

The Other Attention Disorder: Sluggish Cognitive Tempo vs. ADHD

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ADHDLectures.org



Early History of SCT vs. ADHD

- 1775 – Melchior Adam Weikard (Germany) describes a disorder of attention very similar to ADHD in his medical textbook – blames it on child rearing. Makes many treatment recommendations, including exercise, horseback riding, sour milk, and extreme isolation if necessary.
- 1798 – Alexander Crichton describes disorders of attention in his medical textbook. One is inattentive and distractible, the other is low power of attention and lethargy. Blames them both on medical/neurological disorders and child upbringing
- 1968 – Hyperkinetic Reaction of Childhood becomes the official term for what is now ADHD – no subtypes are identified.
- 1980 – The disorders becomes ADD with and without Hyperactivity in DSM-III. This is the first official distinction of two attention disorders cast here as subtypes of ADD. This leads to studies comparing the two with mixed results. But a subset of ADD without H children are found to have relatively unique symptoms of daydreaming, mental confusion, poor processing of information, lethargy and hypo-activity. The term SCT is coined by Carlson & Neeper (1986) to describe this subset.

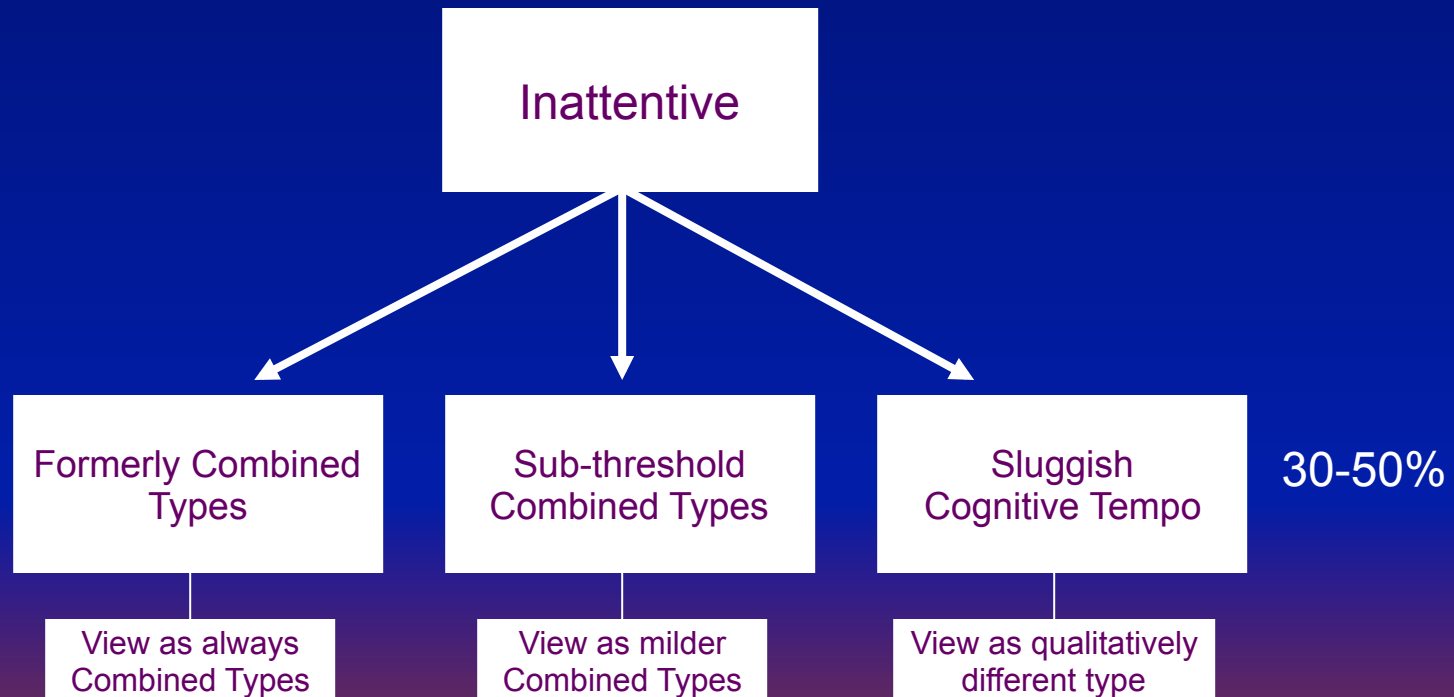
1980 to 2010: ADD and ADHD

- 1984 – Lahey and colleagues invent the term “sluggish cognitive tempo” for a subset of ADD-H kids
- 1987 -- DSM-III-R renames the disorder ADHD and views it as a single condition with one list of symptoms. ADD without H is removed and renamed as “Undifferentiated” ADHD and placed at the end of the manual with a call for more research on its validity.
- 1994 -- DSM-IV keeps the name ADHD but now permits the creation of three subtypes – Predominantly Inattentive, Predominantly Hyperactive-Impulsive, and Combined Types. Again, research to date on the I vs. C-Types shows mixed results. The types are not found to be reliable or stable over development. Yet a subset of I-Type children are again found to have high levels of SCT symptoms.
- 2012 -- DSM5 committee proposes to eliminate ADHD subtypes but proposes “presentations” instead. No category created for SCT



What About the Inattentive Type (ADD)?

DSM subtype/presentation



Is SCT A Separate Disorder from ADHD?



The Criteria for Distinct Disorders

Distinct

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

SCT Symptoms on Rating Scales

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)

What do we know about SCT?

- SCT Symptoms form 2+ dimensions (factors)^{2,3}
 - daydreamy-confused and
 - sluggish/sleepy/lethargic
 - The former are the more diagnostic from ADHD²
- SCT correlates moderately with ADHD IN symptoms but weakly with ADHD HI symptoms³
- Mixed findings for slow, error prone response style & processing
 - Less able to use relevant environmental cues in task responding^{2,3}
 - Slower mean (not variable) reaction times, more omission errors^{1,4}
 - Unlike ADHD-C type, sluggish style is cross-situational⁴
- Some studies of inattentive type ADHD show poor focused or selective attention but not consistent; is this related to SCT specifically?

1. Milich, R. et al. (2001). *Clinical Psychology: Science and Practice*, 8, 463-488.

2. Penny, A. M. et al. (2009). *Psychological Assessment*, 21, 380-389.

3. Special issue on SCT of *Journal of Abnormal Child Psychology* (multiple papers)

3. Solanto, M. V. et al. (2007). *Journal of Abnormal Child Psychology*, 35, 729-744.

4. Derefinko, K. J. et al. (2008). *Journal of Abnormal Child Psychology*, 36, 745-758.

SCT - Findings

- No inhibition problems or impulsiveness on ratings or on cognitive testing in most studies^{1, 2,3}
 - If anything, they can be overly inhibited⁴
- Little evidence for executive function deficits on tests; if present are in working memory (on tests) or self-organization (on EF ratings)³
- Greatest parental concerns related to school failure
- Equally impaired as ADHD in school performance
 - ADHD is a productivity disorder while SCT is an accuracy disorder
 - Greater frequency of math disorders in SCT (?)
 - Math ability shares genetics with ADHD inattention
 - Contribution to school and social impairment is unique from ADHD^{3,6}
- Socially shy, reticent or withdrawn – less impaired socially than ADHD children^{1,2,3,6}

1. Milich, R. et al. (2001). *Clinical Psychology: Science and Practice*, 8, 463-488.

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6. Burns, L. et al. (2013). *Journal of Clinical Child and Adolescent Psychology*. Epub ahead of print.

More Distinguishing Features of SCT

- Comorbidity: Rarely show aggression or ODD/CD¹
 - No correlation of SCT with ODD/CD symptom dimensions
- Greater risk for internalizing symptoms (anxiety and depression)^{1,2,3,4}
 - Especially linked to depression even after controlling for ADHD IN
 - Also accounts for overlap of ADHD with anxiety
- Linked to different personality traits:²
 - ADHD linked to reward sensitivity and risk-taking
 - SCT linked to punishment sensitivity and shyness/fear
- Lower levels of general parenting stress (?)
 - Why? Stress is linked to ODD and SCT is not linked to ODD
- Family history of anxiety and LD (?) – No research with SCT

1. Milich, R. et al. (2001). *Clinical Psychology: Science and Practice*, 8, 463-488.

2. Becker, S. et al. (2013). *Journal of Research in Personality*, 47, 719-727.

3. Special issue on SCT of *Journal of Abnormal Child Psychology* (2013; multiple papers)

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Recent large study of SCT in 1,800 U.S. Children 6-17 Yrs (Barkley, 2013)

- SCT forms two dimensions of symptoms distinct from the two ADHD dimensions
 - Daydreaming & Sluggish
 - Two dimensions correlate more with each other (.75) than with ADHD (.40 -.50)
- SCT symptoms increase slightly with age while ADHD (HI) symptoms decline or remain stable
- SCT symptoms only slightly more severe in males than females; ADHD is much more severe in males
- All above findings now replicated by others

From Barkley, R. A. (2013). *Journal of Clinical Child and Adolescent Psychology*, 42, 161-173.

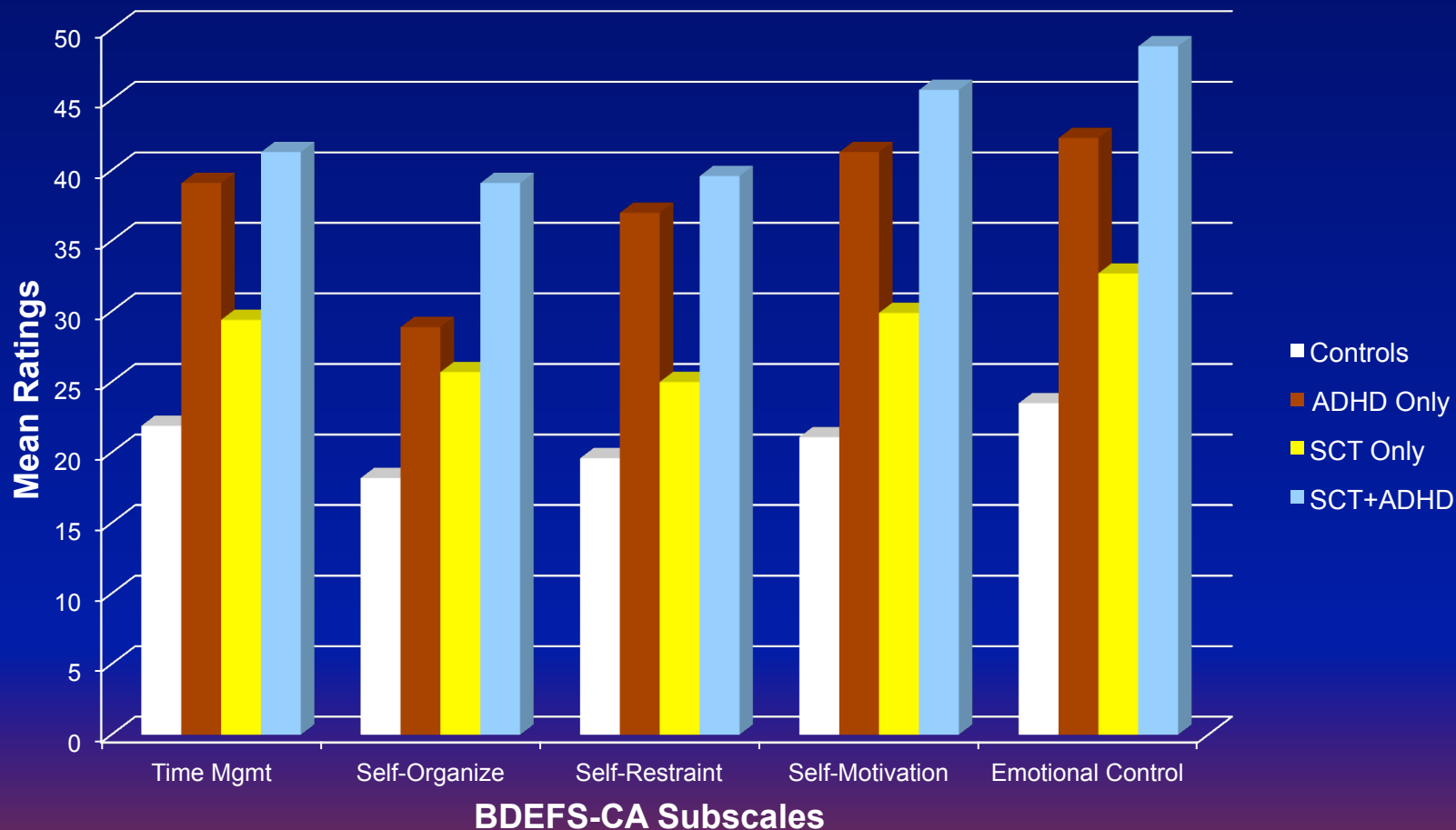
More results on SCT children

- Cast as a disorder (category), SCT is not more common in males than females while ADHD is 2-3:1 (boys:girls)
- SCT is associated more than ADHD with lower parental education, lower household income, greater parental unemployment or disability status, and more parent divorce
- SCT children are older and may have a later age of onset of their symptoms
- Prevalence was 4.7% (93rd percentile or 3 of 12 symptoms plus impairment)

From Barkley, R. A. (2013). *Journal of Clinical Child and Adolescent Psychology*, 42, 161-173.

EF Ratings for SCT vs ADHD

(Barkley, 2013, *Journal of Clinical Child & Adolescent Psychology*)



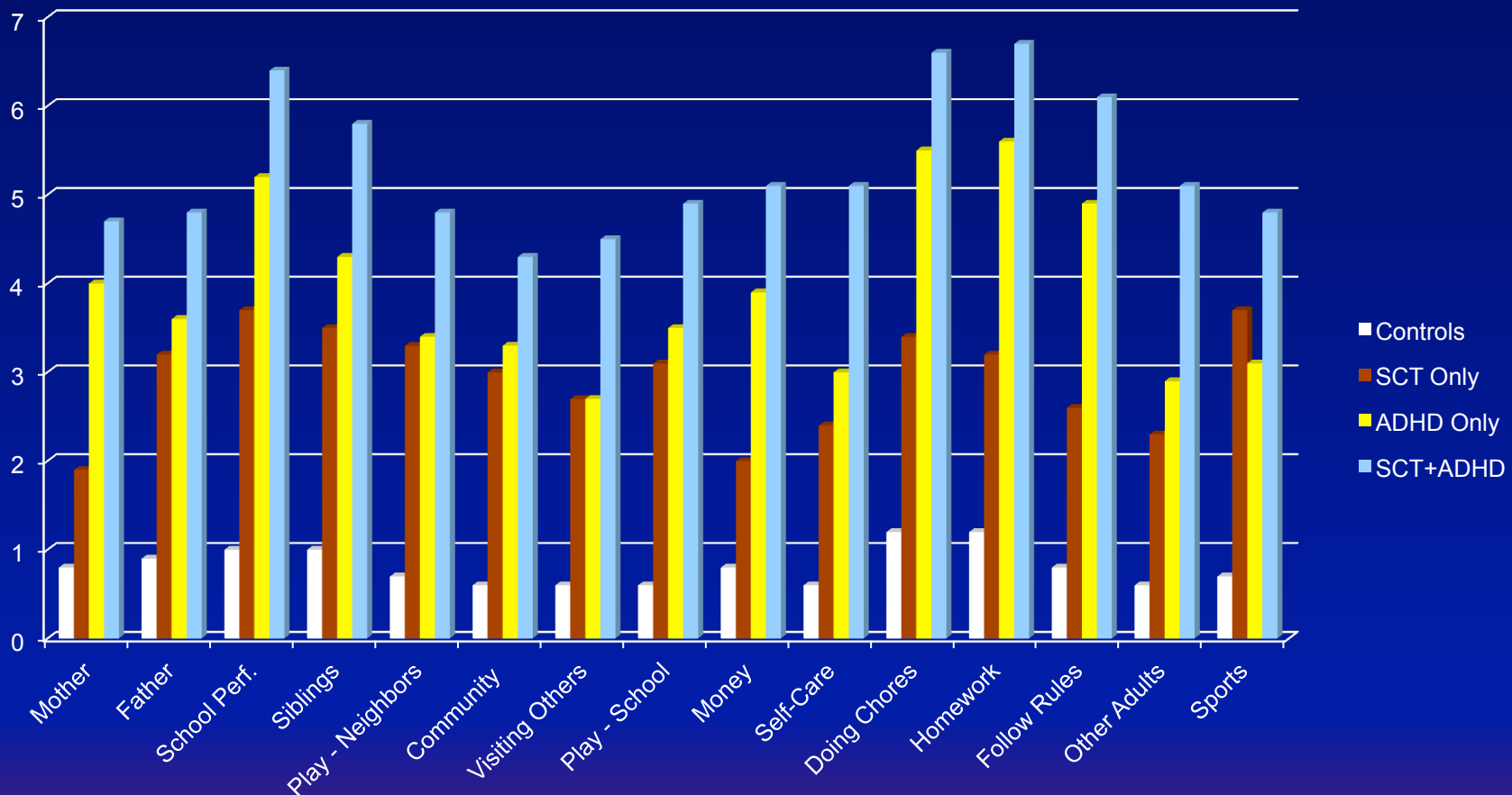
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Contribution of SCT vs ADHD to EF

- 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
- Findings largely replicated using BRIEF
 - Becker, Langberg, Burns, (2013) & Capdivilla-Brophy, etc. 2012



Impairment in SCT vs ADHD



* = SCT Worse than ADHD

! = ADHD Worse than SCT

From Barkley, R. A. (2013). *Journal of Clinical Child and Adolescent Psychology*, 42, 161-173.

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 contributes 49% of variance to Home-School Impairment (SCT = 1%)
- ADHD HI symptoms contribute 35% of variance to Community-Leisure impairment (SCT = 6%)
- ADHD contributes 39% of variance to pervasiveness of impairment (# domains) whereas SCT is <3%
- ADHD is a far more impairing disorder than SCT producing more pervasive impairment as well
- ADHD children had greater percentage having teacher complaints of school problems (72-85%), had lower grade point averages, and were more likely to be retained (8-25%)

Overlap of SCT with ADHD

- 59% of SCT cases had any type of ADHD
 - 37% had I-Type
 - 13% had HI-Type
 - 50% had C-Type
- 39% of ADHD cases had SCT
 - 31% of I-Type
 - 27% of HI-Type
 - 55% of C-Type



Comorbidity in SCT in U.S. Children

(Barkley, 2013, *Journal of Clinical Child & Adolescent Psychology*)

- Not more likely to have ODD, reading, math, anxiety, or bipolar disorder than Control children while ADHD cases were more likely to have these
- More likely than ADHD to be associated with depression disorders
- Equally as likely as ADHD to be associated with motor, spelling, writing, & autistic spectrum disorders and general developmental delay
- 50% of ADHD cases had prior diagnosis of it while 14% of SCT cases had diagnosis of ADHD
- 53% of SCT kids free of comorbidity vs. 39% of ADHD Only and 25% of SCT+ADHD

SCT in U.S. Adults (N = 1,286)

- Later age of onset of symptoms
- No sex differences in general population
- Does not decline with age like ADHD
- 5.1% prevalence (using 5/9 symptoms plus impairment)
- A distinct disorder from ADHD; not a subtype
- Overlaps with ADHD
 - 54% of cases of ADHD have SCT, especially if diagnosed with the Predominantly Inattentive Type
 - 46% of SCT cases may have elevated ADHD symptoms, again mainly of ADHD inattention

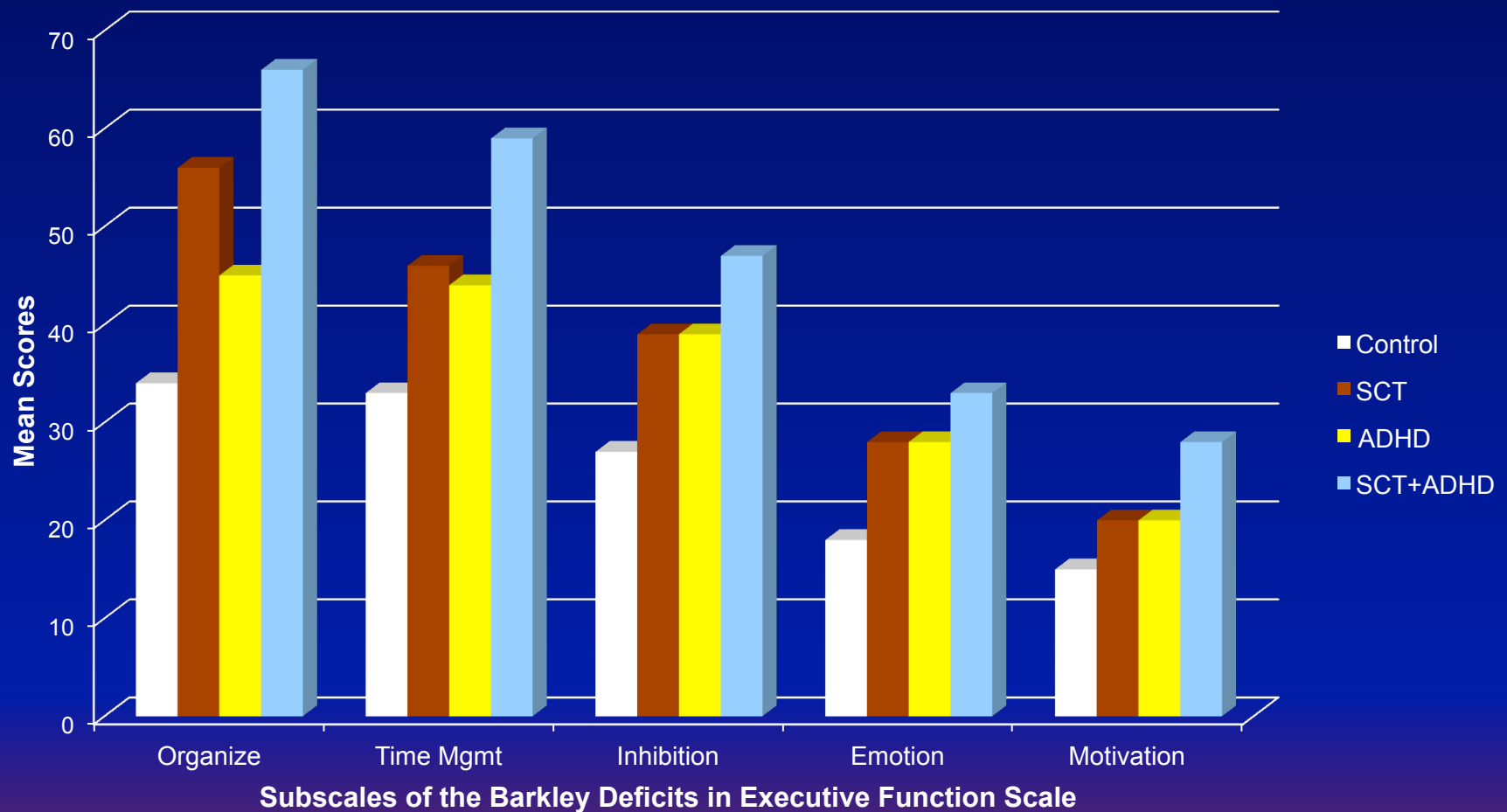
From Barkley, R. A. (2012). Distinguishing sluggish cognitive tempo from attention deficit /hyperactivity disorder in adults. *Journal of Abnormal Psychology*. 121(4), 978-990

New Studies on Adults

- New research shows that SCT forms the same distinctive dimensions from ADHD in college students as was found in the initial Barkley study of U.S. adults (Becker et al., 2013; *J of Abn Child Psychology*, special issue on SCT)
- 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.
- Greatest impairment in school performance was in people having all three conditions (Langberg et al., 2013; *Psych. Assessment*)

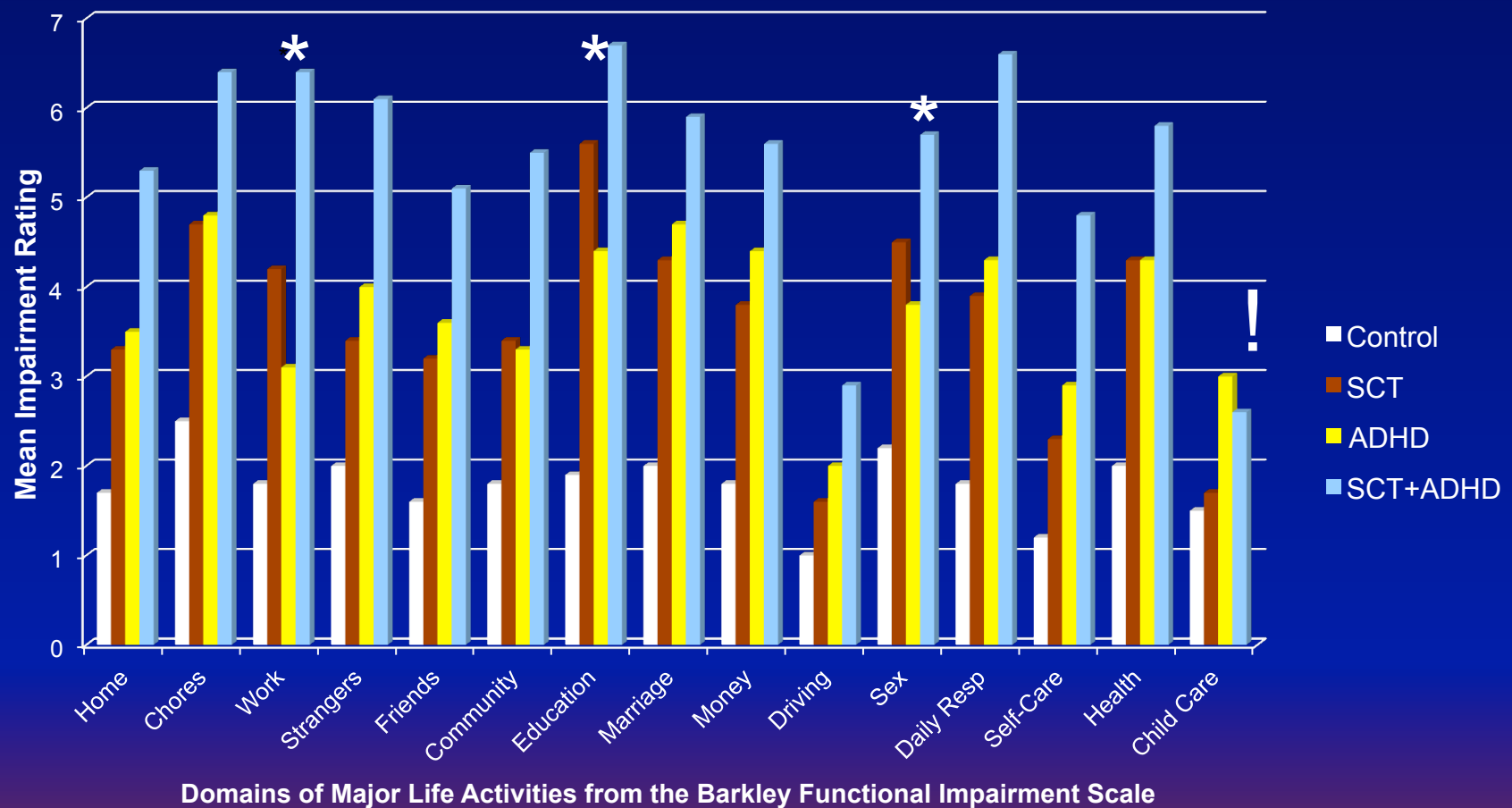


SCT vs ADHD Adults on EF Ratings



From Barkley, R. A. (2012). Distinguishing sluggish cognitive tempo from attention deficit / hyperactivity disorder in adults. *Journal of Abnormal Psychology*. 121(4), 978-990

Impairments in SCT vs. ADHD



From Barkley, R. A. (2012). Distinguishing sluggish cognitive tempo from attention deficit / hyperactivity disorder in adults. *Journal of Abnormal Psychology*. 121(4), 978-990

Possible Etiologies

- Research is very sparse and limited
 - No direct studies of neuro-imaging or molecular genetics
- SCT symptoms occur more often in prenatally alcohol exposed children* and childhood leukemia**
- Recent 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 and to internalizing symptoms (specifically depression). So social stressors may be more linked to SCT than ADHD

*Graham, D. et al. (2012). *Alcohol – Clinical and Experimental Research*, Jul 20. doi: 10.1111/j.1530-0277.2012.01886.x.

** Reeves, C. B. Et al. (2007). *Journal of Pediatric Psychology*, 32, 1050-1058.

***Moruzzi, S. Et al. (2013). *Journal of Abnormal Child Psychology*. Special Issue on SCT. Epub ahead of print

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 a form of mental preoccupation related to social stressors or anxiety?
- Maybe a case of pathological mind wandering?
 - Adams, Z. & Milich, R. (2012). *The ADHD Report*



SCT as a Disorder of Mind Wandering?

- Mind wandering is the shifting of attention away from external events and toward internal mental events, as in daydreaming. It can be deliberate or spontaneous.
- 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.

Seli et al. (2015). On the relation of mind wandering and ADHD symptomatology. *Psychonomic Bulletin & Review*. Epub ahead of print.

Smallwood, J., Fishman, D., & Schooler, J. (2007). Counting the cost of an absent mind: Mind wandering as an under recognized influence on educational performance. *Psychonomic Bulletin & Review*, 14(2), 230-236.

Smallwood, J. & Schooler, J. (2006). The restless mind. *Psychological Bulletin*, 132(6), 946-958.

4 Potential Sources of Mind Wandering

- It can be intentional as in deliberate introspection and contemplation related to planning and problem-solving
- It can reflect poor executive (ideational) control, especially disinhibition or poor prioritization of tasks – Spontaneous mind wandering is linked to this aspect of ADHD symptoms. Deliberate or intentional mind wandering is not.
- It can be escape-avoidant behavior: This can occur in situations where the individual is using visual imagery, self-speech, and other executive functions for daydreaming in order to escape from unpleasant settings or tasks (imposed goals) or for sheer immediate entertainment or pleasure. It can be stress reducing in such situations. This seems like more deliberate mind wandering.
- It can be ruminative: The person is pre-occupied with recurrent thoughts of their problems or fears. It is an excessive deployment of the EF system on ones fears and concerns as in OCD or other ruminative disorders (anxiety, depression) or even psychoses. Perhaps this is why SCT overlaps with anxiety/depression.

Treatment Implications for SCT

- All research has been with children, not with adults
- Most drug research was with methylphenidate and used ADD without H 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
- Consider atomoxetine
 - Recent 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**
- Good (better?) response to joint home-school treatments
 - MTA study: anxious cases did the best in psychosocial treatment
 - Pfiffner (2007) study shows good response to home-school behavioral training and child training in social and organizational skills that is targeted at ADHD-I specific problems***

*Wietecha et al. (2013). Poster presented at American Psychiatric Association, 2013.

**Ding, W. S. et al. (2013). *Neuroimage*, 2013 Aug 8, Epub ahead of print.

**Pfiffner, L. et al. (2007). *Journal of the American Academy of Child and Adolescent Psychiatry*, 46, 1041-1050.

More SCT Treatment Considerations

- Better response to social skills training in ADHD-I type children than 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
- Consider metadoxine XR (5-hydroxytryptamine receptor antagonist; IR used to treat acute alcohol intoxication and withdrawal)
 - Recent study showed significant improvement in ADHD inattention but only in predominantly inattentive ADHD subtype/presentation**
- Consider modafinil (anti-narcoleptic) (??) Why? If SCT overlaps with hypersomnia it may work (?)
- If SCT is ruminative or related to OCD, consider clomipramine or fluvoxamine used to treat OCD (??)

*Antshel, K., & Remer, R. (2003). *Journal of Clinical Child and Adolescent Psychology*, 32, 153-165.

**Manor, I. et al. (2013). *Postgraduate Medicine*, 125(4):181-90.

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 wander? Too soon to say
- Why not Concentration Deficit Disorder?
 - Implies attention problem but not specific dysfunction
 - General enough not to be offensive

Saxbe, C. & Barkley, R. A. (2013). *Journal of Clinical Psychiatry*, in press.

Barkley, R. A. (2013). *Journal of Abnormal Child Psychology*. Special Issue on SCT

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 cognitive correlates – Probably
- ✓ Biological correlates (endophenotypes?) - Unknown
- ✓ Distinct course – Unknown
- ✓ Distinct demographic correlates - Yes
- ✓ Impairments – Yes, milder but some exceptions
- ✓ Distinct pattern of comorbidity - Yes
- ✓ Distinct etiologies – Maybe, not enough evidence
- ✓ Distinct family history - Unknown
- ✓ Distinct pattern of treatment responses – Unknown

