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Cognitive Disengagement Syndrome: A Construct at the Crossroads

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Abstract

Initially described in the mid-1980s, cognitive disengagement syndrome (CDS; previously termed sluggish cognitive tempo) is a set of symptoms comprising excessive daydreaming, mental confusion, and hypoactivity that is distinct from attention-deficit/hyperactivity disorder (ADHD) and other psychopathology dimensions and independently associated with functional outcomes. This article provides a broad overview of the history of the CDS construct, its terminology, and the current state of the science. Although there has been a marked upsurge in research on CDS, including psychometrically rigorous assessment tools and an emerging pattern of findings across numerous domains of functioning, the existing literature base also points to the importance of marshaling an ambitious research agenda that can guide CDS into its next era. Ten key research domains and open questions are highlighted, including (1) developmental course of CDS across the life span, (2) mechanisms linking CDS to functional outcomes and impairment, (3) importance of gathering normative data, (4) clarifying CDS and unidimensional or multidimensional, (5) etiologies of CDS, (6) neurobiology and psychophysiology of CDS, (7) CDS as a transdiagnostic trait, (8) understanding individuals with elevated CDS, (9) promoting participatory approaches and valuing lived experience, and (10) the role of CDS for intervention. Implications of this research for possible conceptualizations of CDS as a distinct disorder, diagnostic specifier, or transdiagnostic dimension are discussed. The road ahead will require increased collaboration, creativity, and rigor to build theory, and, ultimately, support the well-being of individuals with this syndrome.

Keywords

attention-deficit/hyperactivity disorder; comorbidity; diagnosis; psychopathology; sluggish cognitive tempo

“[Our son] is now 18 and we have spent most of his life turning over stones trying to figure out ways we can help and support him. We realize in reading the literature that he may be actually a ‘textbook case’ of [sluggish cognitive tempo] ... One

of his dominant characteristics is that he is extremely spacey most of the time. He tends to be hypo active, passive and unengaged and if not actively engaged by someone will fade out and daydream. He can do many tasks if guided but when he does these tasks he often will do them almost in slow motion ... We have met many kids over the years who have IEPs and diagnoses but there is almost never anyone like [our son] ... When we read the ‘checklist’ that has been created for SCT it was as though [our son] was being described for the first time on paper.”

– Email from a concerned mother

There is accumulating evidence that some individuals display a unique pattern of attentional difficulties not fully captured by other psychopathologies including either attention-deficit/hyperactivity disorder (ADHD) or internalizing symptoms. The term “sluggish cognitive tempo” was initially coined to describe children who appear as frequently adrift in their thoughts, look spacey and confused when interacting with others, and seem to operate at a slower speed than their peers, with a recent Work Group consensus change in terminology to “cognitive disengagement syndrome” (CDS; Becker et al., 2023).

Despite increasing recognition of CDS among professionals and the public alike, our nascent but growing understanding of CDS remains unfamiliar to most researchers and clinicians in psychology, psychiatry, and related fields. Accordingly, this primer on CDS provides a broad overview of the history of the CDS construct, its terminology, and the current state of the science, followed by a Top Ten list of key research domains and open questions. Finally, implications of current and emerging research for conceptualizations of CDS are discussed.

An Historical Overview

Figure 1 provides a timeline of key historical moments in the study of CDS. Historically (and still so today), the study of CDS has been closely tied to the study of ADHD, with CDS first emerging from early studies seeking to understand the nature and factor structure of inattention, hyperactivity, and impulsivity in children (for a more thorough history, see Barkley, 2015; Becker, Marshall, et al., 2014). Following influential work by Virginia Douglas emphasizing the role of sustained attention difficulties in contributing to the deficits and impairments observed in hyperactive children (Douglas, 1972), the Third Edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-III; American Psychiatric Association, 1980) prioritized inattention by replacing the earlier diagnostic term of hyperkinetic reaction of childhood with attention deficit disorder (ADD). Coinciding with this change were two new subtypes: ADD with hyperactivity and ADD without hyperactivity. The introduction of a diagnostic subtype without hyperactivity accelerated new research to characterize this rarely studied, but clinically observed, group of children for whom deficits in attention regulation were front and center.

It was during this same era that a small number of items involving daydreaming, drowsiness, and lethargy began to garner interest in studies seeking to understand the structure and nature of behavior and attention problems in children. These items were included on very early parent and teacher checklists seeking to identify the structure of children’s behavior problems. The initial studies examining these checklists resulted in two dimensions termed

Conduct Problem and Personality Problem, with daydreaming and associated behaviors included in the latter dimension (Himmelweit, 1953; Peterson, 1961). By the 1970's, additional factors were identified, including a more narrow "Sluggishness" factor comprised of items assessing drowsiness, being easily flustered or confused, drowsiness, passivity, and fatigue, as well as numerous inattentive and other behaviors (Dielman et al., 1971). A decade later, seminal work by Benjamin Lahey and his students led to the first empirical support for separate Sluggish Tempo and Inattention-Disorganization factors (Carlson, 1986; Lahey et al., 1988; Neeper & Lahey, 1986). "Sluggish cognitive tempo" entered the nomenclature to describe this group of behaviors (Lahey et al., 1987), a term which took hold for the next several decades.

With new DSM-III subtypes in hand that necessitated scrutiny, researchers repeatedly found that children with ADD without hyperactivity had higher sluggish cognitive tempo scores than children with ADD with hyperactivity (Barkley et al., 1990; Lahey et al., 1985; Lahey et al., 1987). Further, the two ADD subtypes showed a different pattern of external correlates: those with hyperactivity had more externalizing behaviors such as aggression and experienced more peer rejection, whereas those without hyperactivity were more likely to have anxiety and be socially withdrawn (Barkley et al., 1990; Lahey et al., 1987).

Subtypes for attention deficit disorders were briefly eliminated in the DSM-III-R, which combined the inattentive, hyperactive, and impulsive symptoms into a single list under the diagnostic label of attention-deficit/hyperactivity disorder (ADHD) (American Psychiatric Association, 1987). This did little to settle the interest and controversy related to possible subtypes (Frick & Lahey, 1991), and in preparing for the DSM-IV field trials, two alternative symptoms ("often daydreams when should be attending" and "often is sluggish or drowsy") were included alongside the tentative symptom list for ADHD (Frick et al., 1994). When examining the diagnostic utility of each symptom for predicting the provisional threshold for inattention, both sluggish cognitive tempo items showed quite high positive predictive power (conditional probability of the disorder being present given the presence of the symptom) but low negative predictive power (conditional probability of the disorder being absent given the absence of the symptom). As a result, these items were not adopted as symptoms for diagnosing DSM-IV given they were associated with only the predominantly inattentive subtype of ADHD (Frick et al., 1994).

The decision to leave sluggish cognitive tempo items out of the DSM-IV led to research on this symptom set stalling until two landmark articles were published in 2001: one empirical (McBurnett et al., 2001) and one conceptual (Milich et al., 2001). In a sample of 692 ADHD-referred children, McBurnett et al. (2001) revisited the clinical utility of the sluggish cognitive tempo items evaluated in the DSM-IV field trials and found that separate inattention and sluggish cognitive tempo factors emerged only when hyperactive-impulsive items were not simultaneously considered. These findings supported the internal validity of a separate sluggish cognitive tempo factor and suggested that this factor may be especially useful for identifying a more homogenous group of children with ADHD predominantly inattentive symptoms (McBurnett et al., 2001); see also (Carlson & Mann, 2002). In the same vein, Milich and colleagues (2001) marshaled a large and wide-ranging body of research to argue that ADHD combined type and ADHD predominantly inattentive type

were best considered as distinct disorders. Sluggish cognitive tempo symptoms featured prominently in reaching this conclusion, insofar as to assert “that the DSM-IV work group may have erred by excluding items that tap into the sluggish cognitive tempo. These items may be necessary to identify a pure inattentive group” (p. 470). This review, as well as its corresponding commentaries (e.g., Barkley, 2001; Lahey, 2001), stimulated new research in sluggish cognitive tempo which continues today.

In line with the suggestion by Milich et al. (2001), several studies did find that the presence of sluggish cognitive tempo may identify a meaningful subgroup of ADHD predominantly inattentive type (Capdevila-Brophy et al., 2014; Carlson & Mann, 2002; Marshall et al., 2014). However, numerous other studies failed to find convincing evidence for this possibility (Harrington & Waldman, 2010; Hinshaw et al., 2002; Ludwig et al., 2009; Todd et al., 2004; Willcutt et al., 2014). As such, researchers increasingly turned to investigating sluggish cognitive tempo not as a component of ADHD itself, but rather as a construct related to but distinct from ADHD. The rapidly increasing interest in this construct has led to dozens of empirical articles, including special issues in the *Journal of Abnormal Child Psychology* (Becker, Marshall, et al., 2014) and the *Journal of Attention Disorders* (Becker, 2017), as well as an international Work Group that, after several decades, initiated a consensus proposal to change the terminology from sluggish cognitive tempo (SCT) to cognitive disengagement syndrome (CDS) (Becker et al., 2023).

What's in a Name?

As summarized in the preceding section, the term “sluggish cognitive tempo” (or variants such as “sluggish tempo”) was used since initial empirical interest in this symptom set emerged in the mid-1980's. This is not surprising, as identified factors are frequently named based on the items comprising them. Indeed, in one of the first studies finding support for a “sluggish tempo” factor distinct from inattention-disorganization, the “appears to be sluggish” item had the highest subscale correlation among the five items used to create the factor (Neeper & Lahey, 1986). And once the term entered the nomenclature, it stuck. That is, until 2014 when Russell Barkley strongly critiqued the “sluggish cognitive tempo” term in a commentary for the themed special section in the *Journal of Abnormal Child Psychology* (Barkley, 2014). As Barkley argued, given an underlying cognitive dysfunction had yet to be identified, “*the label sluggish cognitive tempo seems premature, likely misleading, and certainly derogatory*” (Barkley, 2014, p. 123, italics in original).

In considering various alternative terms, Barkley settled on proposing “concentration deficit disorder” as one alternative (Barkley, 2014); see also (Barkley, 2016; Saxbe & Barkley, 2014). However, others in the field found it premature to refer to the construct in diagnostic terms (Becker, Leopold, et al., 2016); see also (Becker et al., 2015), which would cast the construct in a dichotomous light while also creating confusion for clinicians and families, as well as the public more broadly, as it was not a recognized disorder in any diagnostic system (see, e.g., Aldhous, 2014; Schwarz, 2014). In transparently discussing their differing perspectives related to this issue, Becker and Barkley (2018) agreed there was a clear need for a new term and hoped to “find consensus around such a term in the near future” (p. 151).

The consensus for a new term would come several years later. In early 2021, a 13-member international Work Group was organized to (1) evaluate the current knowledge and key directions in the study of sluggish cognitive tempo, and (2) arrive, if possible, at a consensus change in terminology that reflects current science while also being more acceptable to professionals, patients, and their families (Becker et al., 2023). The Work Group held ten virtual meetings throughout 2021 during which terminology was discussed, used an online document to generate and comment on ideas and specific terms, and conducted polls among Work Group members as terminology discussions progressed (see Becker et al., 2023 Supplemental Materials for additional details). Following repeated discussions, including with families of children with elevated symptoms, the Work Group selected “cognitive disengagement syndrome” (CDS) as most appropriate and encouraged the field to use this term moving forward, recognizing that the term would likely continue to evolve in tandem with scientific advances.

The Work Group also provided more definitional clarity regarding CDS, emphasizing that CDS refers to developmentally inappropriate and persistent behaviors best characterized by:

“(1) cognitive symptoms involving the disengagement or decoupling of attention and conscious or effortful mental processing from the ongoing external context, as reflected in difficulties with staring, daydreaming, mental confusion, or fogginess, withdrawal, and sleepy appearance; and

(2) motor symptoms involving hypoactivity as manifested in underactivity, periods of passive or sedentary movement, and slow, reduced, or delayed motor movements”

(p. 639).

The Work Group emphasized that the motor symptoms were not reflected in the newly proposed term in an effort to keep the term shorter and not because these symptoms were viewed as less important or prevalent than the cognitive symptoms (Becker et al., 2023). As detailed below, far more research is needed regarding the internal structure, developmental course, and external validity of the cognitive and motor symptoms comprising CDS. Yet the Work Group agreed that CDS research had reached a point where sufficient evidence had accumulated demonstrating its internal validity (coherence of CDS symptoms with each other and distinctions from other psychopathologies) and external validity (independent associations with functional outcomes).

State of the Science

As research on SCT, now termed CDS, has advanced, three key areas of focus to date have involved the (1) measurement of CDS (i.e., what items are optimal for assessing CDS?), (2) internal validity of CDS (i.e., is CDS distinct from other psychopathologies?), and (3) external validity of CDS (i.e., does CDS relate to functional outcomes and impairment?). This section provides a brief summary of these areas of inquiry. In considering CDS across domains of inquiry, cognition, co-occurring psychopathology dimensions, socio-emotional functioning, and academic/occupational functioning have received the most substantial research attention to date. Far fewer studies have examined other critical domains,

including etiology, neurobiological and physiological correlates, psychosocial adversity, and intervention. These domains are not reviewed in this paper, not because they lack importance (quite the contrary) but rather because there are too few studies for drawing clear inferences; readers interested in these domains can find a summary in the recent Work Group report (Becker et al., 2023). Rather, the domains with the most data available are reviewed here to provide readers with an overview of where, to the extent possible, findings have begun to converge.

Assessment of CDS

There have been multiple phases in the assessment of CDS to date (Becker et al., 2023). The first phase included a handful of ad hoc items rather serendipitously included on broadband caregiver and teacher rating scales of children's behavior, such as the frequently used Child Behavior Checklist (CBCL) and its parallel Teacher's Report Form (TRF). An initial sluggish cognitive tempo-specific rating scale was created but did not undergo rigorous psychometric evaluation and failed to gain much traction (McBurnett & Pfiffner, 2005; Pfiffner et al., 2007). This changed in 2009 when the first rating scale specifically developed and evaluated for assessing sluggish cognitive tempo symptoms using test-construction procedures was published (Penny et al., 2009). Other caregiver- and teacher-report measures quickly followed, with item pools ranging from 10 to 44 candidate items (Barkley, 2013; Lee et al., 2014; McBurnett et al., 2014), as well as the first adult and child self-report measures (Barkley, 2012; Becker et al., 2015). In each instance, a sizeable subset of candidate sluggish cognitive tempo items was found to be empirically distinct from ADHD inattentive items.

A meta-analysis was conducted to identify which sluggish cognitive tempo items were consistently separable from ADHD inattention (Becker, Leopold, et al., 2016). Thirteen items were identified, with additional interest in three items assessing mental confusion resulting in a total of 16 possible items. Consistent with some earlier research (Barkley, 2013; Jacobson et al., 2012; Penny et al., 2009), studies examining these 16 items repeatedly found that an item assessing low motivation primarily loaded (or cross-loaded) on an ADHD inattention factor rather than a distinct CDS factor (Becker, Burns, et al., 2019; Burns et al., 2021; Jacobson et al., 2018; Sáez, Servera, Becker, et al., 2019), and so this item is not currently considered part of the optimal CDS symptom set. However, the remaining 15 items have demonstrated strong structural validity, high reliability, invariance across time and samples, and independent associations with various functional outcome measures, though with findings clearer for caregiver and teacher ratings than for self-report ratings (for a review, see Becker, 2021). Although most research examining these items have been conducted in the United States and Spain, support for this CDS item set has also been found in recent studies conducted in Brazil (Belinati et al., 2024), Iran (Sadeghi-Bahmani et al., 2022), Italy (Somma et al., 2022), South Korea (Jung et al., 2021), and Turkey (Yucens et al., 2024), though some inconsistencies have again been found when using self-report ratings (Jung et al., 2021; Sadeghi-Bahmani et al., 2023). There is also promising psychometric support of a semi-structured clinical interview for assessing these 15 CDS symptoms (Becker, Dunn, et al., 2024). These 15 items are listed in Table 1, conceptually grouped into daydreaming, mental confusion, and hypoactivity subdomains. At the present

time, there are numerous rating scale measures with strong psychometric properties that can be used to assess CDS symptoms across the life span (Becker, 2021), and the 15 items listed in Table 1 provide an excellent launching point for advancing research in both the assessment, internal validity, and external validity of CDS.

In addition to the importance of additional research examining the psychometric properties of existing rating scales and interviews for assessing CDS, including in different cultural contexts, there is also a need to evaluate performance-based tasks which may be useful in the assessment of CDS. This may include existing neuropsychological and behavioral tasks, including tasks assessing processing speed, working memory, and attention networks, though current findings examining these domains have yielded mixed findings (see CDS and Cognition section below; also (Barkley et al., 2022). Novel approaches will likely be needed that extend beyond a single task or current ADHD-focused neuropsychological assessment batteries (see, e.g., Becker & Barkley, 2021; Kofler, Irwin, Sarver, et al., 2019). Observational methods may also prove beneficial, particularly if developed and tested in ecologically-valid settings. In sum, in addition to rating scales, rigorous, innovative work in the development of assessment methods in CDS remains a research priority.

Internal Validity of CDS

The clearest evidence for the internal validity of the CDS construct currently available comes from studies examining convergent and discriminant validity. That is, it is important to establish that CDS items have strong loadings on a CDS factor (demonstrating convergent validity), including substantially higher loadings on a CDS factor than another psychopathology factor (demonstrating discriminant validity). Much of the support for the convergent and discriminant validity of CDS comes from studies developing and evaluating measures for assessing CDS, as detailed in the preceding section. Given the historical context in which CDS emerged and its very strong association with ADHD inattention, these studies have primarily asked whether CDS symptoms (or at least a subset of CDS items) are empirically distinct from ADHD inattention and, with very few exceptions (e.g., Lahey et al., 2004; Todd et al., 2004), the resounding answer has been *yes*.

Fewer studies have examined whether CDS is also distinct from other dimensions of psychopathology. However, the existing studies have shown that CDS is not only empirically separable from ADHD inattention but also from depression, anxiety, somatic complaints, ADHD hyperactivity-impulsivity, and oppositional defiant/conduct disorder behaviors (Becker, Burns, Garner, et al., 2018; Becker, Luebbe, Fite, et al., 2014; Lee et al., 2014; Mayes et al., 2021; Smith, Eadeh, et al., 2019; Willcutt et al., 2014). Importantly, these distinctions have been found in numerous types of samples, including community, ADHD, autistic, and psychiatrically hospitalized youth, as well as in college students. Studies have also shown that CDS symptoms are distinct from daytime sleepiness and sleep disturbance in ADHD, autistic, sleep-disordered, and college student samples (Becker, Garner, et al., 2016; Langberg, Becker, Dvorsky, et al., 2014; Mayes et al., 2021; Smith, Eadeh, et al., 2019). There is thus strong evidence that CDS is distinct from ADHD symptoms and increasing evidence for its distinction from other psychopathologies and sleep-related problems.

CDS and Co-occurring Psychopathologies

Although distinct from other psychopathologies, CDS also shows a distinct pattern of associations with internalizing and externalizing dimensions. Most consistently, higher CDS symptoms are positively correlated with both anxiety and depressive symptoms (meta-analytic $r = 0.49\text{--}0.50$; Becker, Leopold, et al., 2016), associations that almost always remain above and beyond ADHD symptoms (for reviews, see (Becker, Leopold, et al., 2016; Becker et al., 2023; Kaçmaz et al., 2024). CDS may be more consistently or strongly associated with depression than with anxiety (Becker et al., 2023), though more studies are needed to examine this possibility, and common genetic and/or environmental factors may be important for understanding the association between CDS and anxiety (Scaini et al., 2023). In addition, extant studies have found CDS symptoms to be associated with higher suicidal ideation/risk above and beyond ADHD symptoms (Becker, Burns, et al., 2020) and depressive symptoms (Becker, Holdaway, et al., 2018; Becker, Withrow, et al., 2016; Thornton et al., 2024).

Quite an opposite pattern of findings is found with externalizing behaviors. Although CDS symptoms may be positively associated with externalizing behaviors in bivariate analyses (meta-analytic $r = 0.21\text{--}0.36$; Becker, Leopold, et al., 2016), this association is generally eliminated or becomes negative when CDS and ADHD symptoms are examined simultaneously to identify unique effects (Becker et al., 2023). The pattern of findings is one that CDS and ADHD inattention part ways when they are included as simultaneous predictors of other psychopathologies, with higher CDS symptoms being uniquely associated with higher internalizing symptoms and somatic complaints and ADHD inattentive symptoms being uniquely associated with higher externalizing symptoms and aggressive behaviors.

Very few studies have used a longitudinal design to examine whether CDS predicts later psychopathology, or vice versa. CDS symptoms in childhood predict internalizing symptoms in adolescence (Becker, Burns, Leopold, et al., 2018) and adulthood (Smith et al., 2020), including predicting increases in depressive symptoms when accounting for earlier depressive symptom severity (Becker, Webb, et al., 2021; Fredrick, Langberg, et al., 2022).

A handful of studies have used a categorical approach when examining CDS and co-occurring psychopathologies, mostly using rating scale data collected from national samples. Across informants, approximately one third to one half of children with elevated CDS ratings are also elevated on depression ratings (Servera et al., 2018), and children with CDS are more likely to have been diagnosed with depression (findings for anxiety diagnoses are few and mixed; Barkley, 2013; Burns et al., 2024). Youth with elevated CDS-only symptoms have higher internalizing symptoms and sleep difficulties than youth with elevated ADHD symptoms (Burns & Becker, 2021; Burns et al., 2024).

Sleep and autism are two domains with increasing interest in relation to CDS (Kaçmaz et al., 2024). First, regarding sleep, above and beyond ADHD symptoms, CDS symptoms are associated with poorer sleep functioning (Becker, Luebke, & Langberg, 2014; Fredrick, Burns, et al., 2022; Fredrick, Yeaman, et al., 2022; Mayes et al., 2021; O'Hare et al., 2021; Rondon et al., 2020), as well as greater eveningness circadian preference (Fredrick,

Yeaman, et al., 2022; J. R. Lunsford-Avery et al., 2021). Experimental data also show that shortened sleep duration causally contributes to increased CDS symptoms (Becker, Epstein, et al., 2019; Garner et al., 2017), underscoring the need for additional experimental and longitudinal studies examining causal and directional effects.

In considering autism, CDS symptoms have similar factor loadings in general elementary samples and clinical samples of youth with ADHD and/or autism (Mayes, Becker, et al., 2023; Mayes, Waschbusch, et al., 2023). CDS and autism symptoms are empirically distinct (Mayes et al., 2025) and moderately correlated (Duncan et al., 2019; Mayes, Waschbusch, et al., 2023), particularly in the reciprocal social interactions and language/communication domains (Reinvald et al., 2017). It is estimated that 30–50% of autistic youth have elevated CDS symptoms (Duncan et al., 2019; Mayes et al., 2020; Mayes et al., 2021; Reinvald et al., 2017). Both autism and insomnia symptom scores in childhood predict higher CDS scores in adolescence (Mayes, Waschbusch, et al., 2023). As emerging research indicates that CDS symptoms are both prevalent and relate to impairments in autistic youth (Carpenter et al., 2024; Duncan et al., 2019; Mayes et al., 2021; McFayden et al., 2022; Reinvald et al., 2017), this is a high-priority area for further study.

As emphasized below (see CDS as a Transdiagnostic Dimension section), as CDS research advances, there is a need for studies that not only document associations (or lack thereof) with specific psychopathological dimensions and diagnoses, concurrently and over time, but also to evaluate CDS in relation to higher-order dimensions (e.g., spectra, general factor of psychopathology) that can determine where CDS may be optimally placed within contemporary, hierarchical perspectives on taxonomy.

CDS and Socio-emotional Functioning

CDS symptoms are independently associated with global difficulties in social functioning, above and beyond ADHD symptoms (Becker, Leopold, et al., 2016). Findings examining social skills are mixed, with CDS potentially being associated with teacher- but not caregiver-reported social skills (Bauermeister et al., 2012; McBurnett et al., 2014). However, a more nuanced look has revealed a specific profile of CDS-related social functioning (for a review, see (Fredrick & Becker, 2023a). Children with ADHD and co-occurring CDS symptoms are more withdrawn from their peers than other children with ADHD (Carlson & Mann, 2002; Marshall et al., 2014; Rondon et al., 2020) and are also less likely to pick up on subtle social cues (Mikami et al., 2007). Similar findings have been found when simultaneously examining CDS and ADHD symptom dimensions, with higher CDS symptoms being independently associated with higher social withdrawal, asociality, isolation, and conflicted shyness, and lower social engagement (Becker, Garner, et al., 2019; Burns & Becker, 2021; Rondon et al., 2020; Sáez, Servera, Burns, et al., 2019; Willcutt et al., 2014). A recent study using school observations found students with elevated CDS symptoms (irrespective of co-occurring ADHD) spent more time alone or engaged in parallel play during recess than age- and sex-matched students, above and beyond ADHD and internalizing symptoms (Becker, Vaughn, et al., 2024).

Studies examining CDS in relation to emotion regulation have yielded mixed findings, particularly when caregiver ratings are used (Araujo Jiménez et al., 2015; Barkley, 2013;

Burns & Becker, 2021). More consistent findings emerge linking CDS symptoms to poorer emotion regulation when self-report ratings are used in children (Becker, Burns, et al., 2020; Becker et al., 2015) or adults (Barkley, 2012; Becker, Burns, Garner, et al., 2018; Flannery et al., 2016; Jarrett et al., 2017; Wood, Lewandowski, et al., 2017). Studies examining more specific aspects of emotion generation and regulation are needed.

CDS and Academic/Occupational Functioning

ADHD symptoms, particularly inattention, are strongly associated with poorer academic functioning (Willcutt et al., 2012). CDS symptoms are also significantly associated with poorer academic functioning (meta-analytic pooled $r = 0.45$; Becker, Leopold, et al., 2016). Studies often, but not always, find CDS symptoms to be independently related to academic functioning outcomes above and beyond ADHD symptoms and/or demographic characteristics (for a review, see (Fredrick & Becker, 2023b). Still, ADHD inattentive symptoms appear to be more consistently and strongly associated than CDS symptoms with academic impairment. Studies examining more specific aspects of academic functioning and performance have yielded mixed findings for CDS-related associations, though several studies have found CDS symptoms to be uniquely related to lower grades (Becker, Langberg, et al., 2014; Willcutt et al., 2014), poorer organization/homework skills (Langberg, Becker, & Dvorsky, 2014; McBurnett et al., 2014), and lower academic enablers (e.g., academic motivation, study skills, engagement; Flannery et al., 2017; McBurnett et al., 2014; Smith, Breaux, et al., 2019). Findings are especially variable among studies examining standardized academic achievement test scores (Fredrick & Becker, 2023b), though one longitudinal study clearly found CDS and ADHD inattentive symptoms in childhood to differentially predict lower reading and math achievement, respectively, in adolescence (Becker, Burns, Leopold, et al., 2018). Importantly, as in other CDS research, many of the studies in this area have used non-optimal measures of CDS and also frequently relied on brief, global measures of academic impairment. Further, several of these studies used samples recruited specifically for ADHD, including for academic-focused intervention trials. A recent study recruited students based on the presence or absence of elevated CDS symptoms, irrespective of ADHD, and found students with CDS had wide-ranging academic difficulties compared to students without CDS (Becker, Epstein, et al., 2022).

Very few studies have examined occupational functioning. In a nationally representative sample in the U.S., adults with elevated CDS reported greater work-occupational impairment than adults with elevated ADHD symptoms (Barkley, 2012). Among college students, CDS symptoms were independently associated with higher work-related impairment (Flannery et al., 2017). In contrast, among adults presenting for an ADHD evaluation, CDS symptoms were not independently associated with either self- or collateral-report of work-related impairment (Jessica R Lunsford-Avery et al., 2021). Although not directly focused on occupational functioning, CDS symptoms are uniquely associated with adults' experiences of greater perceived stress (Combs et al., 2015), maladaptive problem solving (Miller et al., 2024), and lower quality of life (Combs et al., 2014).

CDS and Cognition

A central cognitive deficit underlying CDS has not been identified, as highlighted in a recent review of the literature examining CDS in relation to neurocognition and daily life executive function (EF) by Barkley and colleagues (Barkley et al., 2022). Given the early-established moniker of “sluggish cognitive tempo” which clearly implies slowed cognitive processing, processing speed has been most frequently examined in neuropsychological studies and is most thoroughly reviewed here. Studies testing CDS in relation to processing speed have yielded equivocal findings (and, indeed, this was part of the rationale for the recommended change in terminology). Before summarizing key findings in this area, it is once again important to point out that most studies have used non-optimal measures of CDS and/or limited measures of processing speed (primarily from the Wechsler Intelligence Scale for Children coding and symbol search subtests). One study using Bayesian linear modeling found significant evidence *against* CDS symptoms being associated with computationally-modeled processing speed (Kofler, Irwin, Sarver, et al., 2019). Other studies similarly found no association between CDS symptoms and processing speed, especially when inattentive symptoms were simultaneously included in the model (Baytunca et al., 2018; Reinvall et al., 2017; Wood, Potts, et al., 2017).

Still other studies find CDS to be independently associated, albeit often modestly, with slower processing speed (Creque & Willcutt, 2021; Khalid et al., 2024; Mayes, Kallus, et al., 2022; Willcutt et al., 2014). Other studies point to a more nuanced understanding: CDS symptoms may be more strongly associated with slower processing in younger vs. older children (Jacobson et al., 2018), when using teacher vs. parent ratings of CDS (Tamm et al., 2018), or when tasks have greater fine motor demands (Becker, Marsh, et al., 2020). Slower processing speed in early childhood also prospectively predicts both CDS and ADHD inattentive symptoms in middle childhood (Becker, Dvorsky, et al., 2021). One study estimated that half of children with ADHD have elevated CDS symptoms or slowed processing speed, with approximately 10% having both (Cook et al., 2019). A recent study of children recruited for the full range of CDS symptoms found higher CDS symptoms to be associated above and beyond ADHD inattentive symptoms with slower performance across a range of cognitive domains, including verbal inhibition, rapid naming/reading, planning, divided attention, and set shifting (Tamm et al., 2023). In contrast, ADHD inattentive but not CDS symptoms were consistently associated with poorer performance across these neurocognitive tasks (Tamm et al., 2023), an important dissociation requiring follow-up.

Studies examining CDS and components of neurocognition have not found convincing evidence of an association with response inhibition or reaction time variability, whereas findings with working memory and vigilance/sustained attention are more mixed (Barkley et al., 2022). Very few studies have examined other neuropsychological domains (e.g., selective attention, planning, interference control), greatly limiting the conclusions that can be drawn. Most recently there has been interest in the conceptual overlap between CDS and mind wandering (Becker & Barkley, 2021), with several studies suggesting that higher CDS symptoms may be more clearly related than ADHD inattentive symptoms with greater mind wandering frequency (Fredrick & Becker, 2021; Fredrick et al., 2020; Wiggs et al., 2024). This is one of numerous areas where additional research is needed, recognizing also that,

as with ADHD (Kofler, Irwin, Soto, et al., 2019; Willcutt et al., 2005), CDS is likely to be characterized by neurocognitive complexity and heterogeneity.

“Top Ten” Research Directions

Despite CDS (SCT) being identified as a major research theme of research on ADHD in the past half-century (Cortese et al., 2022; Sonuga-Barke et al., 2023), with important scientific progress in the last two decades in particular (Becker et al., 2023; Kaçmaz et al., 2024), the study of CDS remains in its infancy. By way of simple comparison, a basic search of title/abstract terms was conducted in the PubMed® database on April 11, 2024. A search with the terms “attention deficit,” “ADHD,” or “hyperkinesis” returned 45,823 results. In stark contrast, a search with the terms “sluggish cognitive tempo,” “sluggish tempo,” or “cognitive disengagement syndrome” returned 303 results. It is thus the case that the scientific and clinical literature on ADHD, which itself remains far from completely understood, is more than 150 times larger than the current literature on CDS. To obtain only 303 records in the study of ADD/ADHD, one would have time travel back to the published literature that was available in 1982 (yielding 322 results). As the author of this paper was coincidentally born in 1982, it is both humbling and exciting to consider that the current study of CDS is in some ways comparable to what it would have been like to study what is now known as ADHD 42 years ago.

Given this backdrop, coupled with the state of the science reviewed above, numerous domains of inquiry remain entirely untouched, or very close to it. In an effort to provide a road map for the next phase of research on CDS, an admittedly brief Top Ten list of what the author considers to be some of the crucial areas for future research is provided, in no particular order.

1. Developmental Course of CDS across the Life Span

Perhaps given its emergence from the study of ADHD in children, the vast majority of studies examining CDS have been conducted in school-aged children. Studies in early childhood are needed to examine at what age CDS symptoms can be reliably identified (and by whom), and also to examine important developmental domains of functioning (e.g., pre-literacy skills, school readiness, socio-emotional development). Similarly, numerous domains unique or important to the adolescent period (e.g., romantic relationships, dyadic friendship, pubertal development, circadian/sleep functioning) have been rarely if ever examined. Studies are also sorely needed in adults, including in community and clinical samples of non-college students. Potentially relevant domains of psychopathology (e.g., dissociation, psychosis) often emerge and are more common in adults, in addition to many other unexamined aspects of interpersonal, emotional, and occupational adjustment.

It is also important to understand the developmental course of CDS symptoms. There is indication that CDS symptoms increase across early childhood (Dvorsky et al., 2021) and into adolescence (Leopold et al., 2016), though there are also some conflicting findings (Mayes, Waschbusch, et al., 2022). Very few longitudinal studies have examined the course of CDS symptoms (or its potential subdimensions) across development including potentially

sensitive periods such as the transition to adolescence, and no studies have examined the course of CDS in adulthood.

2. Mechanisms Linking CDS to Functional Outcomes and Impairment

There is now sufficient evidence linking CDS with some domains of functioning such as internalizing psychopathology and social withdrawal that research should move beyond documenting associations to test theoretical models of causal processes leading to clinical outcomes. To take internalizing and withdrawal as examples, it is possible that CDS contributes to social withdrawal which in turn contributes to depression, but it is likewise plausible that CDS leads to depression which then drives increases in withdrawal. Furthermore, it is crucial to move beyond mere demonstration of associations to uncover theoretically-driven factors that maintain, buffer, or exacerbate associations linking CDS to outcomes (e.g., negative attribution bias as recently found in (Miller et al., 2025). Transactional and bi-directional processes may also be essential to understanding developmental cascades involving CDS. The same is true for other domains such as academics and neurocognition. Of course, longitudinal data will be essential to such efforts, with particular attention to timescales and temporal ordering. Identifying reliable mechanisms linking CDS to functional outcomes will be highly informative in guiding both theory and potential intervention targets. Moreover, temporally-ordered data will have the added benefit of further advancing psychometric evaluation of CDS, as well as being crucial for elucidating causal processes that also advance construct validity (Borsboom et al., 2004).

3. Importance of Gathering Normative Data

The value of normative data should not be underestimated. As examples, normative data are highly useful for establishing prevalence rates of clinically-elevated symptoms in different types of samples and subpopulations (e.g., different clinical samples), making comparisons across samples (e.g., using different recruitment methods), identifying possible subgroups for research or clinical/school services (e.g., ADHD+CDS), understanding change across development (e.g., transition into adolescence), and assisting clinicians in interpreting scores in assessment or treatment monitoring (e.g., whether scores remain elevated following intervention). Yet few norms for CDS exist, limited to one nationally representative sample with U.S. adults (Barkley, 2012), two with U.S. children (Barkley, 2013; Burns & Becker, 2021), and one with Spanish children (Burns et al., 2025). In addition to the need for norms across populations, the lack of any norms based on teacher ratings or self-report ratings in childhood or adolescence is of particular importance.

4. Clarifying CDS as Unidimensional or Multidimensional

Despite major advances in the assessment and measurement of CDS, an ongoing question that remains unresolved is whether CDS is best measured (and conceptualized) as unidimensional or multidimensional (e.g., Becker, 2021; see also Table 1). More to the point, while it appears likely that with sufficient item coverage CDS subdimensions emerge in factor analyses, it is not clear if these subdimensions can be *reliably* identified and shown to differentially relate to external correlates. Let us again consider ADHD, which is comprised of inattentive and hyperactive-impulsive dimensions (with hyperactivity and impulsivity perhaps parting ways in adolescence and adulthood). These ADHD dimensions

are not only reliably found but also have distinct associations with functioning, for example inattentive symptoms with poorer academic functioning and hyperactive-impulsive symptoms with peer rejection (Willcutt et al., 2012). Although numerous studies have examined potential CDS subdimensions in relation to functional outcomes (e.g., Barkley, 2013; Fenollar Cortés et al., 2017; Firat et al., 2019; Gul & Gul, 2022; Jacobson et al., 2012; Jiang et al., 2024; Khalid et al., 2024; Mayes, Becker, et al., 2023; McBurnett et al., 2014; Smith & Langberg, 2017), a consistent pattern of either CDS subdimensions or their correlates (or treatment response) has yet to emerge. It may be useful to further this work by focusing on a consistent CDS symptom set and the daydreaming, mental confusion, and hypoactivity components listed in Table 1, though replication across samples will be critical before any conclusions can be drawn.

5. Etiologies of CDS

Early indication from two twin studies (in three samples) point to modest-to-moderate heritability ($h^2 = 0.28 - 0.66$), with remaining variance explained by nonshared environmental influences and measurement error (Moruzzi et al., 2014; Willcutt, 2020). Studies using a more comprehensive CDS item set should provide more precise heritability estimates. Still, CDS may be less heritable than ADHD, and molecular genetic studies are unlikely to identify a single or small set of common or rare genetic variants that relate to CDS (Bolat et al., 2020); environmental factors will be crucial to include in research seeking to chart an etiological understanding of CDS. Prenatal, early childhood, and medical risk factors all require further scrutiny (Becker et al., 2023; Fredrick et al., 2023; Wiggs, Cook, et al., 2025). Although a handful of studies have examined factors within these domains (e.g., prenatal alcohol exposure, smoking exposure, iron deficiency in infancy), almost all are limited in their methodology and await replication. It is almost certain that there are numerous and complex etiological pathways to CDS, and rigorously designed studies that evaluate gene-environment and environment-environment interactions as part of the poly-causation of CDS will be essential to guide etiological models (Uher & Zwicker, 2017). This is a critical area given its importance for not only developing theoretical models of CDS, but by extension informing prevention and intervention.

6. Neurobiology and Psychophysiology of CDS

The literature examining the neurophysiology and neural correlates of CDS is remarkably small. Extant findings suggest possible irregularities or atypical connectivity involving task positive and task negative networks (e.g., the default mode network (DMN) and the ventral and dorsal attention networks; Becker, Braimah, et al., 2024; Camprodon-Rosanas et al., 2019), as well as altered activity in parietal and posterior brain regions during attention tasks (Fassbender et al., 2015; Kardaş et al., 2021). Yet again, existing studies used small samples and/or non-optimal CDS measures. The same is true of the few studies that have examined psychophysiological indices in relation to CDS symptoms, with preliminary evidence that CDS may be associated with heightened autonomic nervous system reactivity to stress (Yung et al., 2019), and potentially social stress specifically (Becker & McQuade, 2020). There is not only a need for more studies examining neurobiological and psychophysiological correlates of and mechanisms underlying CDS, but also for studies that employ rigorous methods and designs, including prospective research

and studies that consider both resting-state and tasks that can inform conceptual models of CDS that cut across units of analysis while also considering relevant contextual and developmental factors.

7. CDS as Transdiagnostic Trait

As detailed above, CDS emerged within the study of ADHD and although its boundaries have begun to expand this is largely still the case. For instance, there are few researchers examining CDS who do not have a primary background in ADHD, which in turn often drives the samples and study methodologies within which to study CDS. Although CDS-related impairments continue to be established in community-based and ADHD-defined samples, studies have yet to examine the structure, prevalence, or correlates of CDS in other clinical samples, with few exceptions. It is important to know not only whether CDS symptoms are common and contribute to impairment in patients with ADHD, but also whether this is also found in patients diagnosed with other psychiatric conditions.

In addition to clear importance of examining CDS in samples selected for mood, anxiety, neurodevelopmental, and learning disorders, there is a need to understand CDS symptoms in the context of trauma exposure (Musicaro et al., 2020) and posttraumatic stress symptoms (e.g., dissociation and related cognitive processes) and in psychopathologies that typically emerge in late adolescence and early adulthood (e.g., thought disorder features such as paranoia, hallucinations, and cognitive disorganization). CDS may likely be a transdiagnostic feature across a range of psychiatric conditions (Becker & Willcutt, 2019), yet empirical research has yet to be conducted in samples with a range of clinical presentations to directly inform this possibility.

8. Understanding Individuals with Elevated CDS

There are numerous advances to dimensional approaches to psychopathology, though an integration of dimension and categorical approaches will be useful to advance understanding of CDS. For example, it is important to understand the extent to which individuals with elevated CDS symptoms experience specific functional impairments and various social determinants of health, their encounters and experiences with mental health service delivery, and treatments received (or not) and their impact on core symptoms and associated impairments (or not). For instance, it is currently unknown whether students with elevated CDS symptoms receive school services through a 504 Plans or Individualized Education Plan (IEP) and, if so, under which Individuals with Disabilities Education Act (IDEA) disability category and with what accommodations or interventions in place. This foundational knowledge will be important for understanding individuals with elevated CDS symptoms, while also providing insights into potential directions for prevention and intervention.

9. Promoting Participatory Approaches and Valuing Lived Experience

There is a need to incorporate the perspectives of individuals with CDS and those around them into research in this area. CDS research to date has been almost exclusively quantitative and deficit-focused. Although important, there is a pressing need for research that seeks out and incorporates the voices and experiences of people with CDS, as well

as their families and other interpersonal supports. At the same time, these efforts should balance aiming to understand both challenges and strengths. The limited qualitative research to date offers a rich perspective on the lives of children with elevated CDS symptoms, including several positive attributes such as increased creativity (Becker, Fredrick, et al., 2022). The voices of individuals with CDS are of great potential value. Indeed, it is now the case that researchers studying CDS regularly receive e-mails from concerned caregivers and adults identifying with CDS, with several real-life examples provided in Table 2. In addition, there are now numerous online and social media groups focused on CDS, and a quick scan of these forums underscores the importance of inviting and incorporating the diverse perspectives of the CDS community for understanding the phenomenology, co-occurring conditions, service use, and challenges and strengths related to CDS. In some regards, the rather nascent stage of CDS research is an advantage here, as there is an opportunity to promote participatory approaches and incorporate a neurodiversity perspective as the field is developing, including in shaping research questions and methods to understand CDS variation and implications for the well-being of individuals with CDS.

10. Interventions for CDS

Despite a surge in research, there are currently no interventions developed and tested specifically for youth with the CDS phenotype. Certainly new discoveries in the above-described and related areas should guide theoretically-driven prevention and intervention efforts to support the well-being of individuals experiencing CDS-related distress and impairment. Few data are currently available as to whether psychosocial or pharmacological treatments reduce CDS symptoms, or whether CDS predicts or moderates intervention response (Becker et al., 2023). There is preliminary support for ADHD inattentive presentation-developed interventions, as well as mindfulness and sleep-focused interventions to reduce CDS symptoms in youth with ADHD (Becker, Duraccio, et al., 2022; Piffner et al., 2007; Smith & Langberg, 2020; Wiggs, Thornton, et al., 2025). It is also possible that higher CDS symptoms predict poorer response to behavioral interventions (Owens et al., 2016) and specific behavioral strategies (e.g., time out; Little et al., 2021).

The literature on the pharmacologic management of CDS is similarly sparse. Similar to psychosocial interventions, there is some indication that front-line medications for ADHD (e.g., methylphenidate, lisdexamfetamine, atomoxetine) may improve CDS symptoms (Adler et al., 2021; Firat et al., 2021; McBurnett et al., 2017; Wietecha et al., 2013). Yet notably, CDS may predict smaller ADHD symptom response (or non-response) to methylphenidate treatment (Firat et al., 2021; Froehlich et al., 2018).

Studies examining either psychosocial or pharmacologic treatments have used widely varying samples (e.g., small samples) and designs (e.g., pilot open trials). In addition to the need for more studies that use rigorous methods in larger and more representative samples, additional treatment possibilities should also be evaluated (e.g., cognitive-behavioral therapy, neurofeedback; see (Becker et al., 2023; Wiggs et al., 2023). A sufficiently large and robust research base is needed to provide evidence-based guidance to patients, families, and clinicians regarding approaches to reduce the symptom burden associated with CDS,

as well as the potential impact of CDS symptoms for the effectiveness of various evidence-based approaches across clinical presentations.

Attending to Diversity and Equity across Domains of Inquiry

Across domains of inquiry including but not limited to those detailed above, it is critical for research on CDS to carefully consider and prioritize issues related to diversity and equity. This should start with increasing efforts to recruit underrepresented populations for research and clearly describing each study sample. Most CDS research to date has relied on homogenous samples with lack of attention to demographic characteristics, social determinants of health, trauma exposure, and other individual and diversity dimensions that may be important for understanding the development and progression of CDS, as well as developmental effects of CDS on outcomes (Becker et al., 2023). There is some indication that CDS symptoms are related to lower family income, lower caregiver education, and food insecurity (Barkley, 2014; Becker, Leopold, et al., 2016; Becker et al., 2023; Green, Martinez, et al., 2024), as well as interpersonal trauma exposure (Musicaro et al., 2020). Studies have yet to test whether these factors influence the association between CDS and functional outcomes. Such analyses will be critical to ensure contextual and environmental factors are incorporated into emerging conceptual models of CDS.

In addition, racial, ethnic, and sex disparities are well-documented in ADHD referrals, identification, and treatment (Coker et al., 2016; Davis et al., 2021; Green, Kang, et al., 2024). Although not yet examined in the context of CDS, similar disparities may exist. There is an imperative need to examine possible disparities, for example in regard to referral patterns, diagnosis, and service use, in the early stages of CDS-focused research. By identifying possible inequities early on, we can work toward addressing disparities before they become deeply entrenched.

Implications for Conceptualizations of CDS

CDS is a construct at the crossroads. A rapid increase in research, including growing interest among scholars around the world and a recent international Work Group that proposed a consensus change in terminology for the first time since the construct was initially identified in the scientific literature approximately 40 years ago, has led to major advancements in our understanding of the CDS construct. Yet as earlier sections of this paper emphasize, we still know so little. CDS has reached a stage where new investigators using new methods to test new ideas will be needed to reach the next stage in its scientific development. Only after such research accumulates will the field be able to adequately consider, let alone determine, how CDS is best conceptualized in existing and emerging models of psychopathology.

Three primary possibilities for how CDS may ultimately be best conceptualized have been proposed: CDS as a distinct categorical disorder, CDS as a diagnostic specifier, and CDS as a transdiagnostic dimension.

CDS as a Distinct Disorder

The first major interest in CDS as a potentially distinct psychiatric disorder emerged a decade ago, when in a *Journal of Abnormal Child Psychology* commentary Barkley

(Barkley, 2014) concluded that “growing evidences demonstrates that SCT [CDS] is most probably a distinct disorder from ADHD but may overlap with it” (p. 118). Establishing CDS as a psychiatric disorder would recognize the substantial and growing empirical literature supporting the distinctiveness of this syndrome from other psychopathologies, as well as its negative impact across a range of functional outcomes. This would also accelerate discovery, including translational, epidemiological, and intervention research, ideally from a range of disciplines using diverse methods. This would be extremely informative in providing empirical evidence for many of the important research directions detailed above. Recognition as a distinct disorder could also reduce confusion among clinicians and patients who are aware of and identify with CDS but are left at a loss as to what to do or how to communicate with other providers, family members, or school and job personnel. In addition to reduced confusion about the nature and status of CDS, recognition as a distinct disorder would also allow clinicians to document and seek insurance reimbursement for the condition. Providing clarity and care to patients and families sooner rather than later, whether within a diagnostic or other framework, is of great importance.

There are also reasons to be cautious about moving too hastily towards establishing CDS as a distinct psychiatric disorder. As CDS research has advanced, so too have growing concerns regarding the DSM nosological system, including increased stigma resulting from dichotomizing a dimensional trait into “normal” and “abnormal” (Lahey et al., 2022). In considering CDS, it would be prudent to consider how normative and even beneficial behaviors such as daydreaming are described and discussed as part of any recognized disorder, as the experiences and associated impairments among individuals experiencing elevated CDS are real and efforts to understand and support these people would be undermined should a so-called “Daydream Disorder” (Aldhous, 2014) enter the public discourse as potential fodder for late-night television jokes. Given these considerations, proposals to recognize CDS as a distinct psychiatric disorder should not be driven by a small handful of investigators but rather from a groundswell of support from researchers and clinicians, as well as the patient community itself. Far more research would almost assuredly be needed for this to occur, and in the meantime the importance of CDS based on existing data should not be ignored. Wakefield’s harmful dysfunction analysis is helpful here, emphasizing that “there are many negative conditions that are not disorders, and many of them contain symptoms and are clinically significant in that they cause distress or role impairment (e.g. grief)” (Wakefield, 2007), p. 151). A condition should not have to be categorized as its own psychiatric disorder to be deemed conceptually and clinically important and worth further scientific attention.

CDS as a Diagnostic Specifier

CDS emerged in research aiming to identify and define subtypes within ADHD, including the possibility that CDS symptoms may be important for identifying a “pure” or “restrictive” ADHD inattentive presentation with few if any hyperactive-impulsive symptoms (Milich et al., 2001). Although there continues to be some interest in a possible restrictive inattentive presentation (e.g., Ercan et al., 2015; Schmitz et al., 2010; Wu et al., 2023), most of the recent studies in this area have not considered the potential utility of incorporating CDS symptoms as part of this phenotype. It remains unclear how fruitful such incorporation

would be (see above), though it is worth examining particularly given advancements in the measurement of CDS.

A related but alternative possibility would be to examine CDS as a specifier across ADHD presentations. The closest analogy here is probably the inclusion of limited prosocial emotions (LPE) as a diagnostic specifier for conduct disorder and also, in the 11th Edition of the International Classification of Diseases (ICD-11), for oppositional defiant disorder. The LPE specifier is intended to be useful for identifying a distinct subset of youth with a unique and more severe profile of conduct problems. Despite being based in a robust research literature on callous-unemotional traits, the clinical utility of the LPE specifier remains uncertain and in need of additional research (Colins et al., 2020). In considering CDS, additional research examining subgroups of individuals with ADHD (with and without elevated CDS symptoms), as well as testing CDS as a modifier (moderator) of ADHD in relation to functional and treatment outcomes, would be illuminative as to whether CDS consistently identifies a subgroup of individuals with ADHD with a particular pattern in terms of their developmental course, pattern of correlates and functional impairments, co-occurring presentations, and treatment responsiveness. Research in this vein should focus on wide-ranging etiologies and characteristics that may differentiate individuals with ADHD with and without a CDS specifier, while also considering the number of persons with ADHD for whom such a specifier would apply.

CDS as a Transdiagnostic Dimension

In large community-based and nationally representative samples, the use of cutoff symptom scores allows for identifying a “CDS only” group that is not also elevated in ADHD symptoms (Barkley, 2012, 2013; Burns & Becker, 2021; Burns et al., 2024) and/or depressive symptoms (Servera et al., 2018). However, whether – and how frequently – a CDS only group can be identified when more in-depth clinical assessment is completed (e.g., diagnostic interviews assessing a range of disorders) remains unknown, as does whether a CDS only group is consistent across informants (e.g., caregivers and teachers) and time. Given the strong associations CDS has with several other psychopathology dimensions, including symptoms of ADHD, mood, anxiety, and sleep disorders, CDS will likely cut across many current diagnostic categories, particularly when more robust assessment methods or clinically-referred samples are used. As shown in Table 3, data from nationally representative samples indicate that many youth with elevations in caregiver-reported CDS but not ADHD symptoms have received a range of diagnoses. Further, approximately half to two-thirds of youth with “CDS only” have received at least one other psychiatric diagnosis (Table 3). Excessive comorbidity has been a long-standing criticism of the categorical DSM nosology (Clark et al., 1995; Kozak & Cuthbert, 2016), and this challenge, coupled with the in-tandem challenge of within-disorder heterogeneity, seems assuredly to be the case for any categorical approach to CDS as well.

These and other considerations raise the possibility that CDS may not ultimately be best conceptualized as its own categorical disorder, but rather a construct of transdiagnostic importance (Becker & Willcutt, 2019). That is, CDS may represent a cluster of symptoms that inform understanding developmental pathways, risk prediction, and treatment response

across a range of conditions. Very few studies have examined CDS outside of specific diagnostic groups (e.g., ADHD, autism), and none have used a prospective design or examined whether the pattern of findings is similar across diagnostic categories. The literature on the transdiagnostic nature of irritability is far more robust (Beauchaine & Tackett, 2020; Klein et al., 2021) and may be informative for guiding similar research efforts into the transdiagnostic nature of CDS. Further, although CDS and irritability are each related to internalizing and externalizing disorders (though CDS less so with externalizing), studies have yet to examine these two potentially transdiagnostic constructs simultaneously and potential differential concurrent and prospective relations, as well as mechanisms, with internalizing and externalizing dimensions and clinical outcomes.

As research examining CDS in relation to other psychopathologies advances, it will be critical to situate CDS within other models of psychopathology. The Hierarchical Taxonomy of Psychopathology (HiTOP; Kotov et al., 2017) and the Research Domain Criteria (RDoC; Cuthbert, 2014) are influential, explicitly dimensional frameworks for the contemporary study of psychopathology. To date, CDS has been examined in relation to specific, generally DSM disorder-based dimensions of psychopathology, though important dimensions remain unexamined (e.g., thought disorders). There is an important need to also examine CDS in relation to higher-order dimensions (e.g., HiTOP-defined spectra and subfactors; see Peng et al., 2024 for a recent application). Research examining CDS from a transdiagnostic perspective would also be well-positioned to advance translational understanding (e.g., RDoC-defined units of analysis; see Becker & Willcutt, 2019). Carefully designed studies would be informative to determine whether CDS is most useful as a specifier for particular disorders (e.g., ADHD) or has broader transdiagnostic value, while also guiding where and how CDS may be positioned within hierarchical models of psychopathology.

Conclusion

There has been a marked upsurge in research on CDS, until recently termed sluggish cognitive tempo, which has led to the availability of psychometrically rigorous assessment tools and an emerging pattern of findings across numerous domains of functioning. The existing literature base also points to the importance of marshaling an ambitious research agenda that can guide CDS into its next era. Such research is needed to inform a theoretical model of CDS and its position in relation to other psychopathologies and developmental outcomes. To achieve this, the road ahead will require increased collaboration, creativity, and rigor to build theory, and, ultimately, support the well-being of individuals with this distinct syndrome.

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Public Significance Statement

Cognitive disengagement syndrome (CDS; previously termed sluggish cognitive tempo) is a set of symptoms comprising excessive daydreaming, mental confusion, and hypoactivity. Growing evidence indicates that CDS symptoms are distinct from attention-deficit/hyperactivity disorder (ADHD) and other psychopathology dimensions and independently associated with functional outcomes. Additional research is warranted to further understand and conceptualize the CDS construct and the people it affects.

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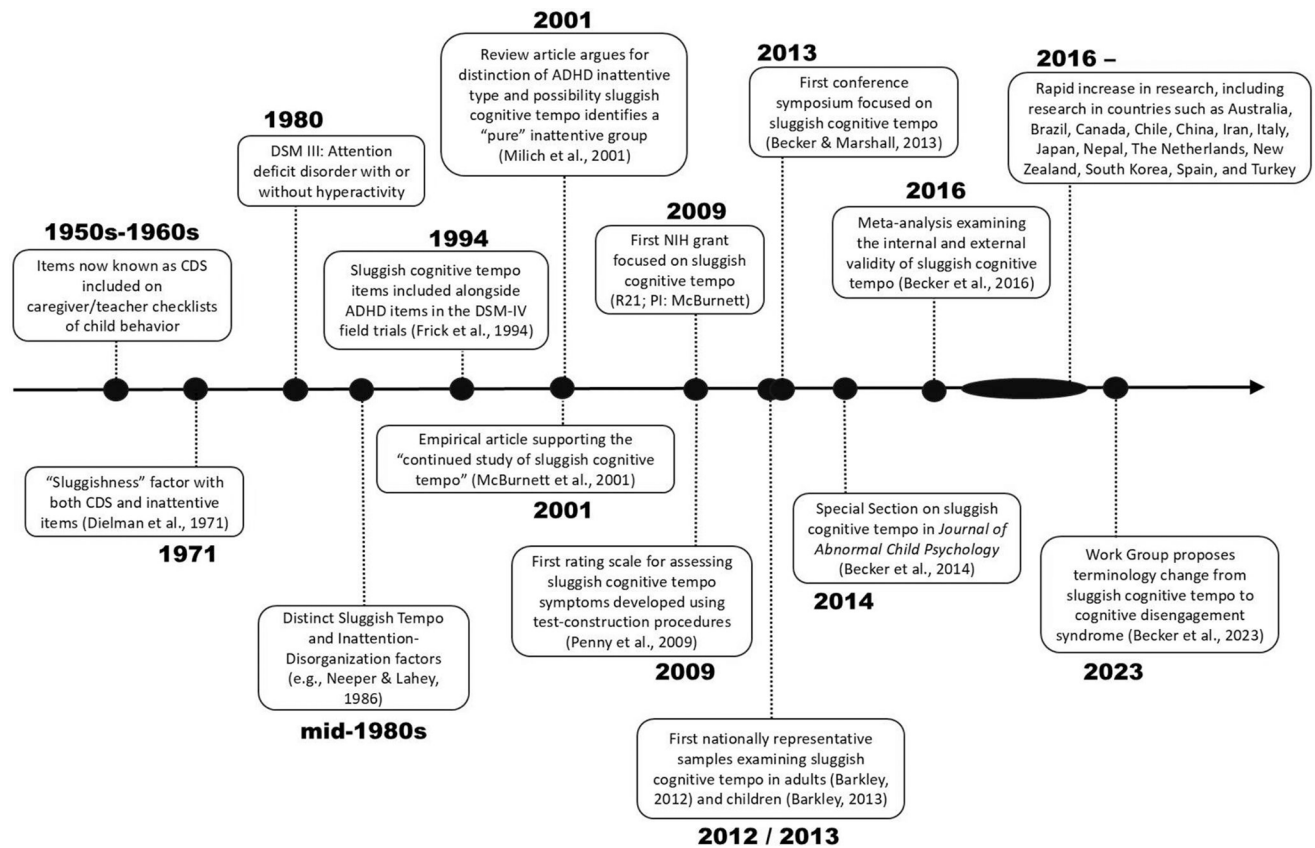


Figure 1.
Timeline of Major Events in the Historical Study of Cognitive Disengagement Syndrome (Sluggish Cognitive Tempo)

Note. CDS=cognitive disengagement syndrome. DSM III=Diagnostic and Statistical Manual of Mental Disorders, Third Edition. DSM-IV=Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition. Figure CC BY 4.0 [Stephen P. Becker], DOI [10.17605/OSF.IO/UTCRX](https://doi.org/10.17605/OSF.IO/UTCRX).

Table 1
Cognitive Disengagement Syndrome Items for Ongoing and Future Research

Daydreaming	
1.	Daydreams
2.	Gets lost in own thoughts
3.	Spaces or zones out
4.	Appears lost in a fog
5.	Stares blankly into space
Mental confusion	
1.	Loses train of thought
2.	Difficulty putting thoughts into words
3.	Forgets what was going to say
4.	Thinking gets mixed up
5.	Easily confused
6.	Thinking is slow
Hypoactivity	
1.	Easily tired or fatigued
2.	Low level of activity (underactive)
3.	Behavior is slow
4.	Drowsy or sleepy during the day

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Table 2

Cognitive Disengagement Syndrome Symptoms and Impacts and Strengths as Described by Caregivers and Adults

Caregivers	Adults
"I am writing first and foremost as a mother, but also as a Clinical Psychologist. With [my child's] move to middle school, his difficulties have increased significantly. Despite above average intelligence according to his evaluation, his grades are often in the 20% range, his working memory extremely poor and his cognitive and physical tempo very sluggish. He is unable to make/maintain friendships. Despite agreement that he is not on the autistic spectrum, he is unable to really 'get' social situations in the moment and lacks mature social skills. Concerningly, he is even more 'lost and confused' than he was in elementary school and now says he thinks he may be depressed."	"I only recently discovered the concept of cognitive disengagement syndrome, but very quickly into my review of research on the subject, I found myself strongly identifying with the traits of this condition... Looking back on my life experiences, it seems that CDS has accounted for much of the difficulty that I have had in school, social relationships, work, home life, and engagement in society, even possibly to a greater degree than my autism has. Despite lacking a name for these difficulties up until now, I feel that I have found ways to effectively manage my symptoms and hope that my struggles and successes can inform your work in some way."
"I just finished [learning about] CDS and I felt somewhat floored by the correlation in symptoms I see with myself and my son (both of us ADHD combined/inattentive traits). The parent descriptions of the child being in their own world was especially relatable, as there are times we talk to my son and it is like he isn't hearing us at all. Homework and mornings also a frequent struggle... I am wanting to do all we can to understand his brain and support him to thrive with all of the strengths he has while managing the areas that impact his functioning."	"I'm a 31 year old man, I was diagnosed with ADHD as an adult at age 28. I believe my symptoms align with CDS more than they do with ADHD. This is a difficult to manage condition. I believe my manifestation of CDS is so apparent and reflects so many of the symptoms listed in published articles... This condition is so pervasive, and it's so challenging to find the appropriate treatment that all I want to do is offer my help in hopes that I could contribute to making it a bit easier for the next guy."
"My husband and I have a wonderful, amazing, humorous, kind, incredible (mid-life) boy. [He] is 10 and was educationally diagnosed with autism at 4 years of age. At eight, we had him fully assessed medically for autism and ADHD and he has been on Guanfacine for about 2 years now... when Dr. X talked about SCT - I about fell out of my chair when I went to pick up my jaw. That was IT! I started digging into and doing my research and for the past year I have been patiently waiting for the name to be updated, because 'sluggish cognitive tempo' is a horrible label - just horrible, might as well call my kid 'lazy' - and he's not... But lately - he's having serious trouble at school... It's almost funny, eerie really - I know when he is 'Autisming' or 'ADHDing' or even 'CDSing' and am able to respond and comfort as needed and push when he needs pushing. And yet - I'm exhausted most of the time, but push through it."	"I thoroughly enjoyed a thoughtful and insightful journey into this new 'disorder' because I exhibit ALL of the symptoms throughout my life. In fact, I have CDS, social anxiety, and mild anxiety/depression. They have impacted my academic, professional, and social lives very significantly. I have these bouts of what I call 'mental constipation,' which I think are really due to the above disorders. As a 30-something now, I still have symptoms of the above disorders. I've never had medications prescribed and am leery of their 'benefits.' Exercising and having a balanced diet help a bit. At least I am aware (sometimes TOO MUCH self awareness). I am trying to develop coping mechanisms and work my life around these symptoms."
"My daughter (14 years old) may have Sluggish Cognitive Tempo. She was previously diagnosed with Autism, ADD, Social Anxiety, and Stereotypic Movement Disorder. We were amazed to hear [about] SCT, as it describes our daughter to a 'T'. We contacted both her Psychiatrist (who prescribes her medicine) and current Psychologist - unfortunately neither have heard of SCT. If possible it is our hope a more suitable medication is available for those with SCT, as well as some sort of therapy that helps her to be more self functioning."	"I'm 42 years old, and I am almost certain I have suffered from CDS/SCT since childhood. As a child I was diagnosed with ADD (in the late 80s, but I forget the specific year), which was considered distinct from ADHD at the time. It's not clear to me if I have just CDS or also ADHD, but the symptoms of CDS feel far too familiar and common to me."
"I am a mother and wife of 2 incredible people who I believe may have SCT... My daughter is 7.5 and is wildly creative, sharing her big ideas for games, books, and art that seldom see completion for the time and focus required. She can spend 30 minutes on the toilet after a pee, just 'thinking' she says. She will sit at the dinner table eating one noodle at a time after everyone has finished. It is often that I am looking directly at her and she says 'what did you say, I was thinking about something else'... My daughter has 2 good friends at school but in photos at school or parties she is often pictured away from the group. She is the last to choose a prize or candy."	"With limited resources and my condition severely affecting both my employability and my general quality of life, I found myself pouring hours upon hours of my time researching pharmacological interventions reading as many academic papers and journals as I could in between psychiatry sessions. It was at this time that I came across the concept of SCT, and how the symptoms of it seemed to perfectly fit me as opposed to the much more loose fitting but formally diagnosed ADHD-PI."
"[My son] is an 11 year old boy who loves his family, drawing, music, and video games. We realized that he seemed to be in his own little world since he was 2... He is very shy at first and it takes him a while to warm up to people. Once he does he can be a chatterbox and can easily participate in a conversation. He loves humor and understands sarcasm... He had a hard time adapting to his new school... when confronted with homework he looks panicked and would rather dissociate or avoid it than embark on the task at hand. We need help. I don't want him to continue navigating school as if this is a punishment that society has imposed on him. I want to reiterate again that his day dreaminess is not limited to school."	"I have come across SCT. Based on my lay understanding of the condition, I am pretty sure I have it. I am a 36-year old male. I have recognized the vast majority of the symptoms in myself at least since the age of 16, but I am fairly sure that most of them have been present since childhood. Over the years, I have made many attempts to get help from both medical doctors and psychotherapists, but they have generally proved unsuccessful. A major factor contributing to that is my record of academic achievement, which causes people to think that it is impossible for me to be as slow as I claim. In reality, I have been working extremely long hours for most of my adult life, while at the same time being considered 'smart but lazy' by most people. At this point, I am facing the prospect of losing my job (for

Caregivers	Adults
	reasons that are specific to my performance and not related to the pandemic) and my anxiety about work in general is jeopardizing my attempts at pursuing other opportunities.”
“My son (8yo) is suffering from CDS...CDS 100% describes my son. I am finding it increasingly difficult to get him support from clinicians in Australia. Meanwhile, it is starting to impair his functioning. He is now daydreaming all the time, and it's difficult to regain his focus. He's also expressing that he cannot make it stop. We are very concerned for our little boy.”	“I'm a 21 year old male looking for adult services for SCT and ADHD...I'm very hopeful there is something out there as living with both of these disorders has made my life extremely difficult and not many doctors recognize it as serious. Any direction you could offer would mean the world.”
“We have watched our 13 year old daughter zone out (or as she now calls it, get ‘lost in space’) since before she was walking. Over the last 12 years, we’ve seen countless doctors, specialists, therapists, etc., and have had numerous diagnoses but they’ve all felt like educated guesses - none have really ‘fit’...I’m especially interested in SCT as it relates to academic success and life skills. We live in the [metropolitan area] suburbs, where I think we have access to above average medical care, but we’ve felt like nobody has been able to figure out what’s really going on with our child.”	“I am 39yrs old from Australia. I am diagnosed [with] social anxiety, generalised anxiety, depression, adhd inattentive, asd all as an adult. I have never really fit the adhd inattentive and asd diagnosis very well and fell like SCT fits me perfectly. My whole working life has been a fail due to not being able to process anything (im pretty sure the rest of my life would have also been a fail if my wife wasn't strong and stuck by me).”
“My daughter currently has a diagnosis of inattentive ADHD, and she recently started seeing [a therapist]. In our first conversation, she told me to look up SCT, and I did, and I am so sure that my daughter has it. Everything I've read about it rings true for her. The problem is that SCT doesn't have a ton of research yet, and not a lot of mental health professionals know what to do about it.”	“I recently discovered SCT within the last two days. It has been an extremely profound experience, and the array of emotion that I have felt has been endless. The best way I can describe it is to imagine finding the thing you have been searching for your entire life. SCT is real, and there are many bright kids with endless potential that are being left behind. It has been a hard thirty years, but I am successful, and I want the same for everyone else who spends the majority of their time lost in their thoughts.”

Note. All quotes are from unsolicited e-mails, with any identifying information removed. ADD = attention deficit disorder. ADHD = attention-deficit/hyperactivity disorder. CDS = cognitive disengagement syndrome. PI = predominantly inattentive presentation. SCT = sluggish cognitive tempo. Table CC BY 4.0 [Stephen P. Becker] DOI [10.17605/OSF.IO/TV5B9](https://doi.org/10.17605/OSF.IO/TV5B9)

Table 3

Rates of Caregiver-Reported Comorbid Diagnoses in Children and Adolescents with “CDS Only” Elevations Based on Caregiver Ratings in Nationally Representative Samples

Diagnosis	Barkley (2013) (%)	Burns and Becker (2021) (%)	Burns et al. (2024) (%)
ADHD	14.0	32.1	25.2
Autism	9.3	12.3	9.9
Anxiety	2.3	17.0	23.7
Depression	4.7	7.6	16.0
ODD	0.0	3.8 (combined ODD/CD)	7.6 (combined ODD/CD)
CD	2.3	See ODD above	See ODD above
Bipolar disorder	0.0	1.9	10.7
Intellectual disability	7.0	3.8	3.8
General developmental delay	(combined with intellectual disability)	5.7	Not assessed
Language disorder/delay	14.0	7.6	9.9
Delayed motor skills or coordination	11.6	3.8	Not assessed
Learning disorder/disability (any)	See specific disorders	See specific disorders	13.7
Reading disorder/disability	7.0	1.9	Not assessed
Math disorder/disability	4.7	1.9	Not assessed
Writing disorder/disability	7.0	0.0	Not assessed
Spelling disorder/disability	7.0	0.0	Not assessed
Other learning disorders	4.7	Not assessed	Not assessed
Sleep disorder	Not assessed	0.0	Not assessed
Schizophrenia/psychosis	Rates too low to analyze	0.0	Not assessed
Tic disorder/Tourette's	Rates too low to analyze	1.9	Not assessed
At least one diagnosis	46.5	56.6	66.4

Note. In each of the studies, the “CDS only” group was determined based on the presence of elevated caregiver-reported cognitive disengagement syndrome (CDS) symptoms but without elevated caregiver-reported ADHD symptoms; no other psychopathology dimensions were considered when establishing the “CDS only” group. Barkley (2013) and Burns and Becker (2021) both used nationally representative US samples, and Burns et al. (2024) used a nationally representative Spain sample. All three studies used caregiver-report of whether their child had ever received a diagnosis of each listed disorder. Barkley (2013) included youth ages 6–17 years, Burns and Becker (2021) included youth ages 4–13 years (though very few participants were ages 4 or 13), and Burns et al. (2024) included youth ages 5–16 years. ADHD = attention-deficit/hyperactivity disorder; CD = conduct disorder; ODD = oppositional defiant disorder.