Cognitive Disengagement Syndrome: What is it and why does it matter?

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A note on terminology
History of CDS & distinction from ADHD
Functional outcomes and impairments
Assessment of CDS
Current evidence on medication and CDS
Possible interventions and treatments
“sluggish tempo” or “sluggish cognitive temp” (SCT) terminology has been used since the construct first discovered in the 1980’s.

- SCT term has been criticized for being pejorative, potentially offensive, derogatory, and inaccurate.
  - Almost half of parents of children with elevated SCT had a negative reaction to the SCT term.
- 13-member Work Group formed to evaluate key research directions and a consensus change in terminology.

**Terminology: From SCT to CDS**

Work Group recently proposed a change from sluggish cognitive tempo (SCT) to **cognitive disengagement syndrome (CDS)**.

“CDS refers to a set of developmentally inappropriate and persistent behaviors (symptoms) that form at least two dimensions best characterized as:

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.”

(Becker et al., 2022)

**History of CDS**

- **1960’s and 1970’s**: Individual CDS symptoms (e.g., daydreaming, drowsiness, lethargy) were included in rating scales for children (e.g., Conners, 1969; Peterson, 1961; Quay & Quay, 1965).
- CDS items tended to load with inattention items.
  - Diehlman, Cattell, & Leeper (1971) named their inattention scale “Sluggishness.”
History of CDS

- **1980s**: DSM-III allowed diagnosis of ADHD without hyperactivity (APA, 1980).

- The first empirical support for a CDS dimension separate from inattention emerged (Carlson, 1986; Lahey et al., 1988; Nepper & Lahey, 1986).

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History of CDS

- **2001**: A distinct CDS factor emerged in a large clinic sample of children with ADHD (McBurnett et al., 2001; also Milich et al., 2001).

CDS research started to pick up

Symptom Properties as a Function of ADHD Type: An Argument for Continued Study of Sluggish Cognitive Tempo

Keith McBurnett,1,2 Linda J. Pfeffer,2 and Paul J. Frick2

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The Great Big Universe of CDS Items

- There was no consensus regarding the symptoms used to define CDS.

- A systematic review examined all the specific items that have been previously used to measure CDS.

150 different CDS items

18 core features of CDS
Questions in the Literature

1. Is CDS distinct or the same as ADHD? What about other mental health conditions?
2. Does CDS symptoms impact daily functioning?
3. Does CDS matter for clinical intervention?

Are CDS symptoms just the same as inattention?

- Factor analyses conducted in 23 independent samples with over 19,000 participants
- Studies varied based on:
  - CDS measure (ranging from 2 to 44 items)
  - Informant (parent, teacher, self-report)
  - Age range (though most were school-aged)
  - Sampling (clinical vs. community)

Distinguishing CDS from ADHD

<table>
<thead>
<tr>
<th>Item content</th>
<th>Mean loadings of the item on CDS factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sleepy</td>
<td>.80</td>
</tr>
<tr>
<td>Tired / lethargic</td>
<td>.80</td>
</tr>
<tr>
<td>Slow thinking / processing</td>
<td>.80</td>
</tr>
<tr>
<td>Looses train of thought / cognitive set</td>
<td>.79</td>
</tr>
<tr>
<td>Sleepy / drowsy</td>
<td>.79</td>
</tr>
<tr>
<td>Slice</td>
<td>.78</td>
</tr>
<tr>
<td>Spacey</td>
<td>.77</td>
</tr>
<tr>
<td>In a fog</td>
<td>.77</td>
</tr>
<tr>
<td>Daydreams</td>
<td>.75</td>
</tr>
<tr>
<td>Underactive / slow moving</td>
<td>.75</td>
</tr>
<tr>
<td>Distracted / slow moving</td>
<td>.75</td>
</tr>
<tr>
<td>Easily confused</td>
<td>.75</td>
</tr>
<tr>
<td>Easily confused</td>
<td>.75</td>
</tr>
<tr>
<td>Stares blankly</td>
<td>.75</td>
</tr>
<tr>
<td>Easily bored</td>
<td>.75</td>
</tr>
<tr>
<td>Absentminded</td>
<td>.72</td>
</tr>
<tr>
<td>Apathetic / unmotivated</td>
<td>.61</td>
</tr>
<tr>
<td>Absentminded</td>
<td>.59</td>
</tr>
<tr>
<td>Slow work / task completion</td>
<td>.50</td>
</tr>
<tr>
<td>Low initiative and persistence</td>
<td>.50</td>
</tr>
<tr>
<td>Poor listening / difficulty with directions</td>
<td>.50</td>
</tr>
<tr>
<td>Easily bored</td>
<td>.48</td>
</tr>
</tbody>
</table>

13 of the 18 potential CDS items loaded consistently on an CDS factor (mean loading ≥.70 across all samples)
CDS Presentation

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

CDS = Depression, Sleepiness, or Anxiety?

- Factor analytic studies find CDS to be distinct from:
  - Anxiety symptoms
  - Depressive symptoms
  - Daytime sleepiness

Although distinct, CDS is more strongly associated with depression and anxiety compared to ADHD-IN symptoms

Etiology of CDS

- Three twin samples of youth have shown modest to moderate heritability of CDS symptoms
  - Remaining variance was explained by nonshared environmental influences and measurement error
- Prenatal, early childhood, and medical risk factors
- CDS associated with socio-contextual factors (e.g., socioeconomic status) and stressors (e.g., peer victimization, interpersonal trauma)

These findings are all preliminary, with more studies and replication needed before drawing any firm conclusions

Becker et al. (2022)
CDS and Functional Outcomes

CDS and Cognition

• No central cognitive deficit underlying CDS has been identified
• CDS is not consistently associated with three major components of EF that are often deficient in ADHD: response inhibition (interference control), attentional control (reaction time variability), and working memory
• Links with processing speed are mixed; perhaps in young kids
  – One longitudinal study found slower processing speed to predict SCT (as well as ADHD) in early childhood
  Beck et al. (2022)

CDS and Mind-Wandering

• CDS may be closely linked to mind wandering
• CDS uniquely linked to self-report ratings of mind wandering, even after accounting for ADHD, anxiety, and depression

In CDS there appears to be an over-engagement or decoupling of attention to mental representations or cognitive content more generally, as in mind wandering, mind blanking, and daydreaming.

Beck et al. (2022)
Fredrick & Becker (2022)
CDS and Comorbidity

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Barkley (ages 6-17)</th>
<th>Burns &amp; Becker (ages 4-13)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADHD</td>
<td>27.8</td>
<td>29.7</td>
</tr>
<tr>
<td>Autism</td>
<td>13.1</td>
<td>13.7</td>
</tr>
<tr>
<td>Anxiety</td>
<td>13.1</td>
<td>23.4</td>
</tr>
<tr>
<td>Depressive</td>
<td>7.6</td>
<td>8.6</td>
</tr>
<tr>
<td>ODD</td>
<td>3.0</td>
<td>6.9 (prevalence 0.03)</td>
</tr>
<tr>
<td>Bipolar disorder</td>
<td>8.6</td>
<td>2.0</td>
</tr>
<tr>
<td>Schizophrenia or psychosis</td>
<td>0.7</td>
<td>2.0</td>
</tr>
<tr>
<td>Intellectual disability</td>
<td>8.1</td>
<td>6.9</td>
</tr>
<tr>
<td>General developmental delay</td>
<td>13.6</td>
<td>9.8</td>
</tr>
<tr>
<td>Language delay</td>
<td>19.6</td>
<td>19.6</td>
</tr>
<tr>
<td>Delayed motor skills or coordination</td>
<td>12.8</td>
<td>7.8</td>
</tr>
<tr>
<td>Reading disorder/disability</td>
<td>15.9</td>
<td>5.9</td>
</tr>
<tr>
<td>Math disorder/disability</td>
<td>7.6</td>
<td>5.9</td>
</tr>
<tr>
<td>Writing disorder/disability</td>
<td>9.6</td>
<td>2.9</td>
</tr>
<tr>
<td>Spelling disorder/disability</td>
<td>8.1</td>
<td>2.9</td>
</tr>
</tbody>
</table>

Most common disorders (≥5% in both studies): ADHD, autism, anxiety, language delay, delayed motor skills, & reading disorder

25-40% of youth with ADHD present with CDS elevations

CDS’s Unique Links with Internalizing & Externalizing Domains

- Depression
- Anxiety
- Suicidal Ideation
- Somatic Complaints
- Hyperactivity-Impulsivity
- Oppositionality
- Aggression
- Disruptive Behavior
- Time-Outs

CDS’s Unique Links with Academic Functioning

- Lower grades
- Poorer organization
- Lower achievement
CDS's Unique Links with Social Functioning

- Conflicted Shyness
- Withdrawal & isolation (observed)
- Poorer perception of subtle social cues
- Peer victimization risk

CDS's Unique Links with Sleep Functioning

- CDS associated with sleep problems and daytime sleepiness in youth
- CDS associated with global sleep problems, shorter sleep duration, and increased daytime sleepiness in adults
- Sleep restriction → worsening CDS symptoms
- One study of overnight polysomnography: no associations
- One study with actigraphy: shorter sleep duration and later sleep onset

What are the lived experiences of youth and families with CDS?
### What language do parents use when describing CDS behaviors?

**Parent Interview**

"He calls it zoned out, we will be talking to him and he starts staring out in space and says, 'Oh I zoned out, what did you say?'"

"It's just that Charlotte's slow, that's Charlotte. We are used to it."

"She's got this thing going on where it almost feels like it's like a mental block where she won't allow herself, like, the control of her mind, you know? I don't know where she is when she's not concentrating, but sometimes you can tell that she's just looking like she's in another world."

"I asked him once what he was doing when he was in the backseat quiet for 40 minutes and he says, 'I'm watching TV in my mind.'"

### What language do kids use when describing CDS behaviors?

**Child Interview**

"My mom calls it Annaland. It is this place where my imagination rests, like a little oasis and there is a bunch of rainbows. And all my ideas for books, stories, roleplays."

"I love going into this world. I just want to be able to pull myself out of it."

"Someone asks me like, 'what are you thinking about?' And I don't know how to say it... Now - now I can't - this is a great example right here. I can't think of what I'm trying to say."

"I really hate it when I get lost in my thoughts because I will overthink a situation."
Do parents and kids perceive strengths of their CDS behaviors?

• Around 80% of children reported several strengths including, respite from daily stressors and being able to zone out and take a break

  “The spacing out is kind of my thing and my favorite part of it because I just, I kind of like it, you know, it just gives me like a small break for a few seconds. And I get back to my work… I’ve given myself a break.”

• Most parents (60%) also identified strengths of their child’s CDS behaviors, primarily related to creativity and imagination

  “I feel like when she goes off and she is daydreaming, she is thinking about what she is going to work on and her imagination goes crazy.”

  “He is always thinking outside the box.”

Phenomenology

• It is challenging to differentiate CDS from ADHD inattention

• There may also be an interplay between CDS and ADHD-IN, or CDS may be a mechanism contributing to ADHD-IN behaviors

  “He would sometimes just forget to write the homework down (an ADHD-IN symptom) either because he is zoned out (a CDS symptom), is forgetful (the same ADHD-IN symptom), or is in his own little world (a CDS symptom).”

  “She cannot pay attention to what the teacher is saying and she is off in la la land (a CDS symptom). This makes it hard for her to finish her work (an ADHD-IN symptom).”

Daily Life Impacts

• Domains with the largest percentage (≥25%) of parents and children indicating a substantial negative impact of SCT behaviors:
  1. Morning routine
  2. Academics
  3. Sleep
  4. Homework (parents only)

• 87% parents endorsed trying strategies (e.g., sleep, verbal reminders, routines), with many being unsure what to do:
  "We really do not know what exactly to do except bring him back to earth.”
Assessment and Treatment of CDS

Current CDS Measures

<table>
<thead>
<tr>
<th>Measures to Assess CDS in Children</th>
<th>Measures to Assess CDS in Adults</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barkley SCT Scale – Children and Adolescents (SG/TS-CA; Barkley, 2010)</td>
<td>Adult Concentration Inventory (ACI; Becker et al., 2018)</td>
</tr>
<tr>
<td>Child and Adolescent Behavior Inventory (CABI; Burns et al., 2015)*</td>
<td>Barkley Adult ADHD Rating Scale—IV (BAARS-IV; Barkley, 2012)*</td>
</tr>
<tr>
<td>Child Concentration Inventory, 2nd ed. (CCI-II; Becker, 2015)*</td>
<td>§ Parent- and teacher-report scale</td>
</tr>
<tr>
<td>Kiddie Sluggish Cognitive Tempo Scale (K-SCT; McBurnett et al., 2014)</td>
<td>§ Parent- and teacher-report scale</td>
</tr>
<tr>
<td>Penny SCT Scale (Penny et al., 2009)</td>
<td>§ Parent- and teacher-report scale</td>
</tr>
</tbody>
</table>

Measures marked with a "§" currently have the strongest support for parent/teacher-reported, youth self-reported, and adult self-reported CDS. All of these measures are available for free or a nominal cost!

Possible Psychosocial/Behavioral Treatments for CDS

- In youth with ADHD, school-based intervention reduced CDS symptoms modestly (Pifflner et al., 2007; Smith & Langberg, 2020)
- It has been hypothesized that CBT and social skills interventions may be effective (Becker & Barkley, 2018)
- Behavioral sleep intervention improves CDS (Becker et al., 2022)
- Mindfulness should also be evaluated (Becker & Barkley, 2021)
Possible Medication Treatments for CDS (SCT)

- In adolescents with ADHD and/or reading problems, atomoxetine reduced CDS symptoms (Witecha et al., 2011; McBurnett et al., 2017)
- Stimulants may not be as effective (Firat et al., 2020; Froehlich et al., 2018; Milich et al., 2001)
  – Not well-established enough to change standard clinical practice guidelines/recommendations, but may want to give patients a heads-up so that they do not give up if stimulants do not seem to be effective

Talking About CDS

- CDS is not currently recognized as a mental health disorder
- “Syndrome” refers to the symptoms being closely related to each other and separate from other symptoms/dimensions of psychopathology
- Some patients will have “ADHD with features of CDS”
- CDS may explain a different type of attention problems
Possible Intervention Targets for CDS Behaviors

**Home**
- Effective commands, visual, externalize time
- Clear routines/schedules
- Simplifying language
- Mindfulness practice
- Daily morning routine
- Behavioral activation
- Social skills training

**School**
- 504 plan/IEP
- DRC
- Scheduled prompts and attention checks
- Daily self-monitoring of internal distractions
- Extended time on assignments
- Attention/physical breaks

Again, why does this matter?

"I have a son who is 16 years old who lives with symptoms that 100% match the symptoms list for CDS...He has been diagnosed with ADHD by his pediatrician. He tried several stimulant medications that did not help...I see my son struggle socially, academically and in his extracurricular activities, the most important to him being baseball. I feel like now I’m seeing some signs of depression. Aside from these symptoms, he has every single described symptom of CDS that I have read about.

I am at a loss as to what to do or where to take him."

—E-mail from a concerned mother