The Other Attention Disorder: Sluggish Cognitive Tempo vs. ADHD

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Objectives

• Discuss the history of Sluggish Cognitive Tempo, or SCT and its emergence in research as a second disorder of attention

• Review the current evidence concerning the nature of SCT, its demographic findings, comorbidities, impairments, and etiologies

• Present current theories on the nature of SCT, particularly that it may represent a form of pathological mind wandering

• Share what is known about the management of the disorder
What About the Inattentive Presentation (ADD)?

DSM subtype/presentation

Inattentive

- Formerly Combined Types
  - View as always Combined Types

- Sub-threshold Combined Types
  - View as milder Combined Types

- Sluggish Cognitive Tempo
  - View as qualitatively different type

30-50%
Is SCT A Separate Disorder from ADHD?
The Criteria for Distinct Disorders

**Distinctions?**

- Coherent symptom complex
- Demographic correlates
- Cognitive correlates
- Impairments
  - (must be a harmful dysfunction – Wakefield, 1997)
- Comorbidity
- Etiology
- Family History
- Biological correlates (endophenotypes?)
- Course
- Treatment Response
Best SCT Symptoms

Becker, Burns, Schmitt, Epstein, & Tamm (2017), *Assessment*, Epub ahead of print

• 1. Behavior is slow (e.g., sluggish) (Factor loading = 0.92)
• 2. Lost in a fog (0.89)
• 3. Stares blankly into space (0.96)
• 4. Drowsy or sleepy (yawns) during the day (0.95)
• 5. Daydreams (0.88)
• 6. Loses train of thought (0.86)
• 7. Low level of activity (e.g., underactive) (0.97)
• 8. Gets lost in own thoughts (0.81)
• 9. Easily tired or fatigued (1.02)
• 10. Forgets what was going to say (0.94)
• 11. Easily confused (0.91)
• 12. Lacks motivation to complete tasks (e.g., apathetic) (0.27)
• 13. Spaces or zones out (0.82)
• 14. Gets mixed up (0.85)
• 15. Thinking is slow (0.87)
• 16. Difficulty expressing thoughts (e.g., gets “tongue-tied”) (0.78)
**Symptoms on Barkley SCT Rating Scale***

1. Daydreaming excessively
2. Trouble staying alert or awake in boring situations
3. Easily confused
4. Spacey or “in a fog”; Mind seems to be elsewhere
5. Stares a lot
6. Lethargic, more tired than others
7. Underactive or have less energy than others
8. Slow moving or sluggish
9. Doesn’t seem to understand or process information as quickly or accurately as others
10. Apathetic or withdrawn; less engaged in activities
11. Gets lost in thought
12. Slow to complete tasks
13. Needs more time than others (doesn’t discriminate from ADHD) ✖
14. Lacks initiative to complete work or effort fades quickly (same) ✖

SCT Symptom Coherence

- SCT symptoms form a single construct that can be usefully subdivided into 2+ related dimensions (factors)
  - daydreamy-confused and
  - sluggish/sleepy/lethargic
  - The former are the more diagnostic from ADHD
- SCT symptoms correlate moderately with ADHD IN symptoms but weakly or even negatively with ADHD HI symptoms
- Two dimensions correlate more with each other (.75) than with ADHD Inattention (.40 -.50)
- Mixed findings for slow, error prone response style & processing
  - Less able to use relevant environmental cues in task responding
  - Slower mean (not variable) reaction times, more omission errors
  - Unlike ADHD-C type, sluggish style is cross-situational
Demographic Differences

- Prevalence is:
  - 4-5% of children and adults in the U.S. (ages 5-89)
    - ADHD is 7-10% of children and 3-5% of adults
  - 21% of children seen in outpatient clinics have high SCT (Spain)

- Sex differences:
  - Slightly greater occurrence of symptoms in males but no differences in prevalence when SCT is cast as a disorder; ADHD is 3:1 (males > females) in children, 1.6:1 or less in adults

- Age:
  - Onset of SCT may be somewhat older than ADHD; not definitive
  - Children meeting SCT criteria tend to be older than those with ADHD
  - Slight increase in SCT symptoms with age but minor; decrease in ADHD symptoms with age, especially the HI dimension

- SCT is associated more than ADHD with lower parental education, lower household income, greater parental unemployment or disability status, and more parent divorce
Cognitive Distinctions

- No inhibition problems or impulsiveness on ratings or on cognitive testing in most studies
  - If anything, they can be overly inhibited (a negative correlation with impulsiveness)
- Small or no significant relationship to IQ (-.15-.20)
  - In ADHD, the relationship is modestly negative ($r = -.30$)
- Slow processing speed in young cases ($<7$) that may attenuate with age
  - Is this a cognitive processing or motor response slowness or both?? Unknown
  - More error prone (?)
  - Slower mean reaction times (RT), more omission errors. In ADHD, greater RT variability is commonplace
  - Unlike ADHD-C type, sluggish style is cross-situational
- Poor focused or selective attention (slower to orient, less attention to important task details)
- Little evidence for EF deficits on tests (inconsistent impact on working memory); any such evidence shows far weaker relationships than is seen in ADHD
- SCT has a small and inconsistent relationship to ratings of EF in daily life such as in self-organization, planning, problem-solving (after controlling for overlap with ADHD Inattention symptoms) (5% shared variance)
EF Ratings for SCT vs ADHD
(Barkley, 2013, *Journal of Clinical Child & Adolescent Psychology*)

Percent of Variance in EF Dimensions Contributed by ADHD vs SCT Symptoms

Survey of US Adults (18-89)
Contribution of ADHD vs SCT Symptoms
to Executive Functioning

Contribution of SCT vs ADHD to EF

- ADHD Inattention accounts for 49-77% of variance in all EF dimensions
- ADHD HI symptoms account for <1 to 6% of variance, mainly in Self-Restraint and Emotional Self-Regulation
- SCT accounts for less than 1% in each except Self-organization, where it is 5%
- ADHD is vastly more associated with EF deficits in daily life than is SCT
- SCT is NOT a disorder of Executive Functioning; ADHD clearly is so.
- Findings largely replicated using BRIEF
Overlap of SCT with ADHD

• In Children:
  – 59% of SCT cases had any type of ADHD
  – 39% of ADHD cases had SCT

• In Adults:
  – 46% of SCT cases had ADHD of any type
  – 54% of cases of ADHD have SCT, especially if diagnosed with the Predominantly Inattentive Type
Academic, Family, and Social Distinctions

• Lower levels of general parenting stress (?
  – Why? Stress is linked to ODD and SCT is not linked to ODD
• Greatest parental concerns relate to homework and school performance (not school behavior problems)
• Equally impaired as ADHD in school performance
  – ADHD is more of a productivity disorder regarding school work while SCT is more likely an accuracy disorder while doing the work
  – The “Slow” dimension of SCT is most related to deficient achievement skills
  – Greater frequency of math disorders in SCT (related to low math achievement ?)
    • Math ability shares genetics with ADHD inattention also
  – Contribution to school and social impairment is unique from ADHD³,⁶
• Socially withdrawn, isolation, low initiative or even anxious
  – Less impaired socially than ADHD children
  – SCT is related to lower social engagement in parent ratings (starting conversations, joining activities) and more asociality/withdrawal, peer ignoring, and more exclusion in teacher ratings
  – ADHD-HI and ODD symptoms related to peer exclusion, being disliked, poor self-control in social settings
Comorbidity and Personality Traits

• Comorbidity: Rarely show aggression or ODD/CD
  – No or even a negative correlation of SCT with ODD/CD symptoms

• Greater risk for internalizing symptoms
  – More strongly linked to depression than anxiety, even after controlling for ADHD
    IN. Also may account for overlap of ADHD with anxiety
  – Not more likely to have bipolar disorder than control children, unlike ADHD

• Equally as likely as ADHD to be associated with motor, spelling, writing, & autistic spectrum disorders and general developmental delay
  – 64% of ASD kids have medium (33%) to high (31%) SCT symptoms
  – SCT was linked to greater social impairments and more internalizing symptoms

• 53% of SCT kids free of comorbidity vs. 39% of ADHD Only and 25% of SCT+ADHD

• Linked to different personality traits:
  – ADHD linked to reward sensitivity and risk-taking
  – SCT linked to punishment sensitivity and shyness/fear
Impairment in SCT vs ADHD Children

Contributions of SCT vs ADHD to Impairments

- ADHD results in impairment in twice as many domains as does SCT (5-7 vs. 2-3)
- ADHD Inattention (IN) contributes 49% of variance to Home-School Impairment (SCT = 1%)
- ADHD HI symptoms contribute 35% of variance to Community-Leisure impairment (SCT = 6%)
- ADHD IN contributes 34% of variance to pervasiveness of impairment (# domains) whereas (ADHD-HI = 5% and SCT is <2%)
- ADHD is a far more impairing disorder than SCT producing more pervasive impairment as well
- ADHD children had a greater percentage having teacher complaints of school problems (72-85%), had lower grade point averages, and were more likely to be retained (8-25%)
Impairments in SCT vs. ADHD Adults

Even so – regression analyses indicate that ADHD contributes 40% of the variance to overall mean impairment and 32% to number of impaired domains (pervasiveness) while for SCT it is 3% and 2%, respectively, just as in the survey of US children.

Further Adult Differences

- SCT is distinct from daytime sleepiness (hypersomnia) but moderately correlated with it (0.51) in college student study.
- Hypersomnia is also associated with ADHD in this study but all three are partially distinct from each other.
Possible Etiologies

• Research is very sparse and limited
• But, two studies have found higher symptoms of SCT to be linked to problems with the Default Mode Network and its functional connectivity. ADHD is associated more with dysfunction in executive networks.
• One study shows that only ADHD is linked to higher theta/beta ratio in the frontal region on EEG while SCT symptoms are not
• SCT symptoms occur more often in prenatally alcohol exposed children* and childhood leukemia
• Recent genetic (heritability) research shows that SCT is
  – moderately heritable but somewhat less than is ADHD
  – with a greater contribution of unique environmental events to symptom variation.
  – Some shared genetic liability between the two types of inattention but also some unique genetic contribution to SCT as well.
• SCT is also linked to greater family and child psychosocial adversity; thus social stressors may be more linked to SCT than ADHD
What is the Nature of SCT?

It appears to be a distinctly different form of inattentiveness from that seen in ADHD

• Possibly a dysfunction of arousal or a hypersomnia?
  – Doubtful given Langberg et al. (2013) study with college students showing it overlaps with but is distinct from daytime sleepiness

• Possibly a disorder of the focus/execute or stabilize attention components?

• Possibly excessive mental preoccupation or rumination related to social stressors, anxiety, OCD?

• Maybe a case of pathological mind wandering or maladaptive daydreaming?
SCT as a Disorder of Mind Wandering?

• Mind wandering or maladaptive daydreaming is the shifting of attention away from external events and toward internal mental events. It can be deliberate or spontaneous. When spontaneous, it is highly related to activity in the Default Mode Network of the brain.

• When intentional it can be constructive. Under some circumstances it can coexist with other goal directed behavior, like a divided attention task. This can occur when more routine goals are being largely automatically pursued – it is an efficient use of excess EF capacity (especially working memory) in which one intentionally focuses on various thoughts, such as other goals, problems, or concerns, while engaged in a separate goal-directed action.

• When it is engaged in spontaneously and excessively, it can diminish the EF capacities needed for the primary goal-directed action and even interfere with the primary task or goal, slowing progress toward the goal, increasing errors, or even preventing the goal from being attained or the task being completed in time.
Different Types of Thought


**Deliberate Constraints** – contents of thought are under executive cognitive control.

**Automatic Constraints** are a result of a family of mechanisms operating outside of cognitive control, such as sensory or affective salience. Each of the three forms of thought can be externally or internally oriented.

- **Strong**
  - **Rumination and Obsessive Thought**
  - **Spontaneous Thought**
    - **Dreaming**
    - **Mind Wandering**
    - **Creative Thinking**
  - **Goal-directed Thought**
Do Medications Treat SCT?

- Most drug research was with methylphenidate and used ADD without H child cases (or Inattentive Only) – not selected specifically for SCT
  - They found ADHD IN to be Less Likely to Have a Clinically Impressive Response to Stimulants (based on a few studies of ADHD IN type)
  - Barkley (1991) found 65% improved modestly in symptom ratings but only 20% showed a good clinical response warranting continued medication; low dose was best
- But a recent study at Cincinnati Children’s Hospital showed that SCT symptoms predicted a poorer response to MPH
- Just one study of SCT symptoms in children treated with atomoxetine
  - Study by Wietecha et al. (2013) shows significant improvement in SCT in children with ADHD+dyslexia and those with ADHD only on parent and teacher SCT ratings.
  - New research also shows that ATX binds with serotonin transporter, not just NE transporter
- If SCT is ruminative or related to OCD would other relevant medications be useful? Unknown
- If SCT is related to hypersomnia or arousal problems, again would other relevant medications be useful? Unknown
Psychosocial Treatment Considerations

• Good (better?) response to joint home-school treatments
  – MTA study: anxious cases did the best in psychosocial treatment
  – Several studies by Pfiffner show that a combined home-school behavioral program focusing on social and organizational skills and that is targeted at ADHD-I specific problems can be effective.
  – Best response in Pfiffner studies was found in children with higher IQs (105+), whose parents were low in anxiety/depression or ADHD symptoms, and in children with lower hyperactivity impulsivity symptoms.

• Better response to social skills training? Used ADHD-I type children compared to ADHD-C cases
  – Improved only assertion in both groups but more in I-types
  – Up to 25% of ADHD cases become more aggressive in social skills groups due to peer deviancy training*

• More responsive to cognitive therapy?
  – It doesn’t work for ADHD kids but if this is not ADHD then try it again?
  – It does work for anxiety disorders and depression

• Obviously, comorbid disorders (depression, anxiety, LD, ADHD) will require separate management
SCT is Not an Appropriate Label

• Implies we know the core cognitive deficit in the disorder – we don’t
  – No studies on timing or processing in SCT
• Could be construed as derogatory or offensive
  – slow witted? lazy?
• ADD has been suggested but just creates confusion
  – ADD was term for ADHD in 1980s
• Pathological mind wandering? Too soon to say
• Why not Concentration Deficit Disorder?
  – Implies attention problem but not specific dysfunction
  – General enough not to be offensive

Summary

- ADHD is a chronic disorder of inhibition, inattention, and poor self-regulation (EF)
- SCT (ADD) seems to be a different disorder from ADHD and not a subtype of it
- Both disorders can be comorbid and are impairing though they may differ in which major life activities they create the greatest impairment and in how they impair them
- ADHD contributes far more to EF deficits than does SCT but contribution of SCT increases in adulthood
- In children and adults, ADHD is a more impairing disorder and more pervasively impairing but SCT can be worse than ADHD in selective situations
- So, is SCT a distinct disorder from ADHD?
Does SCT meet criteria for a distinct disorder?

- Coherent and distinct symptom complex – Yes
- Distinct demographic correlates - Yes
- Distinct cognitive correlates – Probably
- Distinct impairments – Probably, SCT is also milder
- Distinct pattern of comorbidity - Yes
- Distinct biological correlates - Unknown
- Distinct course – Unknown
- Distinct etiologies – Maybe, not enough evidence
- Distinct family history - Unknown
- Distinct pattern of treatment responses – Unknown