search results against eligibility criteria.**

**Conflicts of interest:**
**None declared.**

# The Neuropsychological Correlates of Cognitive Disengagement Syndrome as Distinct from ADHD: A Systematic Review and Meta-analysis Protocol

Stuart, N[1]; Sheridan, A[2]; Pestell, C[3]; Dorrington, K[4]; Badcock, N[5]; Gignac, G[5].

**Review question / Objective:** **The aim of the current review is to use meta-analytic techniques to delineate the cognitive profile of Cognitive Disengagement Syndrome (CDS) as distinct from ADHD-related inattention (ADHD-I) and hyperactivity-impulsivity (ADHD-HI). In addition, this systematic review and meta-analysis will provide an analysis of methodological factors that might account for discrepancies in research findings and guidance for future studies.**
**Condition being studied:** **CDS (previously known as sluggish cognitive tempo) is a constellation of symptoms that includes daydreaming, inconsistent alertness, hypoactivity and lethargy. CDS was originally identified among children with the attention deficit hyperactivity disorder (ADHD). ADHD is a common neurodevelopmental disorder characterised by age-inappropriate levels of impulsivity, hyperactivity, and/or distractibility. Evidence suggests that ADHD has two symptom dimensions: inattention (ADHD-I) and hyperactivity-impulsivity (ADHD-HI). Although there is considerable overlap between CDS and ADHD-I, factor analytic and convergent and discriminant validity studies suggest that CDS and ADHD-I are distinct constructs.**

**INPLASY registration number:** This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 28 August 2022 and was last updated on 17 July 2024 (registration number INPLASY202280102).

## INTRODUCTION

**Review question / Objective:** **The aim of the current review is to use meta-analytic techniques to delineate the cognitive profile of Cognitive Disengagement Syndrome (CDS) as distinct from ADHD-related inattention (ADHD-I) and hyperactivity-impulsivity (ADHD-HI). In addition, this systematic review and meta-analysis will provide an analysis of methodological factors that might account for discrepancies in research findings and guidance for future studies.**

**Rationale:** **CDS can have important clinical and functional implications, including academic impairment, social withdrawal,**

anxiety, depression, and suicidal behaviour. Despite these implications, however, CDS often goes under-recognised and under-treated because it is not yet recognised in diagnostic manuals. A key issue may be that the cognitive and neural mechanisms underpinning CDS symptoms are not well understood. To date, the literature examining CDS's neuropsychological correlates, including how these correlates differ from ADHD, has been mixed. Therefore, a systematic review and meta-analysis of studies investigating the neuropsychological correlates of CDS is proposed as a means of understanding the cognitive deficits that underpin CDS's symptom profile as distinct from ADHD-I and ADHD-HI, as well as methodological issues that might account for mixed findings in the literature.

**Condition being studied:** CDS (previously known as sluggish cognitive tempo) is a constellation of symptoms that includes daydreaming, inconsistent alertness, hypoactivity and lethargy. CDS was originally identified among children with the attention deficit hyperactivity disorder (ADHD). ADHD is a common neurodevelopmental disorder characterised by age-inappropriate levels of impulsivity, hyperactivity, and/or distractibility. Evidence suggests that ADHD has two symptom dimensions: inattention (ADHD-I) and hyperactivity-impulsivity (ADHD-HI). Although there is considerable overlap between CDS and ADHD-I, factor analytic and convergent and discriminant validity studies suggest that CDS and ADHD-I are distinct constructs.

## METHODS

**Search strategy:** Search strategy: Searches will be conducted using PubMed, PsycINFO, PsycARTICLES, and Embase. To identify studies of the neuropsychological correlates of CDS, combinations of the following search terms "(sluggish cognitive tempo)" or "(cognitive disengagement syndrome)" and "(neuropsychology)" or "(neuropsychological)" or "(neurocognitive)" or "(cognitive)" or "(cognition)" will be used for all databases. To identify studies of the neuropsychological correlates of ADHD-I and ADHD-HI, combinations of the following search terms "(attention deficit hyperactivity disorder)" and "(symptom dimensions)" or "(symptom domains)" or "(ADHD traits)" or "(ADHD dimensions)" or "(inattention symptoms)" or "(inattentive symptoms)" or "(hyperactivity symptoms)" or "(hyperactive symptoms)" or "(hyperactivity-impulsivity symptoms)" or "(hyperactive-impulsive symptoms)" or "(ADHD symptoms)" and "(neuropsychology)" or "(neuropsychological)" or "(neurocognitive)" or "(cognitive)" or "(cognition)" will be used for all databases.

**Participant or population:** Human participants across the life span will be included, including both clinical and non-clinical populations.

**Intervention:** Not applicable.

**Comparator:** For between subject studies of the neuropsychological correlates of CDS, a comparator group of participants without elevated CDS symptoms.

**Study designs to be included:** For studies of the neurocognitive correlates of CDS, between subject analyses, regression and correlational studies will be included. For studies of the neurocognitive correlates of ADHD-HI and ADHD-I, studies that report correlations between neuropsychological performance and ADHD-HI and/or ADHD-I will be included.

**Eligibility criteria:** 1) peer reviewed study, published in English; 2) investigated the neurocognitive correlates of CDS, ADHD-I, or ADHD-HI in any age group; 3) used objective neuropsychological tests relevant to any of the following neurocognitive domains: attention, executive functioning, memory, language, perceptual-motor functioning, and social cognition; 3) employed a published measure, specifically designed for identifying and quantifying CDS, ADHD-I and/or ADHD-HI symptoms.

**Information sources:** PubMed, PsycINFO, PsycARTICLES, and Embase.

**Main outcome(s):** Study outcomes will be categorised according to the following neuropsychological domains: attention, executive functioning, memory, language, perceptual-motor functioning, and social cognition. Raw correlations between these domains and ADHD-HI, ADHD-I and CDS will be used in meta-analyses.

**Additional outcome(s):** Other variables of interest include sample age and comorbid diagnoses.

**Data management:** Abstracts will be screened for relevance using Covidence software. For CDS studies, two reviewers will screen the full-text studies for inclusion or exclusion in the review. For ADHD studies, two reviewers will screen 50% of the full-text studies for inclusion or exclusion, with the remainder screened by one reviewer. Conflicts will be resolved via discussion and/or input from an additional reviewer providing third-party oversight. Data extracted will include - Study title, author, journal, and year of publication; - Study aim; - Study funding sources and conflicts of interested reported by the authors; - Participant recruitment method and setting; - Sample size, age, sex composition and clinical diagnoses; - Measures of CDS, ADHD, and neuropsychological functioning employed in the study; - Statistical analyses used; and - Study results, including effect sizes and statistical significance.

**Quality assessment / Risk of bias analysis:** Risk of bias assessment will be conducted using an adapted version of the Joanna Briggs Institute Checklist for Analytical Cross Sectional studies. Two reviewers will independently assess the studies, with conflicts resolved via discussion and/or input from an additional reviewer providing third-party oversight. Methodological items assessed will include inclusion/exclusion criteria; recruitment method; sample description; validity and reliability of the study measures; identification, measurement and strategies for dealing with confounding factors; use of a control group; and statistical analyses.

**Strategy of data synthesis:** Population level correlations with a series of meta-analyses between CDS, ADHD-I and ADHD-HI, between CDS and each of the neuropsychological domains, between ADHD-I and each of the neuropsychological domains, and between ADHD-HI and each of the neuropsychological domains. Meta-analytic structural equation modelling (maSEM) will then be conducted to estimate the unique associations between CDS, ADHD-I and ADHD-HI and the neuropsychological domains, controlling for shared variance between CDS, ADHD-I and ADHD-HI. Indirect associations between CDS and the neurocognitive domains mediated by ADHD-I and/or ADHD-HI will also be estimated.

**Subgroup analysis:** If sufficient data are available, we will conduct the following subgroup analyses: 1 = by age (children 6-11 years of age, adolescents 12-17 years, adults 18 +); 2 = clinical status (clinical sample, non-clinical sample).

**Sensitivity analysis:** For meta-analyses with four or more studies, the data will be tested for influential effects with the INFLUENCE function in metafor. When a study is identified as being influential, the meta-analytic effect will be re-tested after excluding the influential study from analyses. Using the LEAVE1OUT function in metafor, studies will be considered overly influential if there is an absolute difference > .09 compared to the original effect. In such cases, the influential study will be excluded from the meta-analytic model. In addition, risk of bias for each neurocognitive domain will be estimated based on sensitivity analysis comparing meta-analytic results when low and moderate quality studies are excluded vs. included in analyses.

**Language restriction:** English.

**Country(ies) involved:** The review will be coordinated in Australia, seeking papers globally.

**Other relevant information:** Not applicable.

**Keywords:** cognitive disengagement syndrome, sluggish cognitive tempo, attention deficit hyperactivity disorder, inattention, hyperactivity-impulsivity, cognition, neuropsychology, systematic review, meta-analysis.

**Dissemination plans:** The findings of the review may be presented at a scientific conference and published in a peer-reviewed journal.

**Contributions of each author:**

Author 1 - Nicole Stuart - Conceptualisation of the review, literature search, study screening, data extraction, quality assessment, data analysis and literature review, first draft of the manuscript, and approval of the final manuscript.
Email: nicole.stuart@research.uwa.edu.au
Author 2 - Andrew Sheridan - Guidance on the systematic review process, study screening, quality assessment, manuscript review and approval of the final manuscript
Email: andrew.sheridan@uwa.edu.au
Author 3 - Carmela Pestell - Guidance on systematic review process, study screening, quality assessment, manuscript review and approval of the final manuscript.
Email: carmela.pestell@uwa.edu.
Author 4 - Karina Dorrington - Study screening, data extraction, quality assessment and approval of the final manuscript
Email: 22414875@student.uwa.edu.au
Author 5 - Nicolas Badcock - assistance with meta-analysis, manuscript review and approval of the final manuscript
Email: nicholas.badcock@uwa.edu.au
Author 6 - Gilles Gignac - meta-analytic strategy and guidance, oversight of data extraction, synthesis and analysis, review and approval of the final manuscript.
Email: gilles.gignac@uwa.edu.au