Concentration Deficit Disorder (Sluggish Cognitive Tempo)

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This chapter reviews the evidence for a second attention disorder that is distinct from yet overlaps with ADHD. Although this condition has been called Sluggish Cognitive Tempo (SCT) since the 1980s, I have recently recommended that the name be changed to Concentration Deficit Disorder (CDD) for various reasons, not the least of which is that it can be viewed by the public as pejorative, derogatory, or frankly offensive (Barkley, 2014; Saxbe & Barkley, 2014). While some prior reviewers of the evidence have suggested that the disorder be called attention deficit disorder, or ADD (Diamond, 2005; Milich & Roberts, 2012), and many clinicians have adopted this term for people who are primarily inattentive and have little or no evidence of hyperactive or impulsive behavior, it is not advisable to do so. Not the least reason for which is that ADD is the older term for ADHD dating back to DSM-III in 1980 and so resurrecting it as the name for a second attention disorder merely unnecessary creates confusion between these conditions which, as will be shown below, are quite different in a number of important features. The term SCT also implies that the neurocognitive dysfunction underlying the condition is well-known and supported by empirical evidence, and this is very far from the case at the moment. The same criticism can be applied to other terms suggested for this condition, such as Primary Disorder of Vigilance (PDV; Weinberg & Brumback, 1990, 1992; Weinberg & Harper, 1993), although that term was asserted to be an alternative to ADHD and not just the identification of another attention disorder. Obviously, if vigilance is defined as "alertness" and "sustained attention" (Wikipedia) then, by definition, ADHD can be automatically redefined as representing PDV, with the former now relegated to mythical status by those authors (Weinberg & Brumback, 1992). Toss into the definition as they did problems with wakefulness and focus of attention and you pretty much cover both disorders under discussion here without having to do anything more scholarly than pontification. Or do anything more scientific than dredging up five clinical cases out of one's practice while summarily dispensing with 200 years of medical commentary and scientific research on ADHD (Weinberg & Brumback, 1990, 1992; Weinberg & Harper, 1993). CDD seems to be a reasonable option for various reasons: (a) it keeps the focus of the label on an attention problem yet makes it distinct from ADHD; (b) it is not offensive or pejorative to patients and family members as is SCT; (c) it does not imply we know more than we do about the underlying cognitive dysfunction, as do the terms SCT and PDV; and (d) it may suggest some overlap with ADHD, which is the case (see below). Moreover, the term "concentration" does not appear in the symptom lists for either ADHD (DSM-5) or SCT (Penny, Waschbusch, Klein, Corkum, & Eskes, 2009) and thus is less likely to create unnecessary semantic confusion. For these reasons, throughout the remainder of this chapter I refer to this condition as CDD (SCT).

History of CDD (SCT) vs. ADHD

Cases of CDD (SCT) have likely existed within the childhood population at least throughout the past two centuries, if not longer. Descriptions of individuals with "low power" of attention

or arousal, who appear to stare or daydream frequently, and to otherwise seem inattentive to or sluggish and erratic in accurately processing information seem to first appear in the medical literature in Crichton's description of two disorders of attention in his medical textbook (Crichton, 1798). Certainly Weikard (1775) did not seem to mention this condition in his earlier treatise on attention deficits (Barkley & Peters, 2012). The first attention disorder noted by Crichton was one of distractibility, frequent shifting of attention or inconstancy, and lack of persistence or sustained attention. It nicely aligns with the attention disturbance assigned now to ADHD (Palmer & Finger, 2001). The second was a disorder of diminished power or energy of attention that seems more like the attention problem evident in CDD (SCT). Crichton had little to say about the second disorder of attention other than that it may be associated with debility or torpor of the body. That, he reasoned, weakens attention causing individuals to be retiring, unsocial, and having few friendships or attachments of any kind. What friendships may exist are seldom of a durable nature. Crichton further argued that the faculty of attention could be so weakened as to leave an individual insensible to external objects or to impressions that ordinarily would awaken social feelings. This seems to overlap with current depictions of CDD (SCT) (Milich, Ballentine, & Lynam, 2001; Penny et al., 2009) in some respects. However, Crichton's description could also be ascribed to autistic spectrum disorders or even schizoid or schizotypal personality disorders if not psychopathy.

Other than these historical curiousities, the contemporary period of research on CDD (SCT) began in 1980. It was a clear consequence of the proposal to create two types of ADHD in DSM-III (American Psychiatric Association, 1980); those having an attention deficit disorder with (+H) and without hyperactivity (-H). As I recall from those meetings, this bifurcation was largely predicated on some anecdotes of clinician members of the committee who saw such cases of ADD-H in their practices and wished to have a means to identify them in the official taxonomy of childhood disorders. At first, the DSM-III mistakenly placed impulsiveness in with the inattentive symptoms creating this dichotomy on the basis of hyperactivity alone. Studies soon showed that the impulsive symptoms were most closely linked to the hyperactive ones than to those of inattention (Carlson, 1986; Lahey, Schaughency, Strauss, & Frame, 1984; Milich et al., 2001), as was later depicted in DSM-IV (American Psychiatric Association, 1994) and now in DSM5 (American Psychiatric Association, 2013). Subsequently, researchers corrected this error and proceeded to do numerous studies comparing individuals with ADD+H and ADD-H [those high in symptoms of both inattention (I) and hyperactivity-impulsivity (HI) to those with just high I but very low HI symptoms].

Probably the first paper to examine the existence of ADD-H is that by Maurer and Stewart (1980). Out of a review of 297 patients, they identified 52 as likely having ADD. More than half of them (31) conduct disorder and 11 others were diagnosed with various other psychiatric disorders. They found only nine children who appeared to be pure cases of ADD-H, and describe these children as principally being characterized as having significant learning disabilities and quote lack of motivation." The authors concluded that ADD-H did not appear to be an independent syndrome. This study was followed shortly by one by Pelham, Atkins, and Murphy (1981) who screened 610 children between kindergarten and fifth grade and distinguished those with ADD+H from those having only ADD-H. The ADD+H group as usual had higher ratings of conduct problems. Girls with ADD-H were rated by teachers as significantly more inattentive-passive and immature, and by peers as more withdrawn than girls with ADD+H. This is probably the first paper to identify conduct problems as being differentially associated with ADD+H rather than ADD-H. Many other papers would

subsequently replicate this finding. In 1984, Lahey et al. published a paper comparing 10 children with ADD+H the 20 children with ADD-H. Like the earlier studies, they found that the former group had significantly higher levels of aggressive behavior and conduct problems, bizarre behavior, lack of guilt, and were quite unpopular. They also performed poorly in school. In comparison, the ADD-H children were more likely to be anxious, shy, socially withdrawn, and moderately unpopular, did poorly in sports, and to have poor school performance. The two groups both manifested significant problems with depression and poor self-concepts, but differed in the areas of low self-esteem they reported. The ADD+H group reported problems with academic status, behavior, and popularity. The ADD-H group reported self-concept concerns regarding physical appearance, anxiety, and general happiness. This paper was most likely the origin of the term SCT for this subset of ADD-H children having symptoms of being drowsy, sluggish, and daydreamy (Carlson, personal communication, November 20, 2013.

In a subsequent paper, Lahey et al. (1985) compared 20 children with ADD+H to 20 with ADD-H and found the usual differences noted in earlier research above concerning greater sluggish, drowsy, daydreamy symptoms in contrast to the impulsive, distractible, and overactive pattern found in ADD+H. They argued that those having CDD (SCT) symptoms formed a different type of attention disorder from ADD+H; they were not subtypes of the same ADD disorder at all and did not share the same underlying attention disturbance.   In 1985, according to Carlson (1986), Neeper conducted a cluster analysis in order to subtype learning disabled children on the basis of their behavior. Using 75 children with LD, the author used cluster analysis on the child behavior rating scale, a rating scale new to this paper, in which was identified a separate group of 11 children having high scores on inattention-disorganization factor and low scores in motor hyperactivity. This group had significantly higher ratings of anxiety-depression and also higher ratings on a factor he named "sluggish tempo factor," comprised of items related to apathetic, lethargic, sluggish, and drowsy behaviors. The ADD+H children in the study were, once again, found to have significantly higher ratings of conduct disorder, then the ADD-H children. The two subtypes differed somewhat on a battery of cognitive tests (Carlson et al., 1986). In that study, 20 children with ADD+H were contrasted against with ADD-H. Both ADD groups scored significantly lower on intelligence testing. The ADD-H age group had the lowest full-scale IQ score than the ADD or control groups. Both ADD groups did poorly on tests of spelling and reading but the ADD-H group performed more poorly on math achievement. Problems with visual matching were greater in the ADD-H than in the ADD+H group. The groups did not differ in accuracy on the Stroop task, rapid naming, measures of receptive and expressive language, visual-motor integration, or sustained visual attention. Thus it appears that these two disorders of attention differ more in ratings of behavior, social relations, self-esteem, and internalizing symptoms, but less so on cognitive measures. Noteworthy is that this may be the first report of an association of ADD with difficulties with math performance that appeared again in subsequent studies of CDD (SCT).).   Despite these initial successes at identifying differences between these supposed subtypes of ADD+H and -H, other studies produced quite mixed results or found just minor differences (King & Young, 1982; Maurer & Stewart, 1980).

Carlson's 1986 review article provides a more comprehensive summary of the research on ADD+H and –H to that time than space permits here. It concluded that ADD-H could be distinguished from ADD+H in its behavioral characteristics and impairments. Both groups show poor academic functioning, but the peer problems aligned with ADD-H comprised problems with anxiety, shyness, and social withdrawal. Their attention symptoms ran more toward the

sluggish, drowsy, and apathetic sort. These cases were less likely to show conduct problems, peer unpopularity, and social rejection than were children with ADD+H. In contrast, the children with ADD+H were noted to be more socially rejected, displayed more aggression and conduct problems, and were more distractible and impulsive than children with ADD-H or control cases. Milich and colleagues reached the same conclusions in their review years later (Milich et al., 2001).

Eventually, DSM-III-R (American Psychiatric Association, 1987) would abolish the +H and –H in view of the limited research supporting such subtyping; yet it called for continuing research on the ADD-H group, now termed Undifferentiated ADHD and placed in the appendix to that manual. Research would continue to explore differences between these subtypes for a few years thereafter (Barkley, DuPaul, & McMurray, 1990) that continued to suggest a greater manifestation of CDD (SCT)-like symptoms in the ADD-H than +H group and possibly a reduced response to stimulant medication (Barkley, DuPaul & McMurray, 1991).

With the advent of DSM-IV (American Psychiatric Association, 1994), these +H and –H subtypes would now reappear in the official taxonomy as ADHD-Combined type vs. ADHD-I type. Once more, official sanctioning of this subtyping would foster numerous studies comparing them well into the 1990s and beyond. That same year, Wheeler & Carlson (1994) reviewed what was known about ADD and ADDH differences concerning social functioning and argue that these differences could be extended to the newly created I-type vs. C-type children in DSM-IV.

Seven years later, in 2001 a very influential review of the literature concerning these two attention disorders was published by Milich, Balentine, and Lynam (2001). The authors comprehensively reviewed research regarding the subtypes and concluded that ADD-H, or what was now ADHD-I Type, was a distinct and unrelated disorder to ADD+H, or ADHD Combined Type. In addition to the evidence reviewed above, the authors also reported the results of studies using factor analysis with the ADHD symptoms and those of sluggish cognitive tempo. Those analyses revealed three distinct factors, two of which characterized ADHD, those being inattention and hyperactive-impulsive symptoms. CDD (SCT) symptoms formed a distinct factor from these other two dimensions. This was also found to be the case in a factor analysis of the direct observation form of the child behavior checklist by McConaughy and Achenbach (2001). The authors argued that a subset of children characterized as being in the I-Type might be a separate disorder entirely and be best distinguished by their symptoms of CDD (SCT). The reviewers also noted, however, that contained within the I-Type would be children who simply had a milder form of the C-Type but with barely insufficient hyperactive-impulsive symptoms to be so classified. Hence the latter children were being incorrectly classified as being in the I-Type and would contaminate any efforts to find differences between the I- and C-Types if not removed.

Also in 2001, McBurnett et al. (2001) conducted a factor analysis of 692 children referred to a specialty pediatric clinic for ADHD and found, as did Neeper earlier, that symptoms of CDD (SCT) formed a distinct dimension from the two traditional ones comprising ADHD. Three years later, Todd et al. (2004) factor analyzed data from 2,894 twin pairs and also found a separate factor for CDD (SCT) distinct from those for ADHD. It should be noted here that symptoms of CDD (SCT) were included in the DSM-IV field trial (see McBurnett et al., 2001). But they were found to have little or no value in identifying cases of ADHD, particularly the combined type, and so were omitted from further consideration. Now we know why, of course. The symptoms were actually identifying a distinct disorder of attention separate from ADHD.

In the past decade, because of the mixed pattern of findings to date on the distinction, researchers decreased their efforts to study this C-type (ADD+H) vs. I-type (ADD-H) distinction in favor of studying those children specifically identified with high levels of CDD (SCT) symptoms in comparison to those with ADHD-C. Some studies have estimated that as many as 30-63% of cases of the I-type have high levels of CDD (SCT) (Carlson & Mann, 2002; Garner et al., 2010; McBurnett et al. 2001). One of the first papers to separate out children having CDD (SCT) symptoms from within the I-type was Carlson and Mann (2002). They compared two sets of children with the I-type based on whether they were high or low in CDD (SCT) symptoms. Both groups had similar levels of learning problems and inattention. But CDD (SCT) children had less externalizing symptoms, and higher levels of unhappiness, anxiety/depression, withdrawn behavior, and social dysfunction. They argued for the use of CDD (SCT) symptoms to identify a more homogeneous group of inattentive children who were distinct from those having ADHD. Subsequently, many researchers did so (Barkley, 2012a, 2013; Carlson & Mann, 2002; McBurnett, Pfiffner, & Frick, 2001; Garner et al., 2010; Penny et al., 2009; Skirbekk, Hansen, Oerbeck, & Kristensen, 2011). Indeed, Penny et al. went so far as to compile a comprehensive set of CDD (SCT) symptoms according to experts they surveyed and a review of research papers and then subjected them to further analysis, ultimately creating a rating scale of the most useful set. By 2012, I had developed the first CDD (SCT) rating scale for adults and published the results of the first study of adult CDD (SCT) based on a representative U.S. sample of adults ages 18-92 (Barkley, 2012a), to be discussed further below.

In summation, the construct of CDD (SCT) grew out of efforts to identify differences between subtypes of ADD and subsequently ADHD children. While differences between those subtypes proved mixed and unconvincing of any substantial or qualitative differences, research focusing specifically on children having CDD (SCT) proved more promising. Even so, as I have stated elsewhere (Barkley, in press), CDD (SCT) remains a highly under-studied construct and associated pattern of symptoms (and disorder) within the field of clinical psychology and psychiatry – a situation which a special issue was just published to try and redress (*Journal of Abnormal Child Psychology*, in press). More than 10,000 articles exist on ADHD (and more than 4,000 of those have been published just since 2007). But I believe that fewer than 50 currently exist on CDD (SCT) specifically. Substantially more research needs to be directed at all aspects of CDD (SCT) (vs. ADHD and related disorders as well as typical people) including demographics, correlates, comorbidity, families, and especially etiologies, interventions, and life course risks. As I have previously noted (Barkley, in press; Saxbe & Barkley, in press), students now entering the profession could easily make a successful clinical research career specializing in the study of CDD (SCT) given the paucity of research and the great promise of distinct findings foreshadowed by the results of current research including that contained in this special issue. Increased demand for such empirically-based knowledge is likely to occur due to increasing clinical referrals of cases with this condition driven by increased awareness of the general public about CDD. The fact that CDD does not yet exist in any official taxonomy of psychiatric disorders does not alter the situation. The increasing information on CDD (SCT) at various widely visited internet sites such as YouTube and Wikipedia, among others, will insure a growing public demand for more scientific knowledge about CDD (SCT) and its management.

What Do We Know About the Nature of CDD (SCT) Compared to ADHD?
Symptom Dimension Differences

There is no official diagnostic term for children whom researchers have labeled as having CDD (SCT). There are no official criteria available for its clinical recognition. However,

researchers have identified the most salient symptoms of CDD (SCT) (Barkley, 2012a, 2013; Carlson & Mann 2002; Gardner et al., 2010; McBurnett et al., 2001; Penny et al., 2009). These are: (1) daydreaming, (2) trouble staying awake/alert, (3) mentally foggy/easily confused, (4) stares a lot, (5) spacey, mind is elsewhere, (6) lethargic, (7) under-active, (8) slow-moving/sluggish, (9) doesn't process questions or explanations accurately, (10) drowsy/sleepy appearance, (11) apathetic/withdrawn, (12) lost in thoughts, (13) slow to complete tasks, and (14) lacks initiative/effort fades. The last two symptoms, however, are as likely to be associated with ADHD as with CDD (SCT) in children or adolescents, and so they are not recommended for assisting with differential diagnosis between these two types of attention disorders (Barkley, 2013; Burns et al., 2013; Lee et al., 2013). But the remaining twelve, among others (Penny et al., 2009), appear to be highly useful for making such distinctions.

The findings from research using at least 10 or more symptoms of the above list find at least two dimensions that seem unique to CDD (SCT) yet are inter-correlated sufficiently to be combined in this disorder. One is a Daydream/Slow and the other a Sleepy/Sluggish/Underactive dimension or factor (Barkley, 2013; Burns, Serverfa, Bernad, Carrillo, & Cardo, 2013; Jacobson, Murphy-Bowman, Pritchard, Tart-Zelvin, Zabel, & Mahone, 2012; Penny et al., 2009). Sometimes a third factor is found for the low initiative/impersistence items, but as just noted these seem more related to ADHD Inattentive symptoms (IN) and thus not of much help in differential diagnosis (Barkley, 2013). Interestingly, as with ADHD, there is a cognitive-inattentive dimension and a behavioral-motor dimension to CDD (SCT) yet both are reasonably distinct from those evident in ADHD. These distinct factors are evident across all of the various approaches to measurement studied to date. These include parent and teacher ratings (Barkley, 2013; Bauermeister, Barkley, Bauermeister, Martinez, & McBurnett, 2011; Becker, Luebbe, Fite, Stoppelbein, & Greening, 2013; Burns et al., 2013; Garner et al., 2010; Hartman, Willcutt, Rhee, & Pennington, 2004; Jacobson et al., 2012; Lee, Burns, Snell, & McBurnett, 2013; McBurnett, Villodas, Burns, Hinshaw, Beaulieu, & Pfiffner, 2013; Penny et al., 2009; Willcutt, Chhabildas, Kinnear, DeFries, Olson et al., 2013), observations of behavior at school (McConaughy, Ivanova, Antshel, Eiraldi, & Dumenci, 2009), and observations of behavior in clinical settings (McConaughy, Ivanova, Antshel, & Eiraldi, 2009). CDD (SCT) symptoms are also found to be separate from those for ADHD in adult self-reports (Barkley, 2012a).

CDD (SCT) symptoms are significantly but moderately correlated with the ADHD symptom dimensions, particularly so for the IN dimension of ADHD. Moreover, these symptoms identify a unique group of children even within samples that have ADHD I-Type (Capdivila-Brophy, Artigas-Pallares, Nacarro-Pastor, Garcia-Nonell, Rigau-Ratera, & Obiols, 2012; Marshall, Evans, Eiraldi, Becker, & Power, 2013). Yet CDD (SCT) symptoms are substantially less correlated with ADHD symptoms than are the two CDD (SCT) dimensions to each other or than the two ADHD symptom dimensions with each other (Barkley, 2012a, 2013; Penney et al., 2009). A number of studies find that CDD (SCT) symptoms demonstrate a far lower relationship to HI symptoms than they do to IN symptoms (Barkley, 2012a, 2012b; Burns et al., 2013; Hartman et al., 2004; Garner et al., 2010; Jacobson et al., 2012; Penny et al., 2009; Wahlstedt & Bohlin, 2010). In fact, this relationship of CDD (SCT) to HI symptoms may become negative once the overlap of ADHD I with CDD (SCT) is statistically removed (Lee et al., 2013; Penny et al., 2009). All of this is to say that the structure of CDD (SCT) symptoms is not merely a reflection or broadening of the ADHD symptom dimensions as might be expected from the CDD (SCT)-as-ADHD-subtype hypothesis. Instead, CDD (SCT) symptoms are as independent or

partially coupled to ADHD symptoms as are other symptoms dimensions of child and adult psychopathology to each other.

The totality of evidence shows that CDD (SCT) symptoms have a clear separation in their dimensional structure (usually via factor analysis) from the two dimensional structure of ADHD. While correlated to a low-to-moderate degree with the ADHD symptom dimensions, the two (or more) dimensions of CDD (SCT) are more highly correlated with each other than with those of ADHD. The relationship between CDD (SCT) and ADHD dimensions is similar to that found for other dimensions of psychopathology that are semi-related yet also rather distinct from each other, as between anxiety and depression or between oppositionality and ADHD.

Demographic Differences

Only a handful of prior studies examined parental/family demographic characteristics of CDD vs ADHD. Several studies (Garner et al., 2010; Jacobson et al., 2012) found that CDD (SCT) was not related to child age, gender, or minority status. This same pattern was evident in my two large epidemiological studies of representative samples of U.S. children (Barkley, 2013) and adults (Barkley, 2012a) across ages 6 to 89 years. In ADHD, however, the symptoms decline across childhood with age, as discussed in Chapter 2. In the study of children, I (Barkley, 2013) found that those having CDD (SCT) were older than those with ADHD, implying a somewhat later age of onset for the former symptoms.

ADHD symptoms occur more often in boys than girls during childhood and adolescence but come close to equalizing in adulthood (Chapter 2; also Barkley, 2012a, 2013; Burns et al., 2013). This is not the case for CDD (SCT) where males have only slightly more symptoms than females in childhood and no evident sex differences by adulthood (Barkley, 2012a, 2013; Burns et al., 2013). This lack of association of CDD (SCT) with age and sex was also evident in the recent study by Lee et al. (2013). They noted no sex differences and no effect of age on teacher ratings and only a very small difference due to those demographic factors in parent ratings.

Some studies have found ADHD symptoms to be slightly but significantly associated with some ethnic groups (Hispanic-Latino) more than others whereas this is not the case for CDD (SCT) symptoms in those same nationally representative samples (Barkley, 2012a, 2013). Likewise, earlier studies of CDD (SCT) also failed to find any association with age, sex, and ethnicity (Garner et al., 2010; Jacobson et al., 2012).

In my national survey of children (Barkley, 2013), I noted that CDD (SCT) was linked to lower parental education, lower annual household income, and a greater likelihood of a parent being out of work due to disability. My survey of U.S. adults (Barkley, 2012a) also found that those classified as CDD (SCT) also had less education and less annual income. In those instances where CDD (SCT) was comorbid with ADHD in the adult survey (Barkley, 2012a), those cases were more likely to be unmarried and to be out of work on disability than were adults with ADHD. Such findings intimate that CDD (SCT) might be more strongly associated with psychosocial adversity or stressors than is ADHD.

To summarize, what patterns emerge in results to date indicate that the demographic correlates associated with CDD (SCT) may be different from those evident in ADHD.

Neuropsychological Differences

There were initial studies on cognitive differences between ADD+H and –H, such as those by Carlson and colleagues (Carlson, Lahey, & Neeper, 1986), but these do not clearly inform the issue about CDD (SCT) vs. ADHD directly. That is because, as noted above, ADD-H groups are contaminated with children who are really subthreshold +H (or C-Type) cases. Also,

the –H groups, like the later I-Type groups studied in research, were not selected directly for having CDD (SCT). Moreover, all cases were chosen from referrals for ADD or ADHD which makes it appear as if the –H, I-Type, or even CDD (SCT) cases are a subset and hence a subtype of ADHD. To determine if CDD (SCT) is a different disorder from ADD or ADHD, the selection of children with CDD (SCT) must be done directly either from general clinical referrals, or preferably from general community samples screened specifically for having CDD (SCT). Just as did research comparing ADD-H and +H cases, research comparing the ADHD-C to ADHD-I types found patterns of cognitive differences that were rather weak, if they appeared at all (Solanto, Gilbert, Raj, Zhu, Pope-Boyd, Stepak, Vail, & Newcorn, 2007). This makes it appear as if these two disorders of attention differ less in cognitive patterns and more in ratings of disruptive behavior (higher in ADD+H), social relations (less popular yet less withdrawal in ADD+H), self-esteem (lower in ADD-H), and internalizing symptoms (higher in ADD-H) (Milich et al., 2001). As already noted, the study by Carlson et al. (1986) seems to be the first report of an association of ADD-H with difficulties with math performance; a pattern that would be evident in some later studies of CDD (SCT) specifically conducted much later (Bauermeister et al., 2011).

In general, there has been vastly less research on the neuropsychological deficits associated with CDD (SCT) compared to ADHD, where the research literature is abundant (Frazier, Demaree, & Youngstrom, 2004; Hervey, Epstein, & Curry, 2004; Willcutt et al., 2005). A few studies imply that CDD (SCT) may have problems with early information processing or selective attention which is not typical of ADHD (Huang-Pollack, Nigg, & Carr, 2005). But this remains to be replicated in more research before being viewed as a correlate of CDD (SCT). Likewise, slower motor speed has been linked to CDD (SCT) in some studies (Adams, Milich, & Fillmore, 2010; Garner et al., 2010), consistent with its symptom profile. Others (Bauermeister et al., 2012), however, did not replicate this finding. Variability of spatial memory performance was specifically linked to CDD (SCT) but not ADHD in the Skirbekk et al. (2011) study even after controlling for IQ, ADHD inattention, and other variables. Again, replication of such findings is essential before one can have confidence in their linkage to CDD (SCT).

Only a few studies using psychometric tests of executive functioning have been done with cases selected for CDD (SCT). Unlike ADHD, results intimate that CDD (SCT) is not as serious and pervasive a disorder of executive functioning (EF; Bauermeister et al., 2012; Wahlsted & Bohlin. 2010). Research is ubiquitous showing that in ADHD, for instance, there are deficits on tests of inhibition and working memory, especially nonverbal working memory (Willcutt, Doyle, Nigg, Faraone, & Pennington, 2005). In contrast, this is not seen in CDD (SCT) (Bauermeister et al., 2012). But EF tests have low or no ecological validity and low or no relationships to various domains of impairment in contrast to ratings of EF (Barkley, 2012b; Barkley & Fischer, 2011; Barkley & Murphy, 2011). And so EF ratings may provide a different pattern of results fo SCT than do EF tests.

Just a few studies have used EF ratings to study cases of CDD (SCT). For instance, my own large studies (Barkley, 2012a, 2013) used my rating scale of EF in daily life with large epidemiologically derived samples of children and adults having CDD (SCT), ADHD, or both. Results showed that CDD (SCT) had only very weak relationships to four of the five EF deficit dimensions (< 1% shared variance) when statistically controlling for its association with ADHD symptoms, especially the inattention dimension. On one dimension (Planning and Problem-Solving) there was a slightly higher contribution (< 5%) after such statistical control. Overall, it is the inattentive dimension of ADHD that contributes to the vast majority of variance across

most EF dimensions on my scales, with the HI dimension accounting for a lesser but still significant degree of variance, especially in the EF dimensions of Self-Restraint (inhibition) and Emotional Self-Regulation. From these results, I concluded that CDD (SCT) is not a disorder of EF but that ADHD is massively so. Recently McBurnett et al. (2013) found some items related to the EF component of working memory to be a useful additional dimension of CDD (SCT) symptoms beyond those usually found in community studies. But I have reservations about such findings given that the sample used in that study was a large group of children with ADHD Inattentive Type referred for a psychosocial treatment program. As I noted earlier, this procedure can lead to a rather heterogeneous group, only a subset of whom can be expected to be CDD (SCT) cases and none purely so. Moreover, others may well be subthreshold variants of ADHD Combined Type that fall just shy of the necessary six HI symptoms, as McBurnett et al. noted. These cases should be construed as mild versions of ADHD-C. The results of the study by McBurnett et al. (2013) may be an artifact of recruitment that may not replicate in community samples from which CDD (SCT) cases were directly sampled.

     Like my studies on CDD (SCT), Becker and Langberg (2012) likewise found a smaller contribution of CDD (SCT) to the metacognitive factor on the Behavior Rating Inventory of Executive Functioning in comparison to the inattentive symptoms of ADHD. So did Jimenez and colleagues, even after controlling for ADHD inattention (Jimenez, Ballabriga, Martin, Arrufat, & Giacobo, 2013).   This small link of CDD (SCT) to EF-like problems was also evident in the study by Langberg et al. (in press) but only for parent reported organizational problems. Yet only ADHD inattention symptoms linked up with organizational problems as rated by teachers. It is possible that problems with certain aspects of working memory may be weakly related to or possibly secondary to the cognitive CDD (SCT) daydreaming dimension. Yet I believe those working memory/organizational problems hardly compare to the more severe and pervasive EF deficits so evident in ratings of daily life in children and adults with ADHD (Barkley, 2012, 2013). Moreover, it is clear across all of these studies utilizing EF rating scales that SCT has no significant association with EF inhibitory problems whereas those problems are substantial in ADHD.

     Mostly what has been found so far is an apparent dissociation of CDD (SCT) from most EF deficits in daily life that are so striking in ADHD. This pattern implies that the cognitive dysfunctions underlying CDD (SCT) symptoms are not like those involved in ADHD. Consequently, CDD (SCT) is really not a subtype of ADHD.

Overlap of ADHD and CDD (SCT)

          The majority of research on CDD (SCT) selected cases from among children referred to clinics for concerns about ADHD; indeed in some a diagnosis of some type of ADHD (via DSM-IV criteria) was the starting point. As noted above, this can automatically make it seem as if CDD (SCT) is a subtype of ADHD in the results of such research if any differences emerge at all. It also means one cannot study the overlap or independence of the disorders.   But if CDD (SCT) cases are selected from general population or clinic samples, there is the opportunity for CDD (SCT) to be seen independently of ADHD and so the comorbidity between the two can be studied. I did so in my two national surveys (Barkley, 2012a, 2013) where I found that more than half (59%) of the children qualifying for a research diagnosis of CDD (SCT) met research criteria for having ADHD. It was mostly among those ADHD subtypes having significant IN symptoms rather than with the HI-Type, as others have found (Garner et al., 2010; Penny et al., 2009; Skirbekk et al., 2011). While such overlap could mean that CDD (SCT) is a form of ADHD, other findings above seem to rule against that conclusion. Only 39% of the children

qualifying for ADHD of any type also qualified for CDD (SCT).   Again, these findings agree with prior studies of children (Garner et al., 2010; Hartman et al., 2004) and adults (Barkley, 2012a). For instance, a recent survey of U.S. adults (Barkley, 2012a) found that 5.8% of the sample met criteria for high CDD (SCT) symptoms.   Approximately half (54%) of those participants qualifying for CDD (SCT) had ADHD, yet nearly half did not. The overlap arose mostly with those subtypes of ADHD having significant IN. Similarly, approximately half of individuals qualifying for ADHD of any type (46%) also qualified for CDD (SCT).   Once more, the overlap with CDD (SCT) mainly involved individuals having high symptoms of the ADHD IN, as would be expected given the moderate correlation between these two symptom dimensions. It seems here that the relationship of CDD (SCT) to ADHD is one of co-morbidity between two relatively distinct but related or partially coupled disorders, such as exists between anxiety and depression, and not one of subtyping within a single shared disorder. More research will help clarify if this is, in fact, the case. Meanwhile, it seems prudent to create a high order category of Attention Disorders under which one would then break out ADHD and CDD as separate, semi-distinct conditions much like is done now for the supra-category of Learning Disabilities that comprises reading, spelling, math, writing, and related disorders which can exist alone yet can also be comorbid.

Patterns of Comorbidity

As described above, research on ADD-H vs. +H seemed to demonstrate that –H cases were more often linked with anxiety, low self-esteem, social withdrawal, and ratings of internalizing symptoms more generally. Later, this seemed to be true for studies contrasting ADHD I- to those with ADHD-C types. This pattern seems to be even more evident in comparisons of CDD (SCT) to ADHD. Repeatedly, CDD (SCT) symptoms are often linked to elevated ratings of internalizing symptoms generally than are ADHD symptoms (Bauermeister et al., 2012; Becker & Langberg, 2012; Becker, Luebbe et al., 2013; Capdevila-Brophy, Artigas-Pallares, Navarro-Pastor, Garcia-Nonell, Rigau-Ratera, & Obiols, 2012; Carlson & Mann, 2002; Garner et al., 2010; Hartman et al., 2004; Penny et al., 2009), even after controlling for the contribution of ADHD symptoms (Bauermeister et al., 2012; Becker & Langberg, 2012; Burns et al., 2013; Lee et al., 2013; Penny et al., 2009; Willcutt et al., 2013).   When the inverse is done CDD (SCT) symptoms are statistically removed), the IN dimension of ADHD may be less or even unrelated to internalizing symptoms (Lee et al., 2013; Penny et al., 2009) or even to ratings of social problems (Becker, Luebbe et al.,2013). Worth noting is that where the relationship of CDD (SCT) to ODD is not significant or even negative (see below), the relationships of CDD (SCT) to anxiety and depression are positive (Lee et al., 2013). This pattern is different than that seen in ADHD where the relationships to both ODD and internalizing symptoms are both positive (Burns et al., 2013). CDD (SCT) may predict each of these internalizing dimensions (anxiety, depression) even after controlling for the overlap of the latter dimensions with each other (Becker, Luebbe et al., 2013). And this association of CDD (SCT) to depression remains even after controlling for parental internalizing dimensions as was done by Becker, Luebbe et al. (2013). While a few exceptions exist in this literature (Burns et al., 2013; Harrington & Waldman, 2010; Wahlstedt & Bohlin, 2010), the weight of the evidence finds CDD (SCT) to be more closely related to internalizing symptoms (anxiety, depression, withdrawal) than is ADHD. There is a pattern here of a double dissociation between the two disorders in their linkage to internalizing symptoms that is evidence that they are distinct conditions from each other, not subtypes of a common disorder.

ADHD is routinely linked to a higher risk for comorbidity for the externalizing symptom dimension generally; consider that ODD is 11 times more likely to occur with ADHD than it does in the general population (Angold, Costello & Erkanli, 1999). In contrast, there is no or even a negative association of CDD (SCT) with oppositional defiant disorder (ODD) (Barkley, 2013; Burns et al., 2013; Lee et al., 2013 ;Penny et al., 2009).   Because of this lack of association with ODD, it can be reasoned that CDD (SCT) also would have little or no associations with conduct disorder, substance use disorders, or adult antisocial personality disorder, all of which are linked to varying degrees with ODD. Further evidence for this lack of or even negative association with externalizing disorders is evident in a study using direct observations of disciplinary actions [time outs] received on an inpatient unit (Becker, Luebbe et al., 2013). Such disciplinary actions are often instituted for disruptive or aggressive behavior and were positively linked to the HI symptoms of ADHD while being negatively associated with CDD (SCT) symptom severity. This is yet another double dissociation supporting the distinctiveness of CDD (SCT)/CDD from ADHD.

One prior study examined the relationship of CDD (SCT) vs. ADHD to specific professional diagnoses of 17 different learning, developmental, and psychiatric disorders as reported by parents concerning the past professional diagnoses their children had received (Barkley, 2013). It found that both CDD (SCT) and ADHD were associated with elevated rates of comorbidity for 11 of the 17 disorders. But CDD (SCT) was not associated with higher rates of reading or math disorders, hearing impairment, oppositional defiant, anxiety, or bipolar disorder diagnoses than the Controls. ADHD was linked to higher rates for all of these disorders except hearing impairments. Unlike ADHD, the CDD (SCT) group had a higher rate of depression than either the Controls or those with ADHD. The comorbidity of ADHD+CDD (SCT) was associated with higher rates of comorbidity for most disorders than was either disorder alone. This implies an additive effect of each disorder when it exists with the other as if each was a distinct disorder that rendered greater risks when comorbid. Or this pattern could have arisen merely as a function of symptom severity -- comorbid cases had more symptoms of both disorders than was the case for each specific disorder group.

Domains of Impairment

For a condition to rise to the level of being a mental disorder, there must be evidence of impairment or harm to (adverse consequences for) the individual from those symptoms (American Psychiatric Association, 2013). We can think of symptoms as the cognitive and behavioral expressions of a disorder while impairment represents the consequences that flow from such symptoms. As discussed earlier, ADD-H as well as its subsequent iteration as ADHD I-type had been routinely associated with social withdrawal. Studies of CDD (SCT) symptoms more specifically have shown it to be linked to social problems generally and social withdrawal specifically (Becker & Langberg, 2012; Becker, Luebbe et al., 2013; Burns et al., 2013; Capdevila-Brophy et al., 2012; Garner et al., 2010; Marshall et al., 2013; Willcutt et al., in press) even in the presence of high ADHD IN symptoms (Capdevila-Brophy et al., 2012). Such findings may be more apparent in teacher than in parent ratings (Bauermeister et al., 2011; Becker & Langberg, 2010).

Mikami and colleagues (Mikami, Huang-Pollack, Pfiffner, McBurnett, & Hangai, 2007) have provided the only study to date using a detailed observations of the social interactions of children with CDD (SCT) using a simulated chat room with children with ADHD and controls. They statistically controlled for ADHD type, IQ, reading ability, and typing skill in their analyses. CDD (SCT) was noted to independently predict fewer total responses in the chat

room, less perception of subtle social cues, less memory for the conversation, and a smaller proportion of hostile responses. While these findings agree with the more general findings above that CDD (SCT) cases are more socially withdrawn, it also suggests a role of CDD (SCT) in attention and an encoding dysfunction that accounts for impairment in critical social behaviors that are of a different sort than seen ADHD (social intrusion, aggression, bossiness, excessive speech, etc.).

Noteworthy is that the association of CDD (SCT) to social impairment or withdrawal remains even after statistically removing ADHD symptoms as well as those of ODD, CD, generalized anxiety disorder, major depressive disorder, and even IQ (see studies in Special Issue on CDD (SCT), *Journal of Abnormal Child Psychology*, January, 2014; also Burns et al., 2013). CDD (SCT) and the IN dimension of ADHD contribute to variance in social problems and apparently peer neglect, yet their contributions are independent or additive, not redundant (Burns et al., 2013; Willcutt et al., 2013). Similarly, the study by Becker, Luebbe et al. (2013) found that the positive association of CDD (SCT) with general social problems was apparently not due to disruptive social problems, given the association noted above with significantly lower rates of discipline in inpatient children. This relationship of CDD (SCT) to social withdrawal persists even after controlling for demographic factors and comorbidity (*Journal of Abnormal Child Psychology*, 2013). Thus CDD (SCT) contributes unique variance to certain areas of social impairment independent of other disorders including ADHD.

Another domain of impairment linked to ADD-H or the later I-type and probably to the more specific disorder of CDD (SCT) is poor academic performance (Carlson, 1986; Milich et al., 2001). ADD-H has been linked repeatedly across studies with difficulties with academic performance, and possibly math specifically, even if it is not as strongly associated with disruptive behavior in school as is ADHD. Bauermeister et al. (2012) found that both CDD (SCT) and ADHD IN were each significantly and independently associated with lower academic achievement scores on testing after controlling for the other set of symptoms, whereas HI symptoms showed no such relationship. And, as noted above, CDD (SCT) symptoms were uniquely associated with deficient math performance. Similarly, Burns et al. (2013) found that CDD (SCT) was significantly associated with ratings of academic impairment even after controlling for ADHD IN symptoms. In contrast, three studies (Becker & Langberg, 2012; Langberg et al., 2013; Watabe, Owens, Evans, & Brandt, 2013) did not find an association of CDD (SCT) with academic achievement tests after controlling for IQ and ADHD symptoms or found it to be rather weak.

Why the disparity across studies? It may arise from the fact that some studies selected their samples for ADHD first and then within such samples examined those high and low in CDD (SCT) symptoms. This can contaminate any findings for CDD (SCT) with those known to be related to ADHD. Even so, when symptoms of ADHD are statistically removed, CDD (SCT) appears to add unique variance to the prediction of academic problems (Barkley, 2013) and may make unique contributions to written language and reading, organization problems, and homework specifically beyond the contribution of ADHD IN symptoms (Langberg et al., 2013; Marshall et al.,2013; Willcutt et al., 2013). Difficulties with math performance may also be more evident in CDD (SCT) than in ADHD, although this finding, too, requires replication to be considered reliable (Bauermeisteret al., 2012).

In addition to social and academic domains, my own national surveys of children and adults included a measure of 15 domains of impairment (Barkley, 2012a, 2013). Cases were sorted into those who had CDD (SCT) only, those with ADHD only, those with both conditions,

and the remainder serving as the community control group. CDD (SCT) cases were more impaired in all domains than Control cases, having their greatest difficulties in Community-Leisure domains more than in Home-School (work) domains. In contrast, while ADHD cases were also impaired across all domains, their greatest difficulties occurred in Home-School domains. Moreover, ADHD was associated with more pervasive impairment. That is, both ADHD groups (alone and combined with CDD) experienced impairment in at least twice as many of the 15 domains as did CDD (SCT) cases. The results also showed that ADHD symptom dimensions, especially inattention, contributed markedly more variance to impairment in the Home-School domains than did HI or CDD (SCT) dimensions. By contrast, the HI dimension contributed more variance to Community-Leisure impairments while CDD (SCT) also did so but to a far lesser extent. CDD was not found to be more impairing than ADHD in educational settings, at least as rated by parents, consistent with other research discussed above. When ADHD and CDD symptoms were regressed onto the Community-Leisure and Home-School impairment summary scores, results found that both contributed uniquely to impairment although ADHD accounted for a greater proportion of variance in each summary score.

The adult survey (Barkley, 2012a) also used a rating scale of impairment in 15 domains more appropriate to adults. The findings appear in **Figure 16.2**. Both the CDD (SCT) only and ADHD only groups were more impaired than the control group but did not differ in this respect in overall mean impairment. A somewhat different pattern was evident for the percentage of domains in which impairment occurred (pervasiveness). Here, both of the ADHD groups (ADHD alone, ADHD+SCT) were impaired in more domains than was the CDD (SCT) only group and the control group. The results further revealed that the CDD (SCT) only group was also impaired in more domains than the control adults but not to the degree evident in the ADHD groups. These results are consistent with numerous studies showing that ADHD adversely affects many domains of major life activities relative to clinical and community control groups (Barkley, Murphy & Fischer, 2008). But they also show that CDD (SCT) is an impairing disorder in adults even if not as much or as pervasively as ADHD. In both of my studies, when comorbid, CDD (SCT)+ADHD disorders were additive. That is, the combination of disorders resulted in far more severe impairment and more domains of impairment than either disorder alone.

Combs and colleagues have also studied the linkage of CDD (SCT) to some aspects of impairment in large adult community samples (Combs, Canu, Broman, & Nieman, 2013; Combs, Canu, Broman-Fulks, Rocheleau, & Nieman, 2012). In one study (Combs et al., 2013), the authors evaluated the contribution of both ADHD and CDD (SCT) symptoms to a quality of life measure. Findings indicated that each set of symptoms contributed unique variance to negative QOL ratings after controlling for the other set of symptoms as well as for anxiety, depression, and some demographic factors. The second study (Combs et al., 2012) found much the same results for the association of ADHD and SCT with self-reported stress in adults. All of the above suggests that CDD (SCT) is associated with distinct impairments in various domains of functioning from those associated with ADHD and contributes unique effects to impairment beyond that accounted for by ADHD.

Etiology

Very few studies have been done on the issue of the etiology of CDD (SCT)/CDD. A recent study by Moruzzi, Rijsdijk, and Battaglia (2013) examined the heritability of CDD (SCT) using a small set of items of CDD (SCT). CDD (SCT) was substantially heritable. And it shared about half of its genetic contribution with that of ADHD. But CDD (SCT) was less heritable than

ADHD and involved a somewhat greater contribution of unshared or unique environmental factors than was so for ADHD. Another study found that CDD (SCT) may be associated with prenatal alcohol exposure (Graham, Crocker, Deweese, Roesch, Coles et al., 2012). It has also been seen as a treatment emergent side effect along with lower IQ and lower academic achievement in acute lymphoblastic leukemia (Reeves, Palmer, Gross, Simonian, Taylor et al., 2007). The demographic factors shown above to be linked to CDD (SCT) imply that there may be a greater role for social adversities to contribute to it than may be the case for ADHD. And so it seems that like ADHD, CDD (SCT) may turn out to have multiple etiologies. Most causes may fall in the realm of neurobiological and genetic factors but less strongly than does ADHD. We sorely need research using neuro-imaging as well as more behavioral genetic and molecular genetic studies on the nature of CDD (SCT) in comparison to other disorders, especially ADHD. However, researchers must take care to control for the overlap of CDD (SCT) with ADHD. Not doing so will contaminate any findings with ADHD related results.

What is the Underlying Mental Dysfunction in CDD (SCT)?

As I have discussed elsewhere (Barkley, 2014), it is possible that CDD (SCT) represents a dysfunction in the focus/execute component of attention in Mirsky's (1996) model of attention components or in the vigilance component as noted earlier in my discussion of Primary Disorder of Vigilance. It is also possible that CDD (SCT) is a form of hypersomnia or arousal disorder given that some dimensions of CDD (SCT) identified in past research include symptoms of sleepiness, low arousal or energy, or drowsiness (Penny et al., 2009). But this seems unlikely in view of recent evidence in college students that while both CDD (SCT) and ADHD were significantly associated with daytime sleepiness, the such sleepiness formed a distinct factor from those representing CDD (SCT) and ADHD (Langberg, Becker, Dvorsky, & Luebbe, in press). So CDD (SCT) is not just another label for hypersomnia but it does have a significant association with daytime sleepiness even after controlling for ADHD, anxiety, and depression symptoms (Langberg et al., in press).

Could CDD (SCT) be a form of pathological mind wandering (Adams et al., 2010)? Past research suggests that mind wandering is commonplace and advantageous under certain conditions. It arises when a primary task being performed demands little EF capacity and thus allows the contemplative or problem-solving capacity of the EF system to focus on more salient personal concerns. The latter then becomes a secondary task that is engaged while the individual performs the relatively automatic actions toward familiar goals (primary task) in the environment (Smallwood & Schooler, 2006). When poorly regulated, however, mind wandering can lead to adverse effects on performing EF tasks (perhaps due to reduced meta-awareness or self-monitoring of goal pursuit, diminished working memory capacity available for pursing the external goals, etc.) (Smallwood & Schooler, 2006). Excessive mind wandering can adversely affect academic performance (Smallwood, Fishman, & Schooler, 2007). It would seem to be worthwhile for future research to investigate this possibility.

Other possibilities exist. CDD (SCT) could arise from a ruminative/obsessional disorder perhaps being a milder variant of obsessive compulsive disorder. Excessive and recurrent focusing on maladaptive thoughts might well lead to an attentional problem resembling CDD (SCT). Or CDD (SCT) could represent a deficit in motivation in which the person lacks not only energy but also initiative or self-motivation. I think that is unlikely given that research has not linked CDD (SCT) to deficits in self-motivation as reflected on EF rating scales in children or adults once the overlap with ADHD symptoms is statistically removed (Barkley, 2012, 2013).

Diagnosing CDD (SCT)

During the initial evaluation of a child or adult, the suspicion of CDD (SCT) can arise when there are complaints of inattention in the context of low or no symptoms of hyperactivity or impulsivity and where symptoms of passivity, hypo-activity, and even social withdrawal are evident (Saxbe & Barkley, 2014). Clinicians can also use rating scales that directly assess CDD (SCT) symptoms (Barkley, 2011a for adults; and Penny et al., 2009, for children). There is no official diagnostic criteria for CDD (SCT), but my own research (2013) suggests that if parents endorse at least 3 or more of the 12 symptoms of CDD (SCT) discussed earlier, and they occur often or more frequently, this represents the 93rd percentile for the population. That is a traditional index of clinical significance and statistical deviance. That combined with evidence of impairment from the symptoms could be used for the time being as diagnostic criteria for CDD (SCT) in children. In the case of an adult, the symptom threshold would be 5 out of the 9 symptoms used in my study of adults (Barkley, 2012a). When coupled with evidence of impairment in one or more major life activities, such as may be shown on normed rating scales of impairment (Barkley, 2011b, 2012c), one can make a diagnosis of CDD (SCT).

In discussing the diagnosis with a patient or family, it may be helpful to describe the situation between ADHD and SCT as was presented earlier above. Describe a higher order category of Attention Disorders under which one can distinguish ADHD and CDD as separate, semi-distinct conditions much like is done now for the supra-category of Learning Disabilities that comprises reading, spelling, math, writing, and related disorders which can exist alone yet can also be comorbid.

Treatment of CDD (SCT)

As with the etiology of CDD (SCT), there exist only a few studies on possible treatments for CDD (SCT). Early studies on stimulants (methylphenidate, or MPH) for treating ADHD I-type cases did not find them to be particularly effective in improving the inattention linked to CDD (SCT) (Milich et al., 2001). My own study found a modest positive response to MPH, mainly at low doses, but with only 20% of cases remaining on this medication after a double-blind, placebo-controlled trial compared to the vast majority of ADHD-C children in whom the degree of improvement was greater (Barkley et al., 1990). But no stimulant medication studies have been done specifically in CDD (SCT) cases.

Only one study to date examined a nonstimulants ADHD medication for treating CDD (SCT) symptoms specifically (Wietecha, Williams, Shaywitz, Shaywitz, Hooper et al., 2013). It found that the norepinephrine reuptake inhibitor *atomoxetine* was effective at reducing CDD (SCT) symptoms in patients having both ADHD and dyslexia, ADHD only, and dyslexia only. The reduction in CDD (SCT) symptoms remained evident even after statistically controlling for the overlap of with those of ADHD symptoms and also improved CDD (SCT) symptoms in the group with dyslexia only.

What other medications might work? Given the overlap CDD (SCT) has with anxiety and depression, perhaps SSRIs could be a possible treatment. Would an activating antidepressant (such as fluoxetine, sertraline, venlafaxine or bupropion) reduce the observed sluggishness and boost alertness? Some clinicians have used Luvox for management of pathological mind-wandering given its effects on obsessional thinking, but it is not clear that such thinking is the case in CDD (SCT). Given that CDD (SCT) is associated with hypersomnia or daytime sleepiness, should one consider investigating the use of anti-narcoleptics, such as modafinil? It seems to me that the alpha-2 agonist guanfacine XR used for management of ADHD might be

worth investigating for CDD (SCT) yet its side effects of sleepiness could be counter-productive in view of the sluggish/sleepy features seen in CDD (SCT).

Just a single study of behavior modification methods has been done to date. It showed a good response of children with CDD (SCT) symptoms to traditional home and school behavior management methods when targeted to the specific symptoms of children with CDD (SCT) (Pfiffner, Mikami, Huang-Pollack, Easterlin, Zalecki, & McBurnett, 2007). Although it did not use CDD (SCT) cases specifically, one study of social skills training found that children with ADHD IN type (who are more likely to have CDD (SCT)) improved more in their assertion skills than did ADHD-C type cases (Antshel & Remer, 2003). Yet neither ADHD type improved in other domains of social skills. Cognitive behavioral therapy has not been shown to be useful for ADHD (Abikoff, 1987). But it has proven useful for cases of anxiety and/or depression. I believe it may be worth exploring as a possible intervention for CDD (SCT) given the higher than expected comorbidity between these disorders. In view of the distinct symptoms and impairments of CDD (SCT) relative to ADHD, treatments for ADHD cannot be automatically assumed to work for CDD (SCT) nor can those treatments that have failed for ADHD be thus ruled out for CDD (SCT).

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Editor's Key Clinical Points

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✓ *Sluggish Cognitive Tempo (CDD (SCT)) is an impairment of attention in hypoactive-appearing individuals, which first presents in childhood. It is characterized by a cognitive dimension of symptoms comprising daydreaming, sleepy, staring, "spaciness," and mental fogginess and confusion, along with a motor dimension of slow movement, hypoactivity, lethargy, and passivity.*

✓ *The symptom dimensions forming CDD (SCT) are distinct from yet partially correlated with those forming ADHD.*

✓ *To avoid giving offense to patients having the condition and to not imply that the cognitive deficit in CDD (SCT) is known, the condition should be called Concentration Deficit Disorder, or CDD.*

✓ *The history of CDD (SCT) in the medical literature probably dates back to Alexander Crichton in 1798 or at the very least, to 1980 and the creation of ADD without Hyperactivity in DSM-III.*

✓ *At this time it exists only as a research entity that has yet to debut in diagnostic literature.*

✓ *CDD (SCT) is associated with significant impairment, most reliably in social impairment, primarily social withdrawal. It also makes some contribution to difficulties with academic performance in children, and by adulthood even more so. It also is associated in adults with impairment in occupational functioning.*

✓ *CDD (SCT) is also significantly associated with risk for internalizing symptoms and especially anxiety and depression.*

✓ *It has no or even a negative relationship to ODD (and hence likely no relationship to CD, substance use disorders or antisocial personality).*

✓ *The etiologies or CDD (SCT) are not well-studied but some evidence suggests a strong heritability to the disorder but not as much so as seen in ADHD. CDD (SCT) may also be associated with fetal alcohol exposure and with the treatment of acute lymphoblastic leukemia.*

✓ *Evidence supports the view that CDD (SCT) is distinct from ADHD and not a subtype of it. But the two conditions can overlap in nearly half of all cases of each.*

- ✓ *Future diagnostic taxonomies, such as the DSM, should create a higher order category of Attention Disorders under which one would then break out ADHD and CDD as separate, semi-distinct conditions much like is done now for the supra-category of Learning Disabilities (LDs) rather than continue the mistaken view that CDD/SCT is a subtype of ADHD.*
- ✓ *Very little research has been done on treatments for CDD (SCT).*

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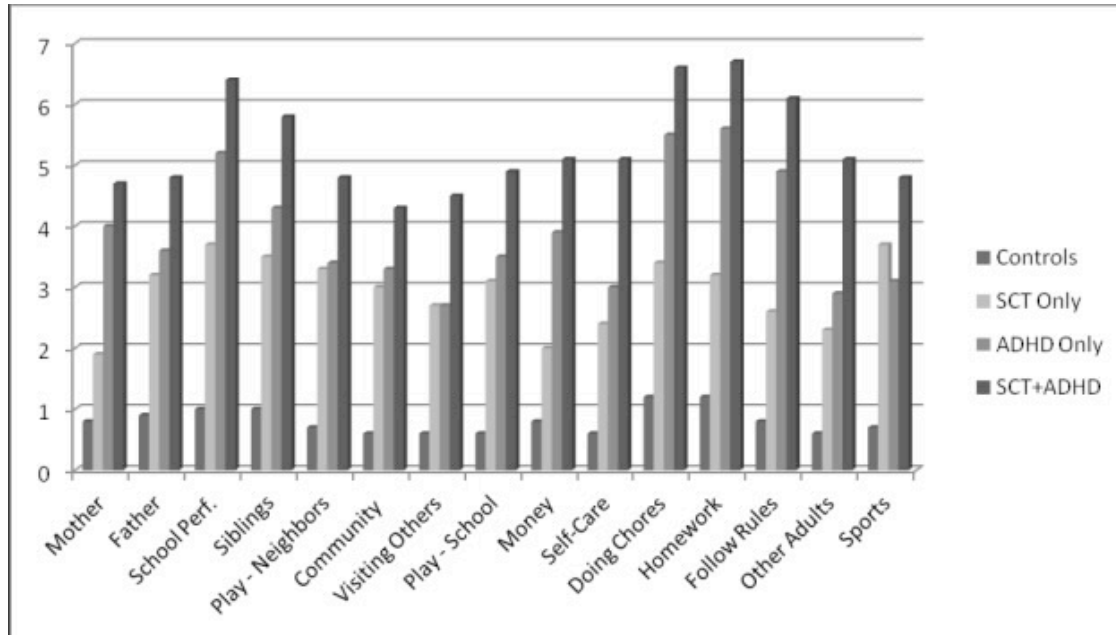
Figure 17.1. Comparisons of children with sluggish cognitive tempo only (SCT), children with attention deficit hyperactivity disorder only (ADHD), and those with both disorders (SCT+ADHD) and a control group. Chart was created from the results reported in Barkley, R. A. (2012). Distinguishing sluggish cognitive tempo from ADHD in children and adolescents: executive functioning, impairment, and comorbidity. *Journal of Clinical Child and Adolescent Psychology*, *42*, 161-173.   Reprinted from Saxbe, C. & Barkley, R. A. (in press). The other attention disorder? Sluggish cognitive tempo vs. ADHD: Update for clinicians. *Journal of Clinical Psychiatry*. Copyright Physician's Postgraduate Press, Inc. Reprinted with permission.
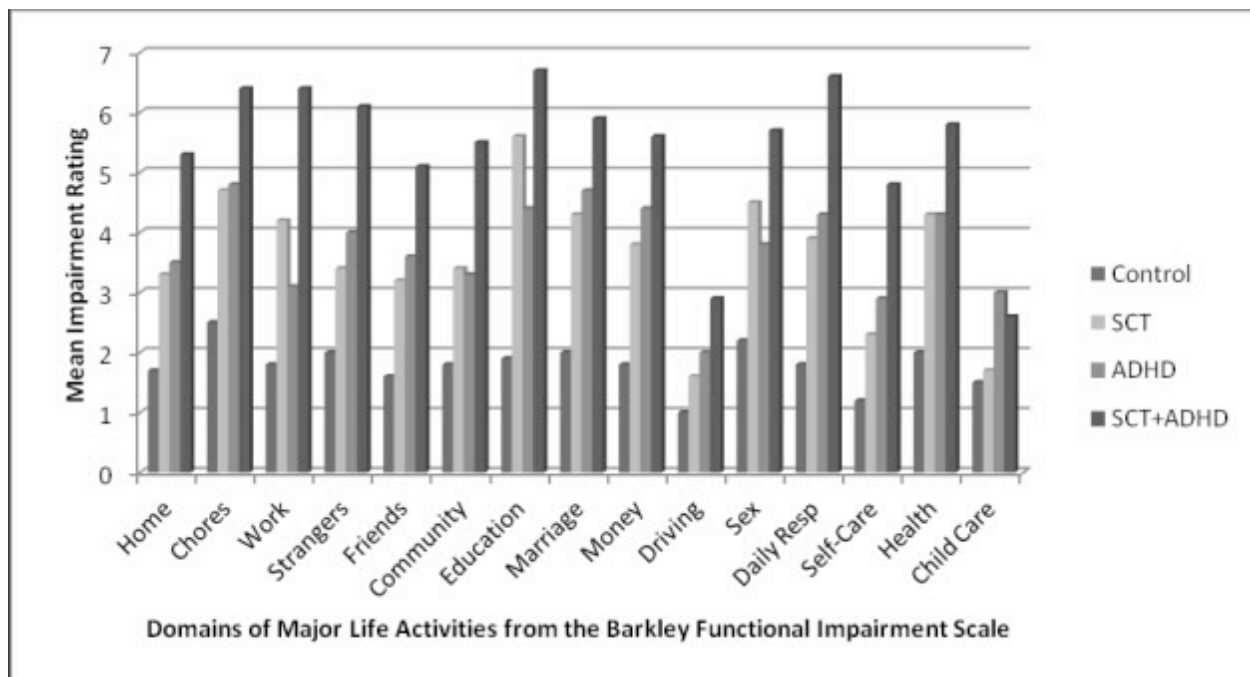
Figure 16.2. Comparisons of adults with sluggish cognitive tempo only (SCT), adults with attention deficit hyperactivity disorder only (ADHD), and those with both disorders (SCT+ADHD) and a control group. Chart was created from the results reported in Barkley, R. A. (2012). Distinguishing sluggish cognitive tempo from attention deficit hyperactivity disorder in adults. *Journal of Abnormal Psychology, 121,* 978-990. Reprinted from Saxbe, C. & Barkley, R. A. (in press). The other attention disorder? Sluggish cognitive tempo vs. ADHD: Update for clinicians. *Journal of Clinical Psychiatry.* Copyright Physician's Postgraduate Press, Inc. Reprinted with permission.