

## Philadelphia College of Osteopathic Medicine DigitalCommons@PCOM

---

PCOM Psychology Dissertations

Student Dissertations, Theses and Papers

---

2018

# Sluggish Cognitive Tempo in Latino Youth

Katie Binns Fabius

Follow this and additional works at: [https://digitalcommons.pcom.edu/psychology\\_dissertations](https://digitalcommons.pcom.edu/psychology_dissertations)

 Part of the [Psychology Commons](#)

---

### Recommended Citation

Binns Fabius, Katie, "Sluggish Cognitive Tempo in Latino Youth" (2018). *PCOM Psychology Dissertations*. 452.  
[https://digitalcommons.pcom.edu/psychology\\_dissertations/452](https://digitalcommons.pcom.edu/psychology_dissertations/452)

This Dissertation is brought to you for free and open access by the Student Dissertations, Theses and Papers at DigitalCommons@PCOM. It has been accepted for inclusion in PCOM Psychology Dissertations by an authorized administrator of DigitalCommons@PCOM. For more information, please contact [library@pcom.edu](mailto:library@pcom.edu).

Philadelphia College of Osteopathic Medicine  
Department of Psychology

SLUGGISH COGNITIVE TEMPO IN LATINO YOUTH

Katie Binns Fabius, MS

Submitted in Partial Fulfillment of the Requirements for the Degree of

Doctor of Psychology

June 2018

PHILADELPHIA COLLEGE OF OSTEOPATHIC MEDICINE  
DEPARTMENT OF PSYCHOLOGY

Dissertation Approval

This is to certify that the thesis presented to us by Katie Binns Fabius  
on the 10<sup>th</sup> day of May, 2018, in partial fulfillment of the  
requirements for the degree of Doctor of Psychology, has been examined and is  
acceptable in both scholarship and literary quality.

Committee Members' Signatures:

Chairperson

—

Chair, Department of Psychology

## Acknowledgements

I would first like to thank my committee members for all of your help and guidance throughout this process. Dr. Suzie Mindel, thank you for all of your support, advice, and guidance throughout my academic journey. I wouldn't have made it through this without you! I would also like to thank the other members of my committee, Dr. Festinger and Dr. Vizzachero for their commitment, time, and feedback on this project.

Additionally, I want to thank my in-laws, Ray and Sara for their help and guidance throughout my academic career and my parents, Tommy and Sharion for valuing my education and for always being there, believing in me, encouraging me, and supporting me over the years. I want to thank my daughter, Sophia, for giving me the drive and determination to be the best role model I can for such a wonderful girl.

Last, and certainly not least, I want to thank my husband Dan for encouraging me and celebrating each accomplishment along the way with me, and for being there in the thick of things through all the stress and tears over these past few years. And special thanks for being my personal 24/7 tech support; especially for the time you sat there and hit "control-z" repeatedly to recover the whole twenty pages of my literature review I managed to delete. I love you.

## Abstract

Sluggish Cognitive Tempo (SCT) is observed in some children and may include daydreaming, inconsistent alertness, mental foginess, confusion, absentmindedness, behaving or thinking slowly, appearing tired even after a full night of sleep, and lacking energy. The symptoms are said to be multidimensional with two domains: cognitive and behavioral. SCT is often associated with Attention Deficit Hyperactivity Disorder (ADHD). High SCT (HSCT) has been shown to impact academic and social functioning and be associated with elevated anxiety and depression symptoms in children. The majority of extant literature focuses primarily on Caucasian children. The primary objective was to examine the prevalence of SCT and common external correlates in a school-based case study of four Latino children. Parents completed a series of questionnaires about their child's behaviors. Four out of thirteen respondents endorsed SCT symptoms for their child, with two of them reporting HSCT. Those two children also had enough symptoms to indicate ADHD inattentive type. One HSCT child was reported to have moderate academic difficulty; and both were reported to have social impairments. One HSCT child met the indication for generalized anxiety disorder, and they both met the indication for separation anxiety disorder. One HSCT child had a behavioral symptom presentation and the other had a combined cognitive/behavioral symptom presentation. The case study provides support for the continued study of SCT in a Latino population. The study found SCT to be prevalent across Latino children of different ages, grade levels, and genders and to impact several domains of functioning. The study also provides support for the heterogeneity of SCT symptom presentation, and the presence of two symptom clusters: cognitive and behavioral.

*Keywords:* Sluggish Cognitive Tempo, SCT, academic functioning, social functioning, anxiety, depression, Latino, youth

## Table of Contents

Chapter 1: Introduction .....	1
Statement of the Problem .....	1
Purpose of the Study .....	4
ADHD .....	5
ADHD History.....	5
ADHD Today .....	9
Presentation and Evolution of ADHD-I .....	11
SCT.....	16
Validity and Measures of SCT .....	24
Etiology of SCT.....	29
SCT and Neurocognitive Functioning.....	32
SCT among Adults .....	36
Longitudinal Studies of SCT.....	37
Treatment of SCT .....	39
External Correlates of SCT .....	42
SCT and Social Functioning.....	42
SCT and Academic Functioning .....	46
SCT and Internalizing Disorders .....	49
Transcultural Understandings .....	53
ADHD among Latinos.....	53
SCT among Latinos .....	56
Chapter 2: Hypotheses .....	59
Hypothesis One .....	59
Hypothesis Two.....	59
Hypothesis Three.....	59
Hypothesis Four .....	59
Hypothesis Five.....	60
Hypothesis Six.....	60
A Note Regarding the Present Study.....	60
Chapter 3: Method .....	61

Overview .....	61
Design.....	61
Participants .....	61
Inclusion criteria.....	62
Exclusion criteria.....	62
Measures.....	62
Demographic questionnaire.....	62
Child and Adolescent Disruptive Behavior Inventory .....	62
Scoring.....	64
Subscales.....	64
SCT.....	64
ADHD-I and ADHD-HI.....	65
Social Functioning.....	65
Academic Functioning .....	65
Anxiety .....	65
Depression.....	65
Screen for Childhood Anxiety Related Emotional Disorders-Parent.....	65
Scoring.....	66
Patient Reported Outcomes Measurement Information System Parent Proxy Peer Relationships Short Form.....	66
Scoring.....	67
Procedures/Recruitment .....	67
Chapter 4: Results and Discussion.....	69
Participant A.....	69
Demographics.....	69
CADBI.....	69
SCARED .....	71
PROMIS .....	71
Summary.....	72
Participant B .....	73
Demographics.....	73

CADBI.....	73
SCARED .....	75
PROMIS .....	76
Summary.....	77
Participant C.....	79
Demographics.....	79
CADBI.....	80
SCARED .....	82
PROMIS .....	82
Summary.....	83
Participant D.....	84
Demographics.....	84
CADBI.....	85
SCARED .....	87
PROMIS .....	88
Summary.....	88
Conclusions .....	90
Limitations .....	95
Future Directions.....	96
Table 1 .....	99
References.....	100



## **Chapter 1: Introduction**

### **Statement of the Problem**

Attention-Deficit/Hyperactivity Disorder (ADHD) is the most common reason that children are referred for mental health services (Eiraldi & Diaz, 2010; Gerdes, Lawton, Haack, & Hurtado, 2011). In the current edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), ADHD is defined as a single disorder with three subtypes, ADHD predominately hyperactive impulsive presentation (ADHD-HI), ADHD predominately inattentive presentation (ADHD-I), and ADHD combined presentation (ADHD-C) (APA, 2013). In order to receive a diagnosis of ADHD-I, a child must present with at least six inattentive symptoms, however, a child can present with up to five hyperactive/impulsive symptoms and still be diagnosed with ADHD-I. Therefore children with a diagnosis of ADHD-I may have anywhere from zero hyperactive symptoms to enough to be just shy of a diagnosis of ADHD-C. Because of the tremendous amount of heterogeneity among individuals diagnosed with ADHD-I some authors suggest that ADHD-I can be further divided to create groups with more homogenous symptoms and presentations of the disorder (Skirbekk, Hansen, Oerbeck, & Kristensen, 2011).

One such suggestion is a group characterized by Sluggish Cognitive Tempo (SCT). SCT includes symptoms commonly seen in children with ADHD-I, including: daydreaming, inconsistent alertness, mental foginess, confusion, absentmindedness, behaving or thinking slowly, appearing tired even after a full night of sleep, and lacking energy (Langberg, Becker, & Dvorsky, 2013). Some authors suggest that SCT is a subtype of ADHD-I, some say that it is best conceptualized as a specifier for existing disorders, and others suggest that SCT is a distinct, though frequently comorbid, disorder from ADHD (Barkley, 2013; Becker et al., 2016; Carlson & Mann, 2002). Regardless, research using factor analysis has consistently found that SCT

items form a different factor from DSM-IV-TR inattention and hyperactivity/impulsivity items (Langberg, Becker, & Dvorsky, 2013; Mikami, Huang-Pollock, Pfiffner, McBurnett, & Hangai, 2007). Research has also consistently shown that SCT and inattention are correlated while SCT and hyperactivity/impulsivity are either inversely related or not correlated (Barkley, 2013). This distinction holds true for factor analyses of parent and teacher ratings, direct school observations, and clinic referrals (Barkley, 2012a). Because SCT is correlated with one component of ADHD and not another, most of the present research assumes SCT is a construct independent from ADHD (Langberg, Becker, & Dvorsky, 2013; Mikami et al., 2007).

Although there is controversy over whether SCT is a diagnosis in and of itself or a part of ADHD, several research studies have begun investigating external correlates that are associated with SCT symptomatology. Some of the more commonly researched topic areas include social and academic functioning and the presence of anxiety and/or depressive symptoms in those children with high SCT (HSCT). Social and academic functioning are often central to a child, and impairments in one or both of these domains can greatly influence a child's life (Becker, 2014). Similarly, internalizing symptoms in children can impact not only their social and academic functioning, but can also lead to internalizing disorders that, if left untreated, can persist well into adulthood (Bauermeister et al., 2012).

Extant research on SCT shows that it has been associated with distinct types of social impairment, including peer neglect, social withdrawal and isolation, and difficulty in social settings, even after controlling for the overlap with ADHD symptoms (Barkley, 2013; Carlson & Mann, 2002; Mikami et al., 2007; Wilcutt et al., 2013). Children with HSCT have also been shown to have decreased aggressive behaviors and less hostility than their low SCT (LSCT) peers (Mikami et al., 2007). One study used a simulated chat room and found that those children

with ADHD-I and HSCT had fewer responses, a decreased ability to attend to subtle social cues, fewer hostile responses, and a decreased memory for the content of the conversation (Mikami et al., 2007). Children with HSCT show clear impairments across several social domains; those who are impaired in social functioning are also likely to be impaired in additional domains, including academic functioning (Becker, 2014).

The literature on SCT and academic functioning provides mixed results (Barkley, 2013). Several studies have found no significant link between academic functioning and SCT in children (Barkley, 2013; Bauermeister et al., 2012; Carlson & Mann, 2002; Hartmann et al., 2004; Wahlstedt & Bohlin, 2010). Whereas other studies found that children with HSCT had increased academic impairment, even after controlling for ADHD symptoms (Burns et al., 2013; Langberg, Becker, and Dvorsky, 2013).

SCT has been shown to predict internalizing symptoms, including those of anxiety and depression among children and adolescents (Barkley, 2013; Bauermeister, Barkley, Martinez & McBurnett, 2012). Studies have found that children with HSCT are more withdrawn and exhibit more depressed behaviors than control children (Capdevila-Brophy et al., 2014; Carlson & Mann, 2002). Additional studies show increased anxiety among children with SCT symptoms, with the highest level of anxiety demonstrated in children with comorbid ADHD-I and SCT symptoms (Capdevila-Brophy et al., 2014; Carlson & Mann, 2002; Skirbekk et al., 2011).

Prevalence rates of ADHD range anywhere from 3-7% in the United States (Eiraldi & Diaz, 2010). Latino children, when compared to Caucasian and African American children have similar prevalence rates of ADHD though they are more likely to underutilize services and therefore less likely to receive a formal diagnosis or treatment (Eiraldi & Diaz, 2010). Latino children are at an increased risk of developing mental health problems including ADHD (Gerdes,

Lawton, Haack, & Hurtado, 2013). In 2000, Latinos were the largest minority group of children, making up 22% of children younger than 18 in the United States (Eiraldi & Diaz, 2010). This number is only projected to increase as Latinos are the fastest growing minority population in the country (Eiraldi & Diaz, 2010; Gerdes et al., 2013). This helps highlight the need for research related to ADHD and its correlates among Latino children, which presently scarce (Eiraldi & Diaz, 2010).

To date, two studies have specifically looked at SCT among Latino school-aged children. In their preliminary study, Bauermeister et al. (2005) looked at a sample of 98 children from six different elementary schools in San Juan, Puerto Rico. Their findings supported the existence of SCT in Latinos with ADHD symptoms by showing that children in the ADHD-I subgroup had the highest SCT scores compared to both the ADHD-C and control groups. In their second study, Bauermesiter et al. (2012) provided further support for SCT as a construct separate from ADHD among Latino children. Additionally, in this study they found HSCT to be associated with greater internalizing symptoms. While these studies provided essential initial validation of the existence of this construct in Latino children, replication of these findings in a subset of Latino children, with and without elevated symptoms of ADHD in the United States is warranted.

### **Purpose of the Study**

While data consistently demonstrate SCT to be a construct independent from ADHD, the question of how to conceptualize SCT still remains. Regardless of this, many studies have begun looking at four major external correlates of SCT: social functioning, academic functioning, anxiety symptoms, and depressive symptoms. The extant literature, though sometimes mixed, indicates a greater degree of impairment in the aforementioned domains among those who have

HSCT. No studies to date have looked at these external correlates in relation to SCT in a sample of Latino youth in the United States. The first purpose of this study was to examine the prevalence of SCT in a school-based sample of Latino youth in the United States. The study also examined the aforementioned external correlates in relation to SCT within this sample. Overall, this study aimed to add to the transcultural utility of SCT.

## **ADHD**

### **ADHD History**

Many authors credit the first description of ADHD in the medical community to pediatrician George Still in 1902 (Palmer & Finger, 2001). However, some authors contend that ADHD-I was actually described before that in a book written in 1798 by Alexander Crichton (Palmer & Finger, 2001; Saxbe & Barkley, 2014). In his book, Crichton described two types of morbid attentional disorders, one of which described children who showed under arousal and had low levels of mental energy, symptoms consistent with ADHD-I as it is portrayed in the fourth edition of the DSM (APA, 2000; Becker, Marshall, & McBurnett, 2013; Palmer & Finger, 2001).

In terms of the modern day conceptualization of ADHD, a disorder of attention called hyperkinetic reaction of childhood was first introduced in the second edition of the DSM (Lahey et al., 1994; Lahey, Schaughency, Strauss, & Frame, 1984; Milich, Balentine, & Lynam, 2002). This diagnosis was made in children with maladaptive levels of inattention, impulsivity, and motor activity (Lahey et al., 1994; Milich et al., 2002). The excess in motor activity served as the core dysfunction characteristic of the disorder (Lahey et al., 1994; Milich et al., 2002).

With the introduction of the DSM-III came a new disorder, attention deficit disorder (ADD), which could be diagnosed in children with maladaptive inattention, impulsivity, and motor activity as attention deficit disorder with hyperactivity (ADD-H) and could also be

diagnosed in children who had the same aforementioned symptoms with normal motor activity as attention deficit disorder without hyperactivity (ADD-WO) (Lahey et al., 1994). The ADD-WO group of children displayed symptoms such as: drowsiness, lethargy, and hypoactivity (Carlson & Mann, 2002). This name change was significant as it highlighted the importance of inattention to the disorder (Adams, Milich, & Fillmore, 2010). This was also the first time ADD was divided into subtypes and, perhaps more importantly, showed for the first time that hyperactivity was not an essential symptom of the disorder (Milich et al., 2002). At the time that the DSM-III was published little research existed to support the validity of the ADD-WO category (Milich et al., 2002). Children were presenting to clinics with the cluster of symptoms congruent with ADD-WO and it is thought that one reason it was included in the DSM-III was to garner research into the validity of the subtype (Milich et al., 2002).

Between the publication of the DSM-III and the DSM-III-TR many validity studies were conducted suggesting ADD-WO to be a valid subtype of ADD (Milich et al., 2002). Despite this, the DSM-III-TR took a combined diagnostic approach, more similar to that of the DSM-II, and created a unidimensional category, ADHD (Becker et al., 2013; Lahey et al., 1994; Milich et al., 2002). This eliminated the subtype that included children with attention problems without hyperactivity (Becker et al., 2013; Lahey et al., 1994; Milich et al., 2002). The result was the perception that the DSM had abandoned the inattentive subtype of the disorder (Milich et al., 2002).

One problem with this unidimensional approach to ADHD was that the population of children diagnosed with the disorder was now more heterogeneous than ever (Milich et al., 2002). The approach to ADHD in the DSM-III-TR sparked controversy and led to research on the dimensionality of ADHD which served to further support two dimensions of the disorder;

one with inattention symptoms and one with excessive motor activity and impulsive symptoms (Lahey et al., 1994). One such study, by Barkley, DuPaul, and McMurray (1990) found that ADD-WO children were confused, daydreaming, lost in thought, and showed a slow cognitive tempo and mental preoccupation. This brought the idea of ADD being two separate disorders back into consideration among ADD research. This debate over the primary symptoms of ADHD is one that still exists, with a fundamental question of whether to “lump” or “split” the symptom criteria (Lahey, Applegate, Waldman, Loft, Hankin, & Rick, 2004; Milich et al., 2002).

Factor analytic studies conducted during the field trials for the DSM-IV showed that ADHD could be grouped into the two factors of hyperactivity/impulsivity and inattention (Milich et al., 2002). During this time, ADHD was once again conceptualized as a single disorder having separate areas of dysfunction (Milich et al., 2002). With the introduction of the DSM-IV, ADHD was subdivided into three categories for the first time; ADHD-HI in which individuals presented with maladaptive symptoms of hyperactivity, ADHD-I in which individuals presented with maladaptive symptoms of inattention, and ADHD-C in which individuals presented with a maladaptive combination of both hyperactivity and inattention (Milich et al., 2002). A study done by McBurnett et al. (1999) which examined clinic referrals based on ADHD symptomatology under the DSM-III and DSM-IV classifications of ADHD found that half of the cases that met DSM-IV ADHD-I criteria would not have received a DSM-III-R diagnosis of ADHD. They concluded that criteria for ADHD in the DSM-IV were more exhaustive and therefore had a better ability to classify true cases of ADHD.

Also during the field trials for the DSM-IV, research looked at how well symptoms predicted a diagnosis of ADHD using the potential diagnostic criteria (Frick et al., 1994). This research in symptom utility looked at positive predictive power (PPP) and negative predictive

power (NPP) when considering the diagnostic process (Frick et al., 1994). PPP refers to the statistical probability that an individual has a disorder given the presence of a particular symptom (Frick et al., 1994). NPP is the statistical probability that an individual who does not have symptoms of a disorder in fact does not have that disorder (Frick et al., 1994). PPP and NPP are often used in diagnostic decision making because a diagnosis is often based on the presence or absence of symptoms (Frick et al., 1994). In the DSM-IV field trials the symptoms for inattention possessed both strong PPP and NPP, which ultimately led to their inclusion as a DSM-IV subtype of ADHD (Becker et al., 2013; Frick et al., 1994; McBurnett, Pfiffner, & Frick, 2001). Additional symptoms that were tested for inclusion were “often drowsy and sluggish” and “often daydreams”, both of which are characteristic of SCT (Frick et al., 1994). While these two criteria showed higher PPP than most of the other inattention symptoms, they showed low NPP, suggesting that the absence of those two symptoms could not be considered highly indicative of the absence of ADHD (Adams et al., 2010; Frick et al., 1994). In addition, those two symptoms were only associated with ADHD-I (Frick et al., 1994).

Because the work group in charge of the DSM-IV wanted to keep the inattention symptoms uniform for all subtypes of ADHD, the two additional symptoms were ultimately not included in the DSM-IV diagnostic criteria for ADHD (Frick et al., 1994; Milich et al., 2002). However, if SCT symptoms are associated with ADHD-I and not so much with ADHD-C, the differences in predictive power would make sense; the presence of SCT might successfully predict the presence of inattention in ADHD-I, but the absence of SCT might not necessarily predict the absence of inattention in ADHD-C (McBurnett et al., 2001). Some argue that not including SCT in the diagnostic criteria for ADHD has led to more heterogeneity and less



diagnostic clarity for the children in the ADHD-I group, a point that will be discussed in greater detail later (Hartman et al., 2004; Moruzzi, Rijdsdijk, & Battaglia, 2013).

The fifth, and current, edition of the DSM was published in 2013 and included many changes, though no changes to the diagnostic criteria for ADHD were adopted (APA, 2013). However, ADHD was moved from the section on disruptive behavior disorders which include oppositional defiant disorder and conduct disorder to the neurodevelopmental disorders section (APA, 2013). ADHD is now grouped with disorders such as autism spectrum disorder and intellectual disability, acknowledging for the first time the strong neurodevelopmental basis of the disorder (APA, 2013; Jarrett et al., 2017).

### **ADHD Today**

Some estimates report that as many as one third of the children in the United States are suffering from a mental health disorder, with ADHD identified as one of the most common (Eiraldi & Diaz, 2010; Gerdes et al., 2011). Some reports indicate that as many as 4-12% of school-aged children in the United States are diagnosed with ADHD (Hinojosa, Hinojosa, Fernandez-Beca, & Knapp, 2012; Raiker et al., 2014). The overall stability of a DSM-IV diagnosis of ADHD is moderate for up to nine years; however there is variation such that a child who is diagnosed with ADHD will likely still carry the diagnosis up to nine years later, though the subtype may change between evaluations (Willcutt et al., 2012). Research shows that ADHD is a lifelong disorder, with it persisting into adulthood in as many as 60-78% of diagnosed children (Combs, Canu, Broman-Fulks, Rocheleau, & Nieman, 2012).

ADHD is the most common reason for referral across multiple treatment settings including pediatricians, mental health specialists, and special education services (Eiraldi & Diaz, 2010). A comprehensive assessment of ADHD includes a multi-method, multi-informant

approach, which places emphasis on gathering information using several different measurements (i.e., interviews, observations, assessment measures) across different observers (i.e., parents and teachers) (Gerdes et al., 2011; Haack, Gerdes, Schneider, & Hurtado, 2010). Studies have shown that parent ratings and teacher ratings of ADHD symptoms each contribute unique information to ratings of functional impairment, thus making the reports by each individual clinically relevant for diagnosis (Willcutt et al., 2012). Unfortunately, most children do not receive a thorough multi-method, multi-informant assessment but rather receive a diagnosis after a parent completes an ADHD symptom checklist, often in the pediatrician's office (Gerdes et al., 2011).

Children diagnosed with ADHD are at an increased risk for adverse outcomes throughout their lives including: poor academic performance, failing grades, and school dropout; greater likelihood of entering the juvenile justice system; and a lower quality of life (Hinojosa et al., 2012; Marshall, Evans, Eiraldi, Becker, & Power, 2013). A meta-analysis of 546 studies aiming to evaluate the validity of DSM-IV ADHD found that the DSM-IV criteria were successful at identifying individuals with significant impairment in social, academic, and occupational functioning even after controlling for socioeconomic status, sex, ethnicity, intelligence levels, and comorbid psychopathology (Willcutt et al., 2012). Children with ADHD are more likely to have trouble developing social skills, being accepted by peers, and maintaining friendships (Marshall et al., 2013). Some of these children may even be rejected by peers due to their impulsive or aggressive behaviors (Marshall et al., 2013). Children with ADHD also have a higher risk of comorbid behavioral, learning, and mental health disorders including conduct disorder, depression, and anxiety (Haack et al., 2010; Hinojosa et al., 2012). Research indicates that the different subtypes of ADHD are equally comorbid among anxiety disorders (Skirbekk et al., 2011). One epidemiological study in 2011 (Larson, Russ, Kahn, & Halfon) surveyed 91,000

households in the United States with children under the age of 18 and found that 18% of the children diagnosed with ADHD had a comorbid anxiety disorder and 14% had a comorbid diagnosis of depression.

The most common treatments for ADHD include behavior therapy, medication management, or a combination of the two (Willcutt et al., 2012). Pharmacotherapy is often used as a treatment for ADHD and many studies have shown significant symptom reduction via pharmacotherapy for those with both ADHD-I and ADHD-C (Willcutt et al., 2012). However, research suggests that those with ADHD-I are less likely to be prescribed medication, perhaps due to the presence of fewer externalizing symptoms (Willcutt et al., 2012). Outcome studies looking at psychosocial treatment of ADHD found that those with ADHD-I and ADHD-C have shown improvement with social skills training, meta-cognitive therapy, and working memory training (Pfiffner et al., 2007).

### **Presentation and Evolution of ADHD-I**

Though research to date suggests that SCT is a construct independent from ADHD, the study of SCT is so closely related to the study of ADHD a detailed discussion of SCT would be incomplete without discussion of the role ADHD has played in the development of the construct (Becker et al., 2013). Just as one would not expect there to be one single learning or reading disorder, one should not expect there to be one disorder of attention (Barkley, 2001). As mentioned when detailing the history of ADHD, there are currently three subtypes: ADHD-I (predominately inattentive presentation), ADHD-HI (predominately hyperactive/impulsive presentation), and ADHD-C (combined presentation) (APA, 2013). Studies that have been conducted within the subtypes of ADHD indicate that individuals experience very different types of attention problems between subtypes (Milich et al., 2002). A detailed description of each

subtype is beyond the scope of the present review, however, a brief description of ADHD-I is warranted.

Despite a large amount of empirical research on ADHD in general, comparatively less research exists specifically on ADHD-I (Mikami et al., 2007). Among community samples, ADHD-I is the more prevalent subtype appearing in nearly twice as many children, whereas among clinical samples ADHD-C is about 1.5 times more prevalent than ADHD-I (Milich et al., 2002; Jacobson, Geist, & Mahone, 2012). Those diagnosed with ADHD-I appear to be more often female and have a later age of onset or referral (Milich et al., 2002). Socially, children with ADHD-I are less assertive and more shy and reserved in social interactions, putting them at risk for negative peer relationships during childhood and adolescence (Bauermeister et al., 2005). Academically, research shows that children with ADHD-I have worse outcomes, including low grade point average (GPA) and learning disorders even after controlling for intelligence (Langberg, Becker, & Dvorsky, 2013; Milich et al., 2002; Willcutt et al., 2012). One large study of over 400 clinic-referred children reported higher rates of anxiety and depression among children with ADHD-I than ADHD-C (Milich et al., 2002; Weiss, Worling, & Wasdell, 2003). Additionally, those with ADHD-I are more likely to meet the criteria for major depression (Wilcutt et al., 2012). Finally, those diagnosed with ADHD-I are more likely to have a lower satisfaction with life as an adult (Wilcutt et al., 2012).

One of the concerns with ADHD-I is that the diagnostic criterion are negative, that is they are defined by the absence of symptoms (Carlson & Mann, 2002). Instead, some authors suggest the validity may be improved by focusing on positive diagnostic criteria that address specific attentional difficulties of this group (Carlson & Mann, 2002; McBurnett et al., 2001). Another concern is that based upon the way in which the symptom criteria for ADHD are presented, the

children with ADHD-I are too heterogeneous to be presenting with the same disorder (Becker et al., 2013). This heterogeneity is thought to exist because a diagnosis of ADHD-I can be made for those who exhibit no symptoms of hyperactivity/impulsivity, and for those who exhibit up to five hyperactive/impulsive symptoms (Milich et al., 2002). Some researchers believe that a subset of children diagnosed with ADHD-I may actually be subthreshold cases of ADHD-C (Becker et al., 2013; Bauermeister et al., 2005; Carlson & Mann, 2002). Others hypothesize that there are two distinct groups of ADHD-I; those that are truly inattentive, and those that have HSCT (Bauermeister et al., 2005; Milich et al., 2002). Still others suggest that ADHD-I and ADHD-C may be different disorders all together (Milich et al., 2014).

Though ADHD-I and ADHD-C seem to have no differences among certain demographic variables, some research suggests that ADHD-I and ADHD-C are too distinct in terms of attention deficit, gender, course, comorbidity, and success with pharmacotherapy to be considered the same disorder (Barkley, 2001; Bauermeister et al., 2005; Capdevila-Brophy et al., 2014; Milich et al., 2014). Research about the development and dysfunction of children with ADHD-I is lacking, however, that could change if the field begins to see ADHD-I as a separate disorder (Milich et al., 2002). This may also assuage some concerns from parents of children with ADHD-I as ADHD is considered a disruptive disorder, but many children with ADHD-I do not engage in disruptive behavior, thereby potentially mislabeling a subset of children who are presently diagnosed with ADHD-I (Milich et al., 2002). Considering ADHD-I its own diagnosis will also encourage the development of treatments, both pharmacological and therapeutic, for the specific disorder, as research has shown traditional ADHD treatments do not have the same efficacy across the subtypes of the disorder (Milich et al., 2002).

The idea that ADHD may represent two distinct disorders goes as far back as the DSM-III when there was uncertainty as to whether the two forms of ADD (with and without hyperactivity) represented two forms of one disorder or two separate disorders (Lahey et al., 1984). In 1984, Lahey, Schaugency, Strauss, and Frame published an article in which they found different characteristics between those diagnosed with ADD-H and ADD-WO, particularly that those with ADD-H demonstrated more hyperactivity and conduct problems and that those diagnosed with ADD-WO were more shy, anxious, and socially withdrawn. This led the researchers to suggest that ADD-H and ADD-WO may, in fact, be two different disorders (Lahey et al., 1984).

A follow-up study by the same group of researchers further hypothesized two different clinical presentations among those with ADD-H and ADD-WO, specifically that the ADD-H group was more active, impulsive, and irresponsible while the ADD-WO group was anxious, withdrawn, drowsy, and sluggish (Lahey, Schaugency, Frame, & Strauss, 1985). Additional seminal studies go as far as to state that children with ADD-WO were sluggish in their cognitive tempo and also more likely to show internalizing symptoms than their ADD-H counterparts (Lahey et al., 1988; Lahey, Schaugency, Hynd, Carlson, & Nieves, 1987). These early studies suggested that a three factor model including hyperactivity-impulsivity, inattention, and slow tempo gave the best description for ADD. They also emphasized that items dealing with a sluggish cognitive tempo may be the best way to differentiate the attention problems seen in different subtypes of the disorder (Becker et al., 2013; Milich et al., 2002).

More recent studies have shown that the two-factor DSM-IV model of ADHD fits better than the one-factor model of ADHD that was previously used, however, the issue remains to be fully resolved (Lahey et al., 2004). One of the main questions surrounds which dimensions of

symptoms should be included in the diagnostic criteria for each subtype of ADHD (Lahey et al., 2004). Research on SCT as it pertains to ADHD-I reemerged in the early 2000's as one of the most widely studied of those dimensions (Lahey et al., 2004). Many researchers suggested that ADHD-I might be uniquely associated with a specific set of inattentive symptoms characterized by SCT and hypothesized that a definition of ADHD-I that focused on the presence of SCT criteria may have stronger internal and external validity than the DSM-IV-TR diagnostic criteria which focused on the absence of hyperactive-impulsive symptoms (Willcutt et al., 2012). Those individuals diagnosed with ADHD-I could further be subdivided into those who exhibit SCT and those who do not (Carlson & Mann, 2002). In one study, those with ADHD-I and HSCT were found to be a more homogenous group than those with ADHD-I and LSCT, who presented more like children with ADHD-C (Carlson & Mann, 2002). Specifically, those with ADHD-I and HSCT were found to have more internalizing problems, and those children with ADHD-I and LSCT were found to have more externalizing problems (Carlson & Mann, 2002). While research may suggest that children with ADHD-I are less impaired when compared to those with ADHD-C, this is not the case for children with ADHD-I and HSCT, who show greater overall impairment than children with ADHD-I alone (Capdevila-Brophy et al., 2014).

Studies then began to surface suggesting that the cluster of symptoms indicative of SCT represents a subgroup of ADHD-I that could be associated with a unique pattern of functional impairment (Willcutt, Chhabildas, & Pennington, 2001). Some researchers suggested that the questionable validity of the ADHD subtypes was impacted by the omission of SCT symptoms from the diagnostic criteria of ADHD-I (Marshall et al., 2013; Milich et al., 2001). One approach was to determine if SCT symptoms would improve the validity of ADHD-I by further dividing it into those with LSCT and HSCT, however, most studies failed to show that SCT

would help improve subtype validity (Bernad, Servera, Grases, Collado, & Burns, 2014). This helped engender the current approach to the study of SCT, which is that SCT is its own construct separate from ADHD and it may be its own independent disorder (Becker et al., 2014; Bernad et al., 2014). The current understanding of the relationship between SCT and ADHD is that it is one of comorbidity between two different constructs, with a relationship similar to that between depression and anxiety (Saxbe & Barkley, 2014).

### SCT

ADHD is one of the most widely researched and also controversial diagnoses in mental health (Lahey et al., 1994; Harrington & Waldman, 2009). As of 2014, there were over 10,000 published articles on ADHD, however, only about 50 published on SCT (Barkley, 2013). A PubMed search in 2018 yielded over 100 articles published on SCT. As early as the 1960s some individual symptoms of SCT were included in behavior rating scales for children (Becker et al., 2013). It was not until the mid-1980s that research first began looking into SCT as a dimension separate from inattention (Neeper & Leahy, 1986).

Once researchers began doing factor analytic work including SCT as a separate factor, studies began to show that SCT scores were uniquely elevated in children with ADD-WO as compared to children with ADD-H (Leahy et al., 1988). Unfortunately, very few studies examining SCT were published between 1985 and 1999 (Becker et al., 2013). The research on SCT was pretty much laid to rest until after the release of the DSM-IV-TR where SCT was somewhat included in the “Not Otherwise Specified” section of ADHD where it was said that those who did not meet the full criteria for ADHD but had symptoms of inattention and “a behavioral pattern marked by sluggishness, daydreaming, and hypoactivity” could then be diagnosed with ADHD Not Otherwise Specified (Becker et al., 2013).



An article by McBurnett, Pfiffner, and Frick (2001) was one of the first to bring the symptoms of SCT back into current research. These authors suggested that by including SCT symptoms one could create two groups of children with ADHD-I, those who were really more similar to sub-threshold ADHD-C children, and those with HSCT. SCT and ADHD-I symptoms are highly correlated (Skansgaard & Burns, 1998; Willcutt et al., 2012). Individuals with ADHD-I have been shown to have some of the highest levels of SCT when compared with other subtypes of ADHD (Willcutt et al., 2012). Despite the strong relationship between SCT and ADHD-I, one of the most consistent findings in the SCT literature is the strong internal validity supporting SCT as a separate factor from ADHD-I across the lifespan as SCT has been found in children as young as preschool age all the way through adulthood (Barkley 2012a; Becker et al., 2013; Becker et al, 2014; Becker et al., 2016; Lee, Burns, & Becker, 2016a; Lee et al. 2014; McBurnett et al. 2014; Willcutt et al. 2014).

The symptoms of SCT have yet to be consistently defined across domains, however some of the most salient symptoms include: daydreaming, inconsistent alertness, mental foginess, confusion, absentmindedness, behaving or thinking slowly, appearing tired even after a full night of sleep, and lacking energy (Milich et al., 2002; Saxbe & Barkley, 2014). The question remains as far as how many symptoms should be included to help identify SCT; however, this could be asked about the diagnostic criteria for any disorder prior to each updated edition of the DSM (Barkley, 2013). A single, agreed upon definition of SCT does not presently exist; however, this author agrees with the definition proposed by Bernad, Servera, Grases, Collado, and Burns (2014) which is “SCT is a pattern of behavior characterized by inconsistent alertness along with slow thinking and/or slow behavior”.

Like ADHD, SCT itself is often considered multidimensional, with at least two symptom dimensions appearing: daydreamer/sleepy and slow/sluggish/lethargic (Becker et al., 2016; Barkley, 2013; Saxbe & Barkley, 2014). Therefore, much like with ADHD, SCT can be considered to have a cognitive dimension which encompasses symptoms like daydreaming, mental confusion, and being in a fog and a behavioral dimension that includes being sluggish, moving slow, and being sleepy or drowsy (Becker et al., 2016; Becker et al., 2014). Both dimensions are significantly different from those seen in ADHD (Barkley, 2013).

Not many studies have examined the prevalence rates of SCT; however a study by Barkley (2013) found that roughly 6% of youth in the United States had HSCT. A study conducted with almost 3,000 school children in Spain found HSCT to have a prevalence rate of 11% (Camprodon-Rosanas et al., 2016b). One study of 515 non-ADHD specific outpatients at a mental health clinic who completed the Child Behavior Checklist found that 20.8% of their sample had HSCT, suggesting a higher rate in clinical populations (Camprodon-Rosanas et al., 2016b). SCT and ADHD have been found to co-occur in that roughly 60% of youth with SCT also have ADHD and 40% of youth with ADHD also have SCT (Barkley, 2013; Saxbe & Barkley, 2014). Barkley found in a national study of children in the United States in 2013 that 59% of the children who were considered to have SCT also had comorbid ADHD, with the most common comorbidity being between SCT and ADHD-I. This is compared to only 8% comorbidity between SCT and ADHD-HI (Barkley, 2013).

In a study of adults in the United States, Barkley (2012) found that 54% of adults with HSCT also had ADHD, however, presented the opposite way, nearly half the adults with HSCT did not have ADHD, supporting the notion that SCT continues to occur independent of ADHD in adults. He also found that 46% of adults with ADHD met criteria for SCT. His studies were

interpreted as showing a partial comorbidity between the two disorders, as opposed to supporting SCT as a subtype of ADHD. The symptoms of SCT have been shown in recent studies to increase across the lifespan (Becker et al., 2016; Leopold et al., 2016). One study found SCT to be relatively stable except for a slight increase in SCT symptoms over a ten year period from preschool to ninth grade (Leopold et al., 2016).

Demographic data also support the notion that SCT is different from ADHD (Saxbe & Barkley, 2014). A number of studies to date have found SCT to be unrelated to age, race, or gender (Burns, Servera, Berna, Carrillo & Cardo 2013; Garner et al., 2010; Harrington & Waldman, 2009; Jacobson et al., 2012; Saxbe & Barkley, 2014). However, others indicate that SCT is more commonly found in male children, though the gender difference does disappear in adults (Becker et al., 2016; Camprodon-Rosanas et al., 2016a). Other research has shown SCT symptoms have a later age of identification and onset and that they increase with age (Becker et al., 2016; Camprodon-Rosanas et al., 2016a). These findings are in contrast to many studies on ADHD which report that ADHD symptoms decline with age, are more often associated with certain ethnic groups, specifically Latinos, and appear more often in boys than girls (Barkley, 2013; Saxbe & Barkley, 2014).

Indirectly, studies supporting the validity of SCT were corroborated with research showing that the two subtypes of ADD were associated with different external correlates (Becker et al., 2013). ADD-H was uniquely associated with higher levels of aggression, conduct problems, impulsivity and peer rejection (Becker et al., 2013). ADD-WO, on the other hand, was uniquely associated with higher levels of anxiety, unhappiness, shyness, peer withdrawal, and lower academic performance (Becker et al., 2013; Milich et al., 2001). Additionally, children with SCT have been found to have parents with lower levels of education, a higher

likelihood of having a parent out of work on disability, and a lower household income than children with ADHD (Barkley, 2013; Saxbe & Barkley, 2014). Initial demographic findings between ADHD and SCT suggest that SCT could be more strongly impacted by psychosocial stressors than ADHD, or, at least, that the two constructs show different demographic correlates (Saxbe & Barkley, 2014).

Barkley (2013) completed a large national survey looking at the relationship between SCT and ADHD with 17 other potentially comorbid disorders including learning, developmental and psychiatric disorders. He found that for 11 of the 17 disorders SCT and ADHD both had higher rates of comorbidity, as per parent report based on past clinical diagnoses. However, those with HSCT did not show higher rates of reading or math disorders, hearing impairment, ODD, anxiety, or bipolar disorder diagnoses than the controls. Those with ADHD had higher rates in all domains except hearing impairment. Research also indicates that SCT may actually contribute to lower levels of ODD whereas ADHD is associated with an 11 times higher risk for development of ODD (Barkley, 2013; Wåhlstedt & Bohlin 2010). Though not directly studied, due to the inverse relationship between SCT and ODD, it is reasonable to hypothesize that SCT may have little or no relationship with conduct disorder, substance use disorders, and antisocial personality disorder, which are all associated with ODD (Barkley, 2013).

Another way in which SCT may differ from ADHD is in the nature of the distractibility (Saxbe & Barkley, 2014). While those with ADHD are typically distracted by external stimuli, those with SCT are distracted more internally, with symptoms such as daydreaming and mind wandering (Saxbe & Barkley, 2014). SCT has been shown to be distinct from ADHD in ADHD-referred samples, population based samples, school and community samples, and non-ADHD-specific clinical samples (Becker et al., 2013). A study of SCT in college students helped

corroborate the hypothesis that SCT symptoms remain distinct from ADHD even into adulthood, in both clinical and nonclinical samples (Barkley 2013a; Becker, Langberg, Luebbe, Dvorsky, & Flannery, 2014).

SCT has also emerged as its own construct in a sample of psychiatrically hospitalized children who exhibited emotional and behavioral difficulties severe enough to warrant hospitalization (Becker, Luebbe, Fite, Stoppelbein, & Greening, 2013). A study by Raiker et al. (2014) looked at evidence of psychopathy in a sample of inpatient children as it pertained to symptoms of ADHD and SCT. They found that both ADHD and SCT were related to psychopathy however, when controlling for symptoms of ADHD, SCT symptoms were no longer significantly related to psychopathy. This lack of relationship suggests that the psychopathy might be more related to the hyperactive and impulsive features of ADHD rather than the behaviors that are more characteristic of SCT.

Despite the clear distinction between ADHD and SCT, much of the literature on SCT comes from children who are referred for an evaluation of ADHD, and the children are selected from those who have ADHD-I, which creates a confound of SCT symptoms with ADHD symptoms. This makes it hard to distinguish the unique contributions of SCT because SCT often appears as a subset of ADHD-I rather than its own disorder (Barkley, R. (2012a). One point for the importance of considering SCT as a distinct disorder from ADHD-I is demonstrated in the case of a child who exhibits symptoms of SCT along with five DSM-5 ADHD inattention symptoms; this child by definition would not meet criteria for an ADHD diagnosis yet may be just as impaired socially and academically as a child who does (Lahey 2001).

Not all studies support the idea that SCT symptoms represent either an additional subtype of or a disorder separate from ADHD (See: Harrington & Waldman, 2009 and Todd, Rasmussen,

Wood, Levy, & Hay, 2004 for examples). One consideration when reviewing the aforementioned studies is that one of them used a two item assessment of SCT symptoms and the other used a three item assessment to draw their conclusions. The internal consistency of the construct would likely increase if a larger pool of items was used to assess SCT. Perhaps one explanation for results that do not distinguish the validity of SCT as a separate disorder from ADHD is the studies used SCT patients who had comorbid ADHD. While the two are highly linked, examining SCT only in the context of ADHD can contaminate the findings or make SCT seem more strongly linked to ADHD than it actually is, thus supporting the link, perhaps erroneously, that SCT is a subtype of ADHD (Barkley, 2013).

In many studies SCT is presented as a disorder similar to ADHD with less deficits, implying that SCT is either less severe than or just a milder form of ADHD (Saxbe & Barkley, 2014). However, when ADHD and SCT are comorbid the symptoms are synergistic, meaning children who score high in both domains have more significant impairment than children who present with either disorder alone (Barkley 2012b; Barkley 2013; Saxbe & Barkley, 2014). One explanation is that the more severe symptomatology could be a product of the number of symptoms, as comorbid cases naturally have more symptoms than a single disorder alone (Saxbe & Barkley, 2014). However, the significant associations between different deficits even after controlling for ADHD symptoms would not occur if SCT were simply a milder form of ADHD (Saxbe & Barkley, 2014). Finally, a significant amount of overlap exists among other psychological disorders, anxiety and depression for example, which does not negate the clinical or scientific utility of either of the disorders alone (Saxbe & Barkley, 2014). The distinction of SCT symptoms from those symptoms of ADHD can be thought of now as a reliable, established hypothesis (Barkley, 2013).

One case study by Becker et al. (2014) examined the clinical presentation of SCT. One of the ideas that emerged was the diagnostic challenges of SCT given the differential, which can include ADHD, internalizing disorders, and sleep problems. An interesting point made in the case presentation was that the individual had HSCT though did not meet criteria for one of the core ADHD diagnoses. However, she may have met the DSM-5 criteria for Other Specified ADHD; the diagnostic category that currently best fits children with subthreshold ADHD who have HSCT (APA, 2013). The case study conceptualized SCT as a form of psychopathology, though the emergence of SCT as a distinct psychiatric disorder remains to be seen.

Both parent and teacher reports of SCT have been empirically validated and are commonly used in the assessment of SCT (Barkley, 2013; Barkley 2016). Garner, Marceaux, Mrug, Patterson, and Hodgins (2010) suggested that teacher reports of SCT may be more accurate than parent reports since the symptoms of SCT may be more apparent in a structured setting, such as a classroom. McBurnett et al. (2001) found similar evidence of greater validity of teacher reported SCT symptoms when compared to parent reports. They concluded that there was more evidence for teacher reports because teachers may be better than parents at making the fine distinctions among SCT and ADHD in the context of normal children of the same age.

The question “How should SCT be conceptualized?” is one that remains today (Becker et al., 2016). Some researchers support the idea that SCT should be its own psychiatric disorder (Barkley, 2014; Saxbe & Barkley, 2014). Another consideration is that SCT may best be understood as a specifier of an existing disorder, such as ADHD with HSCT or major depressive disorder with HSCT (Becker et al., 2016). This would be helpful for understanding the trajectory and functioning of the primary disorder and assist with treatment choices (Becker et al., 2016). A final consideration is that SCT is best conceptualized as a transdiagnostic construct, meaning

something that can help predict the course, impairments, and treatment response of a specific disorder, similar to the way in which emotion regulation is not in and of itself a disorder but is important for understanding psychopathology (Becker et al., 2016). At this point though, it is too early to conceptualize (Becker et al., 2016).

Arguably most important for clinicians are the clinical implications of SCT. There is no mention of symptoms of SCT in the DSM-5 (APA, 2013; Becker et al., 2013). This could be viewed in both positive and negative ways. This could be a positive change in that there are many studies supporting that SCT should not be subsumed within the diagnosis of ADHD but rather classified as its own entity (Becker et al., 2013). However, the lack of mention of SCT at all in the DSM-5 could halt research interests about SCT and stop the progression of understating its causes and correlates (Becker et al., 2013). Regardless, ADHD and SCT are independently associated with multiple domains of functional impairment and as such each provides their own information that is clinically useful, and symptoms of SCT should be assessed as part of routine clinical evaluations (Willcutt et al., 2013).

### **Validity and Measures of SCT**

Initial factor analytic studies of SCT yielded a two-factor model of inattention which had most of the inattention items for ADHD-I and a second factor with the SCT items (McBurnett et al., 2001; Hartman, Willcutt, Rhee, & Pennington, 2004). Though these early models suggested that SCT was closely related to ADHD-I, they still suggested that SCT may be a separate dimension of inattention (Hartman et al., 2004). Other studies provide support for a three-factor model of SCT including: SCT symptoms, inattention symptoms, and hyperactive impulsive symptoms for both parent and teacher ratings (Harrington & Waldman, 2009; Smith et al., 2016). Most recent analyses demonstrate a bifactor structure of SCT is the most valid, with a behavioral



component (slow, sluggish, drowsy) and a cognitive component (daydreaming, inconsistent alertness) (Penny et al., 2009). This bifactor model has been validated in children and adults (Becker et al., 2016).

Support for the internal validity of SCT comes from confirmatory factor analyses showing that the SCT items load on factors separate from those of ADHD-I and ADHD-HI (Moruzzi et al., 2013; Garner et al., 2010; Garner et al., 2014; Hartman et al., 2004; Willcutt et al., 2013). Some studies report that SCT and ADHD-HI are not related (Barkley, 2013; Bernad, Severa, Grases, Collado & Burns, 2014) and others have found the two to be significantly, and negatively associated (Lee, Burns, Snell, & McBurnett, 2014; Penny et al., 2009). The SCT and ADHD-I factors are often highly correlated, though separate enough to be distinct constructs, which helps provide support for the psychometric validity of SCT (Moruzzi et al., 2013).

Carlson and Mann (2002) tested the external validity of SCT symptoms in a large school-based sample of children using SCT items from the Child Behavior Checklist (CBCL). The children in this study with HSCT had less externalizing behaviors and more unhappiness, anxiety, depression, and withdrawn behavior than the children with ADHD-I and ADHD-C. Similarly, Willcutt et al. (2013) provided support for the external validity of SCT across several dimensions of functional impairment and neuropsychological functioning, even after controlling for psychopathology, including ADHD. Lahey (2001) pointed out the importance of discriminant validity of SCT, indicating that it is essential to understand the relationship between SCT symptoms and different, related disorders. Carlson and Mann (2002) looked at the discriminant validity of SCT with learning problems, and found that both the LSCT and HSCT groups were the same with regards to learning problems, suggesting that SCT is independent of

learning problems. Research provides support for the convergent and discriminant validity of SCT as well (McBurnett et al., 2013).

One of the biggest challenges for SCT is the lack of a unified set of criteria or scale with which to measure its presence or absence (Skirbekk et al., 2011). The symptom dimensions of SCT can range from anywhere to 2-20 questions assessing the construct (Saxbe & Barkley, 2014). Most studies until about 2012 used the same two to five items to operationalize SCT, which is often cited as a limitation to in SCT research (Burns et al., 2013). The current understanding of SCT highlights the importance of using at least four items to ensure sufficient internal consistency (Becker et al., 2016; Garner et al., 2010).

Many earlier studies used a version of the CBCL which includes a subscale looking at SCT symptoms (Becker, 2013; Becker and Langberg, 2013; Bauermesiter et al., 2005; Garner et al., 2012). The SCT scale of the CBCL contains four items which are: appears confused, daydreams often, stares, and lacks energy. These items have been shown to be statistically distinct from ADHD and internalizing symptoms with adequate internal consistency (Raiker et al., 2014). In 2007, the CBCL officially categorized the SCT scale as a separate construct (Loutfi et al., 2011). However, the SCT subscale does not sufficiently capture the multiple dimensions of SCT and it has limited psychometric evidence (Becker, 2013).

From the CBCL came the development of more SCT scales which are now widely used in SCT research (Becker, 2013). The current scales are brief, multidimensional, and offer acceptable reliability and validity (Barkley, 2013; Penny et al., 2009). Penny et al. (2009) created a preliminary list of SCT symptoms after completing a comprehensive literature review and then used a group of experts to assess content validity. They then completed factor,

reliability, and validity analyses. The final version of their scale, which is both a teacher and parent report scale, consisted of 14 items across three subscales: slow, sleepy, and daydreamer. In a study of 335 children these scales were found to have strong reliability and validity. SCT was found to be weakly associated with ADHD-HI and ODD and strongly associated with ADHD-I (Burns et al., 2013). Penny et al. (2009) found their parent scale showed support for a three factor model of SCT. Their teacher scale showed support for a two factor model of SCT including slow and sleepy/daydreams. Their scale has acceptable internal consistency, inter-rater reliability, and test-retest reliability. This scale development marked the first attempt to develop a psychometrically sound rating scale of SCT and has since been used in several studies (Burns et al., 2013; Jacobson et al., 2012).

The scale was also influential in the development of a nine item SCT scale for adults by Barkley (2012a) and a twelve item rating scale for SCT in children (Barkley, 2012b). Barkley also found support for a two factor model of SCT, which was comprised of sluggish and daydreaming. Barkley's (2012a, 2012b) and Penny et al.'s (2009) measures of SCT both have sufficient questions to assess SCT with good construct validity (Burns et al., 2013). However, they each have domains that may better target other constructs (Burns et al., 2013). The items on their scales including: appears tired, lethargic, slow-moving, lacks energy, apathetic, shows little interest in things, and unmotivated are all similar to items that measure depression and could better target depression than SCT (Burns et al., 2013; Bernad et al., 2014). Similarly, the items seems drowsy; often yawning, stretching, sleepy; has trouble staying awake or alert; and more tired than others could better target sleep problems than SCT (Burns et al., 2013; Bernad et al., 2014). As a result of the confound between depression, sleep, and SCT, McBurnett (2010) developed a new measure to address these concerns.

McBurnett and colleagues (2010) used symptoms of SCT from the recently developed measures and existing literature to create the Kiddie Sluggish Cognitive Tempo Diagnostic Interview (K-SCT). They used ten symptom domains to identify SCT and multiple examples were used for each domain with probes to help rule out an individual endorsing a symptom because of depression or sleep problems (Burns et al., 2013). The domains focused more on the cognitive and behavioral aspects as well as the working memory component of SCT symptoms than the measures created by Penny et al. (2009) and Barkley (2012a, 2012b) (Burns et al., 2013). One should note that there have not been validity studies conducted on the K-SCT (Burns et al., 2013). Despite this Lee, Burns, Snell, and McBurnett (2013) created parent and teacher ratings to assess the symptom domains measured in the K-SCT (Burns et al., 2013). This rating scale, known as the Child and Adolescent Disruptive Behavior Inventory (CADBI), was used in the current study; this scale has been empirically validated across cultures and is the most frequently used measure of SCT (Becker et al., 2016). See Methods section for a more detailed description.

Another way to measure SCT symptoms is through observation of a child's behaviors in classrooms; one such measure is called the Direct Observation Form (DOF) (Volpe, McConaughy, & Hintze, 2009). This measure uses a record of behavioral observations and ratings of problem and on task-behavior in the classroom. The DOF items are scored on five syndromes, one of which is SCT. While an effective measure, research indicates that the scales that measure less overt behaviors, like SCT, take many more observation sessions to create an accurate report and may not be the most efficient or reliable way to measure SCT (Volpe et al., 2009). One study using the DOF during child centered play therapy with first grade students

with ADHD-C did, however, show a moderate to large effect size in the reduction of SCT symptoms (Robinson, Simpson, & Holt, 2017).

One group of researchers (Becker, Luebke, & Joyce, 2015) provided initial support for a child self-report rating of SCT symptoms called the Child Concentration Inventory (CCI). This measure was designed to correlate with the SCT symptoms used by Penny et al (2009). The initial study provided support for the internal validity of this measure with children ages 8-13, indicating that children can, in fact, reliably report their own SCT symptoms. The CCI scores were related to poor child reported social functioning, academic functioning, and self-worth and increased loneliness and emotional dysregulation. The measure demonstrated acceptable internal consistency, construct, and criterion validity. It also showed that child reported SCT symptoms were associated with the child's own perception of their own academic difficulties and social functioning.

Though the current SCT measures may differ on the number of items or the wording of the symptoms, they tend to agree on the multidimensionality of the construct, including the fact that SCT has both cognitive and behavioral components (Barkley, 2013; McBurnett et al., 2014, Penny et al., 2009; Cortes, Servera, Becker, & Burns, 2014). Cortes, Servera, Becker, and Burns (2014) who replicated Lee et al. (2013) found that the two factor structure of SCT held up against clinical and community samples in both Spain and the United States, demonstrating transcultural utility of the two factor structure of SCT.

### **Etiology of SCT**

There are presently only a small number of studies examining the etiology of SCT. Two studies to date have shown that SCT is heritable and shares about half of its genetic contributions with those of ADHD (Graham et al., 2012; Moruzzi et al., 2013). Both studies also reported that

SCT is less heritable than ADHD and probably has a greater environmental than genetic etiology. These authors noted that none of the correlations were perfect (i.e., 1.0) and so neither ADHD nor SCT should be considered either completely genetic or completely environmental. With the present knowledge of demographic factors linked to SCT, the idea that social adversities contribute to SCT seems plausible (Barkley, 2013). Some authors suggest that SCT should be considered a potential consequence of early environmental risk, medical conditions, or even injuries (Becker, 2013).

One of the first biologic studies of SCT examined its relation to thyroid functioning in children (Becker, Luebbe, Greening, Fite, & Stoppelbein, 2012). Thyroid hormones are influential during child and adolescent development, and an underactive thyroid can include a range of symptoms, many of which are similar to SCT, including slowness and lack of energy. The authors found a positive relationship between SCT symptoms and thyroid stimulating hormone (TSH) concentration, even after controlling for ADHD symptoms and child demographics. Furthermore, they found no relationship between ADHD and TSH, further supporting the distinctiveness of the SCT construct. TSH only explained a small amount of the variance in predicting SCT symptoms, suggesting that additional biological correlates are factors among those with HSCT. Another study examined the relationship between iron deficiency and childhood attention regulation, including SCT symptoms (East et al., 2017). They found that those who had iron-deficient anemia had more frequent SCT symptoms at age 10 including mental foginess and daydreaming. The authors stated that iron deficiency impacts nearly 2.5 million children in this country and Latinos, who are more likely to live in a lower socioeconomic bracket, have a higher prevalence of iron deficiency than their Caucasian counterparts.

Studies have identified children with prenatal alcohol syndrome (Graham et al., 2013) and those who have been exposed to second hand smoke at home (Camprodon-Rosanas et al., 2016) to have HSCT. One study showed children with acute lymphoblastic leukemia (ALL) to have HSCT (Reeves et al., 2007). Not only did ALL patients have significantly more SCT symptoms than their control group siblings, but those with HSCT also had greater impairment in IQ scores and reading ability (Reeves et al., 2007). Another study related SCT to survivors of pediatric brain tumors (Willard et al., 2013). Fatigue and slow processing speed, which are characteristic of SCT, are two of the most common symptoms among patients with brain tumors (Willard et al., 2013). The children in this study were found to have higher rates of SCT than survivors of ALL (whom, as previously mentioned, display HSCT) and controls (Willard et al., 2013). Another study examining possible medical correlates found children with epilepsy to have HSCT (Loutfi, Carvalho, Lamounier, & Nascimento, 2011). One consideration is that children with SCT can look postictal as children with SCT have been found to sometimes have staring spells (Saxbe & Barkley, 2014). There is currently no research to suggest a seizure component to SCT; though considering that epilepsy and staring spells have been found in children with HSCT, temporal lobe seizures should always be ruled out (Saxbe & Barkley, 2014).

Some research suggests that SCT may be a form of pathological mind wandering (Barkley, 2013; Adams et al., 2010). Mind wandering can lead to negative effects on executive functioning (EF) tasks, and can also adversely impact academic performance, much like SCT (Barkley, 2013). Another speculation is that SCT could arise from an obsessional disorder, and may be a milder form of obsessive compulsive disorder (OCD) (Barkley, 2013). The idea behind this is that excessive and recurrent focus on thoughts, as seen in OCD could lead to an

attention disorder similar to SCT (Barkley, 2013). Some authors suggest that SCT is an amotivational syndrome in which an individual lacks energy, initiative, and self-motivation (Barkley, 2013). A final consideration is the idea that suggests SCT is a form of hypersomnia, an arousal disorder, or the same thing as daytime sleepiness given that some of the common symptoms of SCT include sleepiness, drowsiness, and low arousal (Barkley, 2013; Saxbe & Barkley, 2014).

Studies have examined daytime sleepiness and sleep in college students (Becker, Luebbe, & Langberg, 2014; Langberg, Becker, Dvorsky, & Luebbe, 2014). Given that SCT is associated with daydreaming and sluggish and slow behaviors, a link between SCT and daytime sleepiness was hypothesized. Daytime sleepiness is characterized by tiredness, lack of energy, drowsiness, and sluggishness (Langberg et al., 2014). Researchers found that SCT was associated with poorer sleep quality during the night including more disturbances such as waking up in the middle of the night or having bad dreams (Becker, Garner, & Byars, 2016; Becker, Luebbe, & Langberg, 2014). In addition, SCT has been shown to predict greater daytime dysfunction independent of poor sleep quality, ADHD, anxiety, and depression (Langberg et al., 2014). In a study of college students, those with ADHD, HSCT, and daytime sleepiness were significantly more impaired than students with ADHD, LSCT, or daytime sleepiness alone (Langberg et al., 2014). These studies lend support to the distinction between SCT and daytime sleepiness (Becker, Luebbe, & Langberg, 2014; Becker et al., 2016; Langberg et al., 2014). SCT is likely to have multiple etiologies that fall within genetic, neurobiological, and social domains (Barkley, 2013).

### **SCT and Neurocognitive Functioning**



There have been no studies that show SCT to be related to a particular neuropsychological profile (Becker, 2013). Research shows that ADHD, particularly the inattentive symptoms, is associated with significant impairments in neuropsychological functioning (Bauermeister et al., 2012). Specifically ADHD is associated with deficits in EF, including working memory and inhibition ((Bauermeister et al., 2012). Considering the comorbidity between SCT and ADHD research on the neuropsychological functioning of children with SCT is an important step in learning about the construct (Becker & Langberg, 2013b; Jimenez, Ballabriga, Martin, Arrufat, & Giacobo, 2013; Wilcutt et al., 2001). As such, the question of whether SCT involves deficits in EF has come to light (Saxbe & Barkley, 2014). Even though some research hypothesizes children with ADHD will show greater EF impairments than children with SCT, those with SCT have still been found to have EF impairments above and beyond those that are attributable to ADHD (Becker & Langberg, 2013b).

Becker and Langberg (2013b) found that parent-reported SCT symptoms including motivation, initiative, and apathy were associated with EF impairments. They go on to state that this is important because motivation and initiative are essential for organization and goal-directed behaviors, two of the EF deficits found to occur in their sample (Becker & Langberg, 2013b). They also found deficits in working memory and attentional control in children with SCT (Becker & Langberg, 2013b). The strongest correlations were found among SCT and EF problems with metacognition, which includes things like initiation, motivation, and working memory (Becker & Langberg, 2013b). One study found that SCT was the strongest predictor of self-reported EF deficits in daily activities among college students (Flannery, Luebbe, & Becker, 2016). Those college students with HSCT had the greatest impairments in the domains of organization and problem solving, suggesting they may play a bigger role in SCT than ADHD

(Barkley, 2012; Jarrett et al., 2014). These difficulties in EF may persist into adulthood, as Barkley (2012a) found that adults with HSCT had more difficulties with self-organization and problem solving than a comparison group of ADHD participants.

Barkley (2013), however, measured ratings of EF in daily life with large samples of children and adults and found that SCT was only weakly associated with EF deficits, even when controlling for ADHD symptoms. The only significant, though small, association he found was among SCT and planning and problem-solving. Some studies have even failed to find a relationship among SCT and EF, though Becker and Langberg (2013b) indicate that those studies often used laboratory tasks of EF which seem to measure a different aspect of EF than rating scales (Jarrett, Rapport, Rondon, & Becker, 2014). Despite some clear EF deficits, the general consensus in the literature is that SCT is not primarily a disorder of EF (Barkley, 2013). The dissociation of SCT from EF deficits further suggests that the cognitive dysfunction seen with SCT symptoms are different from those involved in ADHD (Barkley, 2013).

A study done with young children (6-7 years old) and adolescents (8-16 years old) found that the younger children with HSCT had more severe deficits in processing speed than the adolescents (Jacobson, Geist, & Mahone, 2017). A neuropsychological study of preadolescent girls by Hinshaw, Carte, Sami, Treuting, and Zupan (2002) found that those with HSCT had slower performance on motor tests. More recent studies have shown children with HSCT frequently demonstrate slow motor speed (Adams et al., 2010; Becker & Langberg, 2013b; Garner et al., 2010). One study with college students examined self-reported reading and test-taking abilities and results of tests of processing speed, reading fluency, and reading comprehension (Wood, Potts, Lewandowski & Lovett, 2016). The authors found that those with HSCT self-reported more difficulty on timed reading tasks, though this was not corroborated by

the testing which found no time differences between the groups. This means they perceived themselves as slower than they actually were. The authors go on to recommend that students with SCT are not at any disadvantage in terms of speed and do not recommend extra time accommodations on the basis of self-reported SCT symptoms.

However, a follow-up study by the same group of researchers using self-report measures found that SCT symptoms accounted for more variance in functional impairment and executive dysfunction than ADHD symptoms (Wood, Lewandowski, Lovett, & Antshel, 2017). In their study, almost half of the participants with HSCT did not have symptoms of ADHD. They concluded that those with HSCT may be experiencing similar to or more impairment in EF than someone with a formal diagnosis of ADHD. This time, they concluded by acknowledging the impairing nature of SCT and the supporting future investigation on the topic.

Other associations that have been found between SCT and poor neurocognitive performance, include deficits on measures of sustained and selective attention and early information processing (Bauermeister et al., 2011; Huang-Pollock, Nigg, & Carr, 2005; Jarrett et al., 2017; Wahlstedt & Bohlin, 2010). SCT has been associated with variability in spatial memory in one study (Skirbekk et al., 2011). These authors hypothesized that SCT could reflect variability in attention rather than a slow cognitive tempo. One study used a neuropsychological test battery and found that the children with ADHD and HSCT were more impaired in the domain of cognitive flexibility than the ADHD-only group (Baytunca et al., 2018). Other studies have also found neurocognitive differences when their sample was divided into participants with LSCT and HSCT (Hinshaw et al., 2001). One of the only neuroimaging studies to date that has been done with those with HSCT found hypoactivity in the superior parietal lobe which may be

associated with impaired reorienting or shifting attention that is seen in those with HSCT (Fassbender, Krafft, & Schweitzer, 2015).

There are studies that suggest SCT belongs in the category of neurodevelopmental disorders in the DSM (Barkley, 2012; Becker 2013). Future neurocognitive studies should address this hypothesis in more detail. A specific starting point may be to examine SCT as it relates to neuropsychological functioning using a comprehensive neuropsychological test battery with children who have and have not been diagnosed with ADHD, as previous samples with participants with ADHD and comorbid SCT may not allow the unique impairments of SCT to be discovered (Becker et al., 2016).

### **SCT among Adults**

According to one study, approximately 5% of the adult population has HSCT and about half of the adults who have ADHD also have SCT (Barkley, 2012a). Unlike ADHD symptoms, especially the hyperactive and impulsive ones, which often decline with age, SCT symptoms have been found to increase with age and persist into adulthood (Barkley, 2012a). Research by Barkley (2012a) found that SCT symptoms in adults form their own factor separate from ADHD symptoms in the same way it does in children.

In adult populations, those with HSCT reported less education, less income, and a higher likelihood of being on disability than controls (Barkley, 2012a). Research also suggests that SCT symptoms are predictive of greater perceived stress in adults (Combs et al., 2012). Adults with comorbid SCT and ADHD are also significantly more impaired than adults with either set of symptoms alone (Barkley, 2012a). Those with comorbid symptomatology are most impaired in the domains of education and sexual activities (Barkley, 2012a). Those individuals with HSCT alone have been found to have less: energy levels, capacity for work, ability to perform

daily activities, sleep satisfaction, and mobility than those with comorbid ADHD and HSCT (Barkley, 2012a; Combs et al., 2013). Those adults with SCT have been shown to have a higher likelihood of being unmarried, however, SCT was found to be less impairing than ADHD in child rearing (Barkley, 2012a).

Combs, Canu, Broman Fulks, and Nieman (2013) examined the relationship between quality of life (QOL) and SCT in adults. They found that SCT was predictive of lower physical, psychological, and overall QOL. SCT emerged as one of the strongest predictors of low QOL, along with inattention. SCT clearly has negative impacts on children and adults. While these negative impacts alone are reason for continued study of SCT, longitudinal evidence that further validates the persistence of the disorder across the lifespan provides reason for continued study.

### **Longitudinal Studies of SCT**

Because of the clear association between SCT and social impairment (see section SCT and Social Functioning for a detailed discussion), one of the first longitudinal studies of SCT aimed to determine if SCT predicted social impairment longitudinally using a large sample of first through sixth grade students in the Midwestern United States (Becker, 2014). Measures were given to teachers at baseline and then again six months later. This study found that SCT predicted poorer peer functioning after 6 months. Nearly 75% of the children in this study with HSCT were impaired in the peer domain as compared to less than 10% of the children with LSCT. Children with HSCT were more likely to be considered clinically impaired in peer functioning; they had poorer functioning with regards to popularity, social preference, and overall peer relationships.

Bernad, Servera, Grases, Collado, and Burns (2014) published the first longitudinal study on the external correlates of SCT using a group of Spanish children from Madrid, Spain. They

gave teacher ratings twice at the end of the first grade year (six weeks apart) and once at the end of the second grade year (one year after the first assessment). They found that SCT predicted academic and social impairment after controlling for ADHD-I at baseline and one year later. At baseline, HSCT was associated with elevated depressive symptoms; however, SCT did not predict depression one year later, though ADHD-I did.

A second longitudinal study by the same group of researchers (Servera, Bernad, Carrillo, Collado, & Burns, 2015) continued assessing SCT symptoms in a group of Spanish school children, this time using mother and father ratings of SCT. Assessments were again given at three time points; twice during the first grade year (six weeks apart) and once during the second grade school year (one year after the first assessment). This study found similar results as the first, specifically that HSCT from earlier assessments predicted higher levels of depression, academic impairment, and social impairment at the final assessment even after controlling for symptoms of ADHD-I.

The same group of researchers conducted one more longitudinal study, this one extending out two years (Bernad, Servera, Becker, & Burns, 2015). They again used children from Madrid, Spain. There were three measurement points: first grade, second grade, and third grade. This time they used four different report sources: mothers, fathers, primary teachers, and secondary teachers. This study found that HSCT scores in first and second grades were associated with higher scores on anxiety, depression, academic impairment, social impairment, and peer rejection in the third grade. SCT was more strongly correlated with depression than anxiety.

A study by Leopold et al. (2016) was the first to study SCT across six different time points during a ten year period, following students from preschool through ninth grade. They demonstrated stability of the construct during this period while showing that the mean levels of

SCT increased slightly with age. The authors noted that the increase in SCT symptoms over time may reflect developmental progression of SCT or the increased manifestation of SCT as children got older and there was a greater academic demand on the students.

### **Treatment of SCT**

A final, though arguably the most clinically important area of research surrounds treatment for individuals with HSCT. Given the lack of research on treatments for SCT, clinicians started by using treatments which are effective for ADHD-I (Becker et al., 2014). One example of treatment used for ADHD that may be effective for SCT is stimulant medications (Barkley, 2013; Saxbe & Barkley, 2014). However, it is known stimulants are less effective at treating the inattentive symptoms of ADHD, and therefore may not be effective at treating the symptoms of SCT, though given the independence of the two constructs, it is worth investigating (Saxbe & Barkley, 2014). One study examined this hypothesis and found no differences between participants with and without SCT symptoms in response to methylphenidate (Ritalin) (Ludwig, Matte, Katz, & Rohde, 2009). Another study examining methylphenidate response in children with ADHD found that HSCT with a behavioral presentation (i.e., sleepy, slow moving) predicted methylphenidate nonresponse such that the more SCT symptoms present, the weaker the response to methylphenidate (Froehlich et al., 2018).

One study has shown promise for the use of atomoxetine (Strattera) for children with SCT (Wietecha et al., 2013). Atomoxetine is not classified as a stimulant medication; it is a selective norepinephrine reuptake inhibitor and therefore may be more appealing for patients who do not want to take stimulants (Wietecha et al., 2013). This study assessed SCT symptoms at baseline, 16 weeks, and 32 weeks, and found at 32 weeks on atomoxetine SCT symptoms had improved significantly (Wietecha et al., 2013). A second study showed similar results though

stated that baseline SCT severity was the strongest predictor of effectiveness of atomoxetine; HSCT at baseline in which there was more room for improvement yielded a greater response to atomoxetine (McBurnett et al., 2016). The improvement they found on SCT was independent of improvement in ADHD symptoms, suggesting a direct effect of atomoxetine on SCT (McBurnett et al., 2017). An additional pharmacological avenue to explore is the use of selective serotonin reuptake inhibitors given the overlap with SCT and anxiety and depression (Saxbe & Barkley, 2014).

It may be prudent to also look at treatments that have been unsuccessful in treating ADHD; given the distinction between SCT and ADHD, treatments that failed for ADHD may be effective for SCT (Bernad et al., 2014). Cognitive Behavioral Therapy (CBT) may be one of those treatments to consider given the high comorbidity among HST and internalizing disorders, as it is an effective treatment in children with depression and anxiety (Saxbe & Barkley, 2014). Behavioral activation which is often used to treat depressive symptoms is one CBT treatment to explore (Becker et al., 2016; Smith & Langberg, 2017). Additionally, CBT protocols for social anxiety may be effective at targeting some of the social avoidance which is often seen in SCT (Marshall et al., 2013).

Because social impairment is often present in children with SCT, these individuals may also benefit from social skills training. Social skills training interventions are especially effective for children who are socially withdrawn (Becker, Garner, Tamm, Antonini, & Epstein, 2017). Preventing and treating social problems early on offers great benefits given that social skills in childhood are strong predictors of positive adjustment in adult life (Becker & Langberg, 2013; Marshall et al., 2013). Social interventions targeted toward children with HSCT might target social engagement, assertiveness, and leadership behaviors (Marshall et al., 2013).



A randomized controlled trial of psychosocial treatment for ADHD-I (Pfiffner et al., 2007) specifically addressed symptoms of SCT. One group of children, aged 7-11, completed a 12-week intervention while the control group did not. To address the SCT symptoms, they used interventions that are commonly used for patients with mild closed head injuries including practice, prompting, routine setting, and reducing the complexity of tasks. The intervention addressed deficits that are seen in both ADHD-I and SCT including social, peer, and academic impairment. They used social skills training to try to help increase friendships and social assertion in this group of children. They also taught children how to improve homework routines, work more independently, and improve time-management and overall organization skills. The intervention was delivered in both home and school settings to increase generalizability and included a teacher and a parent training component as well as 5 monthly follow-ups after completion of the treatment.

The results of the trial showed support for this intervention in children with ADHD-I. There was a significant reduction in attention problems and an improvement in organization and social skills at the end of treatment and at follow-up. The SCT symptoms showed some of the biggest treatment effects, demonstrating utility of the intervention originally targeted for populations with head injuries on SCT. Furthermore, teaching compensatory strategies may also be helpful to address attention and comprehension difficulties (Marshall et al., 2013). Finally, academic interventions that have been used with ADHD youth to help with homework completion and academic performance may be helpful with SCT youth as well (Marshall et al., 2013).

Despite the equivocal nature of SCT as an independent mental health disorder, one thing is certain, and that is interventions to address the sluggishness and attention problems may help

prevent the academic, social, and internalizing difficulties that are often seen in children with HSCT (Capdevila-Brophy et al., 2014).

### **External Correlates of SCT**

Many studies, detailed above, have concluded symptoms of SCT to be distinct from those of ADHD; the examination of SCT and its clinical correlates now tends to be the primary objective in SCT research (Becker, 2017). Some of those correlates of SCT that have come into focus include: social functioning, academic functioning, and symptoms of anxiety and depression.

### **SCT and Social Functioning**

The link between SCT and social impairment is one of the more consistent findings in the literature (Becker, 2014). The majority of extant research suggests that SCT adversely impacts different aspects of social development, even after controlling for ADHD symptoms (Becker et al., 2013). This has been demonstrated across parent and teacher reports (Garner et al., 2010; Becker & Langberg, 2013a). Teacher ratings of children with SCT symptoms in one study found a negative relationship between SCT and social competence (Lee, Burns, Snell, McBurnett; 2014). Parent reports have been more often associated with broad social functioning deficits (Becker & Langberg, 2013a). One study found that 75% of school aged children with HSCT were reported by teacher ratings to have impairments in the peer domain, as opposed to only 8% of the children with LSCT (Becker, 2014).

While children with SCT have been shown to have social problems, they may or may not be socially impaired (Becker & Langberg, 2013a; Marshall et al., 2013). For instance, children with SCT are not as socially aggressive or intrusive as children with ADHD and in some circumstances can be considered to have less social impairment than children with ADHD even

after controlling for symptomatology (Garner et al., 2010; Becker & Langberg, 2013; Saxbe & Barkley, 2014; Watabe, Owens, Evans, & Brandt; 2014). SCT is sometimes characterized by fewer social problems like unpopularity or peer rejection than ADHD (Saxbe & Barkley, 2014). Some research indicates that the social impairment is informant dependent, with social impairment reported by teachers but not by parents (McBurnett et al., 2014). One study even reported no significant differences in peer relationships between children with HSCT versus LSCT (Watabe et al., 2014). A study of psychiatrically hospitalized inpatients suggested that although SCT symptoms are risk factors in most contexts, like school, they may be protective in situations that are full of disruptions (Becker et al., 2013). For instance, compared to children who have disruptive social behaviors these children may get less time outs (Becker et al., 2013). While these findings raise questions about whether children with SCT have as much of a risk of developing social problems as children with ADHD, the finding that children with SCT are at risk for different psychosocial impairments than children with ADHD remains (Barkley, 2012b; Raiker et al., 2014).

One type of impairment found in children with SCT is peer neglect (Becker, 2013). Research suggests that children with SCT experience more peer neglect than peer rejection (Becker, 2013; Carlson & Mann, 2002). SCT has also been linked specifically to peer withdrawal and social isolation, though this could be a more prominent finding in teacher rather than parent ratings (Bauermeister et al., 2012; Becker & Langberg, 2013; Becker et al., 2017). However, this link remains even after controlling for ADHD symptoms, ODD, conduct disorder, generalized anxiety disorder, major depressive disorder, and even IQ (Barkley, 2013). Studies also indicate that children with SCT experience peer neglect, social withdrawal, and social isolation more frequently than children with ADHD (Carlson & Mann, 2002; Raiker et al.,

2014). One study found children with HSCT to be more shy and to have lower social engagement such as starting conversations or joining in activities (Becker et al, 2017).

One hypothesis is that the withdrawal and shyness often seen in SCT is consistent with high levels of internalizing symptoms, which are sometimes comorbid in individuals with SCT (Saxbe & Barkley, 2014). Another thought is that the slow, sluggish, lethargic behaviors characteristic of SCT cause children to isolate themselves from peer groups and that peers gradually ignore these isolated children more and more over time leading to peer neglect or social rejection (Becker, 2014; Becker & Langberg, 2013; Marshall et al., 2014). SCT could make it more difficult for children to pay attention to and remember what other children have said, potentially making social interactions more difficult and also leading to social withdrawal (Mikami et al., 2007). Similarly, another hypothesis is that the problems seen with social withdrawal in these children may correspond to the behavioral symptoms of SCT including lethargy, confusion, daydreaming, and lack of motivation (Raiker et al., 2014).

SCT is also associated with poorer perception of social cues (Mikami et al., 2007). One speculation is that HSCT individuals may become overwhelmed by information that is presented to them when trying to navigate social interactions and ultimately end up misunderstanding or avoiding social situations, again, possibly leading to social isolation (Willcutt et al., 2013). Studies even suggest that children with HSCT have increased social inhibition (Barkley, 2012b). One study also showed that those with HSCT had low levels of leadership, less extracurricular involvement, and less social problem-solving skills than their peers (Marshall et al., 2013). Studies of college students and adults have found those with HSCT to have lower self-reported self-esteem (Barkley, 2012a; Jarrett et al., 2014). It has been hypothesized that the lower

leadership skills seen in children with ADHD may lead to lower occupational attainment that is seen in adults with SCT (Marshall et al., 2013).

The link between SCT and internalizing symptoms is detailed below. Of relevance to SCT and social impairment, however, is research that indicates that internalizing symptoms are linked to problems with emotional experiences, including difficulties with emotional and behavioral regulation (Flannery, Becker, & Luebbe, 2014). This is important because emotion regulation supports social development and functioning, so, stated differently, emotion dysregulation is associated with social impairment (Flannery et al., 2014). Flannery, Becker, and Luebbe (2014) found a significant, albeit indirect, effect of SCT on social impairment via emotion dysregulation in their study of college students. Becker et al. (2013) had similar results in a group of psychiatrically hospitalized children, demonstrating a positive association among SCT and social problems and a negative association among SCT and overt behavioral dysregulation. One hypothesis is that SCT contributes to increased social passivity and withdrawal, which in turn may contribute to increased anxiety and depression; that is, social impairment may actually mediate the relationships between SCT and internalizing symptoms (Becker, Luebbe, Fite, Stoppelbein, & Greening, 2013). Another hypothesis is that children manifest HSCT symptoms as a result of worry and rumination that is associated with preexisting anxiety and depression, or, that SCT and internalizing symptoms have a synergistic effect on each other and in turn increase a child's social withdrawal (Becker et al., 2013).

Mikrami Huang-Pollock, Pfiffner, McBurnett, and Hangai (2007) are the only researchers to date who have completed a detailed observational analysis of the social interactions of children with SCT. They simulated a chat room experience with children with ADHD (controlling for type of ADHD and SCT symptomatology) and controls. They found that SCT

predicted fewer chat room responses, less memory for the content of the conversation, and a smaller proportion of hostile and aggressive responses. These findings support the notion that SCT involves inattention to one's environment, including social cues, and a more socially withdrawn demeanor (Saxbe & Barkley, 2014).

The social impairment seen in children with HSCT has been found cross culturally in a sample of children from Korea (Lee et al., 2016) and Nepal (Khadka Burns, & Becker, 2015).

### **SCT and Academic Functioning**

When determining if SCT is related to academic functioning, data are mixed and not as well established as the relationship between social impairment and SCT as detailed above. Carlson and Mann (2002) found that children with ADHD, LSCT, and HSCT did not differ on learning problems. Wahlstead and Bohlin (2010) found no significant relationship between levels of SCT and academic achievement per teacher ratings. In a study by Bauermeister et al. (2012) they found a small negative relationship between teacher ratings of SCT and academic achievement when controlling for ADHD symptoms, but found no relationship with parent ratings of SCT and academic performance. Becker and Langberg (2012) also found that SCT was not related to parent or teacher reports of academic impairment. SCT did not contribute to academic impairment in a community sample (Wahlstedt & Bohlin, 2010) or a school sample of children with ADHD (Becker & Langberg, 2012). Barkley (2012b) found that SCT was not related to higher rates of reading or math disorders, whereas ADHD was. Some studies showed that SCT was either unassociated with intelligence (Becker & Langberg, 2003; Skirbekk et al 2011) or associated with higher levels of intelligence when comorbid with ADHD (Marshall et al., 2014). One study by Capdevila-Brophy et al. (2014) even found that children with HSCT have fewer problems with sustained attention when compared to children who have ADHD-I or

ADHD-C who have LSCT. Some research suggests that the inattentive symptoms seen in ADHD-I contribute more to academic problems than the inattention seen in SCT (Barkley, 2013). One reason for the inconsistent findings could be that early studies looking at SCT and academic impairment did so in the context of ADHD, selecting samples with both ADHD and HSCT rather than those with HSCT alone (Barkley, 2013).

A good amount of literature, however, suggests that SCT adversely impacts aspects of academic functioning, even after controlling for symptoms of ADHD in clinical and non-clinical samples (Becker et al., 2013; Becker et al., 2016; Camprodon-Rosanas et al., 2016b; Jacobson et al., 2012; Langberg, Becker, & Dvorsky, 2013; Lee, Burns, Snell, & McBurnett, 2013). Some authors suggest that the presence of SCT symptoms might increase the probability of learning difficulties which in turn may lead to academic impairment (Camprodon-Rosanas et al., 2016a). Bauermeister et al. (2012) found that both SCT and ADHD-I were each independently related to lower academic achievement, specifically as measured by test scores. They also found that HSCT ratings were uniquely associated with lower math scores. Cortes, Servera, Becker, and Burns (2014) found that both the slowness variable of SCT and the inconsistent alertness variable were related to academic impairment, however, the slowness variable had a greater impact on academic impairment. The deficits found in the domains of attention shifting and cognitive flexibility in those with HSCT may contribute to greater academic impairment as children may have a hard time reorienting or shifting between task demands at school (Baytunca et al., 2018). Parental reports of child behaviors show that children with HSCT also have problems in self-monitoring and working memory, which could also help explain some of the academic difficulty seen in these children (Capdevila-Brophy et al., 2014).

Langberg, Becker, and Dvorsky (2013) assessed both parent and teacher reports of SCT symptoms and academic impairment and found evidence to support a relationship between SCT and academic impairment in children with ADHD. Specifically, one of the subscales on the parent report predicted impairment in organizational skills and homework. One of the subscales on the teacher report predicted homework problems and lower GPA. In this study, the variables of low energy, initiative, and motivation were the biggest contributors to academic impairment.

One study showed the slow factor of SCT was a strong predictor of homework motivation (Smith, Breaux, Green, & Langberg, 2018). One finding from this study was that SCT may not have necessarily led students to have less interest in homework but rather SCT may have been associated with low self-efficacy about one's ability to be successful with, and therefore complete the task. In their study age was negatively associated with homework performance, that is, as age increased, homework performance decreased. Homework motivation is important because youth who do not complete their homework are at risk for poor academic performance, particularly as they get older and their assignments become more challenging. Other studies have also shown that SCT was associated with lower GPA and more teacher reported homework problems, including homework completion (Langberg, Becker, & Dvorsky, 2014; Marshall et al., 2013). Homework could be particularly challenging for children who have SCT symptoms such as drowsiness, low energy, and inconsistent alertness (Marshall et al., 2013).

Research also indicates that SCT is associated with poorer study skills in college students (Flannery et al., 2016). Wilcutt et al. (2013) found that SCT was related to problems with written language and related to lower rates of reading and math achievement. One also study found HSCT to be related to symptoms of dyslexia (Camprodon-Rosanas et al., 2016). In a



sample of college students, SCT was the strongest predictor of academic problems by means of academic functioning and GPA even after controlling for demographic characteristics (i.e., sex, age, parent education, family income) and ADHD symptom severity (Becker et al., 2014).

Bernad et al. (2014) found that HSCT predicted greater academic impairment longitudinally over a one year period.

The academic impairment seen in children with HSCT has been found cross culturally in samples of children from Korea (Lee et al., 2016) and Nepal (Khadka et al., 2015).

### **SCT and Internalizing Disorders**

One question in the literature is whether SCT is a different construct from internalizing disorders (Becker et al., 2013). One study (Lahey, 2001) proposed that SCT could be a presentation of ADHD-I with comorbid anxiety and depression. Some authors suggest that SCT is just another way of identifying children with internalizing disorders, given that SCT has a higher association of internalizing symptoms than ADHD (Harrington & Waldman, 2009; Saxbe & Barkley, 2014). If SCT was just a way to manifest an internalizing disorder such as depression, the point could be made that these children may be better served with a diagnosis of depression rather than a friendlier sounding diagnosis of SCT, which could lead to neglecting important possibilities, such as suicide risk (Garner et al., 2012; Lahey 2001). This is relevant because one study of psychiatrically hospitalized children found that SCT symptoms were correlated with suicide risk even after controlling for many other demographic and behavioral variables (Becker et al., 2016).

Generally speaking, SCT is associated with more ratings of internalizing disorders than ADHD, even after controlling for ADHD symptoms and demographic characteristics (Becker et al., 2016; Bauermeister et al., 2012; Kamradt, Momany & Nikolas, 2017; Penny et al., 2009;

Saxbe & Barkley, 2014; Wilcutt et al., 2013). The association between SCT and internalizing disorders has been found in both school-based and clinic referred samples of children (Becker & Langberg, 2013a). Carlson and Mann (2002) found that children with HSCT and ADHD-I, as rated by teacher reports, had the highest rates of internalizing symptoms and withdrawn behaviors when compared to children with ADHD-I and LSCT. Not only are SCT symptoms often positively correlated with internalizing problems, they are often negatively correlated with externalizing problems (Barkley, 2013; Hartman et al., 2004; Garner, Marceaux, Mrug, Patterson, & Hodgens, 2010). Overall, research suggests that SCT and internalizing disorders are different; therefore the impairment seen among those with HSCT cannot fully be explained by the presence of internalizing symptoms (Becker, 2013; Becker et al., 2013; Lee et al., 2014; McBurnett et al., 2014).

SCT is more strongly associated with depression than anxiety (Barkley, 2013; Becker, Luebbe, Fite, Stoppelbein & Greening, 2013; Garner et al., 2012; Jacobson et al., 2012). A study by Barkley (2013) found that those in the SCT group had higher rates of depression than those children in both the ADHD group and the control group. One thought is that because SCT is categorized by slow behavior and thinking which can be associated with apathy and lethargy it is possible that the slow aspect of SCT could be a predictor of depressive symptomatology. This thought is congruent with results from Cortes, Servera, Becker, and Burns (2014) who found that SCT slowness was a significant predictor of depression and also Bernad et al. (2014) who found the same results longitudinally up to a year later. Barkley (2013a) found that only a small portion of children with HSCT had a professional diagnosis of depression, even though depression was significantly elevated in SCT children compared to both ADHD children and controls.

Garner, Mrug, Hodgins, and Patterson (2012) were not only the first to examine child and parent reports of internalizing symptoms in relation to SCT but also the first to do so while distinguishing between anxiety and depression. They found that SCT was only related to parent-reported depression; it was not related to child-reported internalizing symptoms. This study found that inattention predicted SCT even when controlling for internalizing symptoms, suggesting that SCT is not simply a byproduct of internalizing disorders comorbid with ADHD but rather a separate syndrome, with some relationship with internalizing disorders. A study by Capdevila-Brophy et al. (2014) concluded that the presence of anxiety and depressive symptoms could be responsible for the increased dysfunction in EF seen in children with HSCT. They also concluded that the presence of HSCT scores predisposes children to internalizing problems. Harrington and Waldman (2009) found that the group of children with ADHD-I and HSCT had elevations in depression, anxiety, social phobia, and obsessions compared to a control group, suggesting elevated internalizing symptomatology in their sample of clinic-referred children. A study by Becker, Luebke, Fite, Stoppelbein, and Greening (2013) used a sample of psychiatrically hospitalized children and concluded that SCT symptoms were distinct from, though associated with, ADHD-I, depression, and anxiety. These relationships also existed when controlling for the overlap of anxiety and depression and also when controlling for parental symptoms of anxiety and depression.

One study that looked at levels of anxiety in children with and without ADHD found that children with comorbid anxiety disorders and ADHD the highest levels of SCT, followed by children with ADHD, children with an anxiety disorder, and then finally control children (Skirbekk et al., 2011). This study was one of the first to examine the relationship between SCT and anxiety in children with and without ADHD, and provided rationale for continued study on

relationship among SCT and anxiety, regardless of comorbidity. Furthermore, even though SCT was related to inattention in this study it did not seem to be related to ADHD-I; rather the inattention piece seemed to be more closely related to the comorbidity of SCT and an anxiety disorder, regardless of ADHD subtype. These authors even proposed that one could speculate comorbid ADHD and HSCT increases one's predisposition to develop an anxiety disorder. Studies have shown that anxiety disorders are evenly dispersed across each subtype of ADHD; this holds true only when SCT symptoms are not included (Skirbekk et al., 2011). When SCT symptoms are included in the analyses, children with ADHD-I and HSCT levels had more anxiety than children with ADHD-I alone (Carlson & Mann 2002; Hartman et al., 2004).

A study which claimed to be the first to look at personality theory as it relates to SCT looked at sensitivity to reward and punishment as it relates to ADHD and SCT symptoms and found that sensitivity to punishment was uniquely related to SCT and internalizing problems (Becker et al., 2013). Fear and shyness were the strongest predictors of SCT in this study. Fear and shyness in this context could refer to fear or discomfort and avoidance of social situations; this supports literature that states that SCT is linked to increased social withdrawal (Becker et al., 2013). This study further suggests that SCT may be less associated with general anxiety and more closely linked to social anxiety, as evidenced by the social withdrawal and avoidance that is often elevated in children with HSCT symptoms (Becker et al., 2013).

The relationship between SCT and internalizing symptoms has also been found in a study of college students with and without formal diagnoses of ADHD, even after controlling for ADHD symptoms and demographic variables (Becker et al., 2014). SCT has also been linked to higher level of perceived stress in adults (Combs, Canu, Broman-Fulks, Rocheleau, & Nieman, 2012). This study concluded that the symptoms of SCT may impact an individual's ability to

adaptively respond to stressors to the point that one could even develop a sense of learned helplessness when faced with a stressful situation because of a maladaptive stress response (Combs, Canu, Broman-Fulks, Rocheleau, & Nieman, 2012). An observation made by Becker et al., (2014) is that patients who may not meet the criteria for an internalizing disorder at the time they are evaluated as having HSCT symptoms may be at risk for developing one, particularly if they also experience social and academic impairments, which are common among those with HSCT.

The impact of SCT on anxiety and depression is even seen cross culturally, with parent and teacher reports of Chilean students reporting HSCT is associated with both elevated anxiety and depressive symptoms (Belmar, Servera, Becker, & Burns, 2015). HSCT also predicted higher depression scores in a sample of children from Nepal (Khadka et al., 2015).

### **Transcultural Understandings**

An important consideration when examining any construct is the cross cultural utility of the construct. SCT has been validated in samples from South America (Belmar et al., 2015), Korea (Lee, Burns, & Becker, 2016b; Lee, Burns, & Becker, 2018), Nepal (Khadka et al., 2015), and Spain (Cortes et al., 2014). Because of the overlap between SCT and ADHD, a brief discussion of ADHD among Latinos precedes information about the only two studies to date specific to SCT among Latinos. Neither study of SCT among Latinos examined Latinos living in the US, as was examined in the present study.

### **ADHD among Latinos**

In 2010, Latino youth made up 22% of the children younger than 18 in the United States (Eiraldi & Diaz, 2010). Latinos are the fastest growing ethnic minority group in this country and estimates predict they will represent a quarter of all children in this country by 2050 (Gerdes, et

al., 2011). Latino youth have a higher likelihood of developing certain childhood mental disorders, including ADHD, when compared to Caucasian peers (Gerdes et al., 2011; Haack et al., 2010). Not only do Latino youth have a higher likelihood of developing ADHD but they also tend to have more severe symptoms and they are more likely to have mental health, including psychiatric, comorbidities when compared to Caucasian peers (Hinojosa et al., 2012).

Fewer than half of the children suffering from ADHD in this country receive professional services of any kind, and this percentage is thought to be lower in Latino youth, despite their increased risk of developing ADHD (Gerdes et al., 2011). Latino youth are less likely than their Caucasian or African American peers to receive either therapeutic or pharmacological treatment for ADHD, demonstrating a high level of unmet need within this population (Eiraldi & Diaz, 2010; Gerdes et al., 2011). However, many epidemiological and treatment outcome studies exclude individuals who do not speak English, so there is a lack of accurate research examining both prevalence rates and treatment outcomes among Latino youth (Haack et al., 2010). Although, the research examining service use does suggest that overall, receiving a diagnosis of ADHD increases the use of mental health services among Latino families (Eiraldi & Diaz, 2010). However, Latino youth are still significantly less likely to be diagnosed with ADHD, and therefore the need for treatment is less likely to be identified, which is often a result of practical and cultural factors and parental beliefs (Eiraldi & Diaz, 2010).

Practical factors that have been identified which may help explain the discrepancy between need for and utilization of treatment services among Latino families include: immigrations status, lack of health insurance, lack of transportation, limited parental education, low socioeconomic status, and command of the English language (Gerdes et al., 2011; Haack et al., 2010). Latinos are overrepresented in the lowest socioeconomic brackets in this country

increasing the likelihood that they are less educated and have a more limited command of the English language than one would expect from a mainly European sample (Haack, & Gerdes, 2011). Language is one of the most frequently reported barriers to treatment seeking among Latinos (Haack et al., 2010). This is likely due in part to the fact that limited command of the English language makes it difficult for parents to identify the appropriate services and providers for their children, communicate with professionals, and understand assessments and treatments of their child's disorder (Haack et al., 2010). To this, studies have shown that participation in parenting interventions, which are empirically supported treatments for ADHD to reduce child attention and behavior problems, is increased among Latino parents when these interventions are conducted in Spanish rather than English. This speaks to the importance of identifying any potential language barrier when working with Latino families (Eiraldi & Diaz, 2010). Additional factors that may shed light on the need versus utilization discrepancy include a lack of knowledge or even a distrust of the mental health field as well as a lack of bilingual mental health providers (Gerdes et al., 2011).

Cultural factors, including parental beliefs, may also play a role in the underutilization of treatment services among Latino families by having an impact on the family's etiological beliefs about mental health disorders (Gerdes et al., 2011). Specifically, research indicates that parents may not believe in a biopsychosocial conceptualization of mental health disorders. As compared to Caucasian parents, Latino parents are more likely to hold spiritual beliefs about the cause of mental health disorders (Gerdes et al., 2011; Haack et al., 2010). This may increase the likelihood of a Latino parent accepting a child's behavior that a Caucasian parent may view as problematic and in need of mental health treatment (Gerdes et al., 2011). In one study, the sample of Latino parents viewed hyperactive-impulsive behaviors that were symptomatically

diagnostic of ADHD as developmentally normal (Gerdes et al., 2011; Haack et al., 2010).

Another study showed that parental report of ADHD symptoms was lowest among parents of Latino children (Eiraldi & Diaz, 2010).

Research also suggests that Latino parents are unlikely to base a child's need for mental health services on symptom criteria, which is the common diagnostic method used in the DSM-5 (APA, 2013). This parental perception of behavioral symptoms and lack of perceived need for treatment are significant barriers to mental health diagnoses and mental health service utilization because an accurate diagnosis of ADHD often relies heavily on parental reports of a child's behaviors (Eiraldi & Diaz, 2010). While Latino parents may not identify that their child meets certain symptoms detailed in the DSM-5 for ADHD they may report functional impairment such as identifying that their child is not doing well academically, not getting along with his peers, or is having difficulty completing chores and tasks at home. These symptoms may prompt the Latino parent to seek professional help for their child (Haack, & Gerdes, 2011). The identification of ADHD symptoms has been found to differ between minorities and European American families, leading some to suggest looking at functional impairment may be a more universal way to help diagnose ADHD (Haack, & Gerdes, 2011).

### **SCT among Latinos**

To the best of the author's knowledge only two studies to date have discussed SCT in samples exclusive to Latino children. The first study, by Bauermeister et al. (2005) aimed to examine the construct validity of ADHD-I and ADHD-C in a school-based sample of Latino children. 98 Puerto Rican children in San Juan between the ages of 6-11 participated in this study. 44 of the children met the DSM-IV criteria for ADHD-C, 25 met the criteria for ADHD-I, and 29 did not meet criteria for ADHD.



The authors' conclusions supported the construct validity of ADHD in their sample. The children in the ADHD-I group had significantly higher SCT scores both at home and at school than the children with ADHD-C and those without ADHD. They found the children in the ADHD-I group to have more sluggishness, under activity, confusion, daydreaming behaviors, and staring as reported by both mothers and teachers. The authors concluded that in their sample the ADHD-I children were characterized by a later onset of ADHD symptoms, HSCT, less externalizing behavior problems, and less impairment in adaptive functioning. This pattern of behavior was very different than that found in the children with ADHD-C, leading the authors to conclude that in this sample ADHD-I and ADHD-C represent distinct disorders. However, this study is not informative with regards to the extent to which those children in the ADHD-I group demonstrate levels of SCT as there were no subgroups of SCT within the ADHD-I group (Harrington & Waldman, 2009).

Another study by Bauermeister, Barkley, Bauermeister, Martínez, and McBurnett, (2012) used parent and teacher reports of children aged 6-11 in San Juan, Puerto Rico to look at SCT symptomatology. Their results supported many previous studies that suggested SCT is a domain distinct from both inattention and hyperactivity/impulsivity. SCT was correlated with internalizing problems in both parent and teacher reports, though it was more strongly correlated in the parent reports. Regarding academic performance, this study found a weak association with SCT and math achievement. These studies serve as preliminary evidence of the construct validity of SCT among Latino children by beginning to address cultural gaps in the literature. Future studies focusing specifically on SCT as its own construct in a Latino population in the United States are needed to further validate the construct.

Given the above review of the literature, it is speculated that SCT may soon be accepted as a neurodevelopmental disorder separate from ADHD. In the meantime, additional research exploring SCT and common external correlates must be done, particularly as it pertains to the transcultural utility of SCT; the current study aimed to do just that.

## **Chapter 2: Hypotheses**

### **Hypothesis One**

It was hypothesized that roughly 6% of the children in this sample would have HSCT. Few studies to date have examined the prevalence rates of SCT, though Barkley (2013) did find that roughly 6% of children in the United States have HSCT.

### **Hypothesis Two**

It was hypothesized that SCT would be a distinct factor from each ADHD subtype in a sample of school aged Latino children. Even though SCT and ADHD-I symptoms are often highly correlated, the literature consistently finds strong internal validity for the support of SCT as a distinct factor from ADHD-I (Becker, 2013; Becker et al., 2013; Becker et al., 2014; Willcutt et al., 2014). To date, two studies have examined SCT in school-aged Latino children in Puerto Rico (Bauermeister et al., 2005; Bauermeister et al., 2012). No studies have yet examined SCT as it relate to ADHD in a group of Latino children living in the United States.

### **Hypothesis Three**

It was hypothesized that HSCT when controlling for ADHD-I would predict greater impairments in social functioning as assessed through peer relationships and quality of interactions with peers and adults. Research suggests that SCT has adverse effects on social functioning even after accounting for symptoms of ADHD (Becker et al., 2013).

### **Hypothesis Four**

It was hypothesized that HSCT when accounting for ADHD-I would predict greater impairments in academic functioning. The data are mixed with regards to SCT and academic functioning. While some studies show a positive relationship or even no relationship (Becker & Langberg, 2012; Wahlstedt & Bohlin, 2010; Willcutt et al., 2014), many studies suggest that

SCT has an adverse impact on academic functioning (Becker et al., 2013; Jacobson et al., 2012; Langberg et al., 2013; Lee et al., 2013).

### **Hypothesis Five**

It was hypothesized that HSCT when accounting for ADHD-I would predict greater impairments in anxiety. SCT has been associated with higher ratings of anxiety symptoms than ADHD even after controlling for ADHD symptoms (Bauermeister et al., 2012; Penny et al., 2009; Saxbe & Barkley, 2014). In a study of Latino children in Puerto Rico, HSCT was found to be associated with more internalizing symptoms, including anxiety (Bauermeister et al., 2012).

### **Hypothesis Six**

It was hypothesized that HSCT when accounting for ADHD-I would predict greater impairments in depression. SCT has been associated with higher rates of depressive symptoms than ADHD even after controlling for ADHD symptoms (Bauermeister et al., 2012; Penny et al., 2009; Saxbe & Barkley, 2014). In a study of Latino children in Puerto Rico, HSCT was found to be associated with more internalizing symptoms, including depression (Bauermeister et al., 2012).

### **A Note Regarding the Present Study**

Due to unforeseen circumstances, an insufficient number of participants were recruited to run formalized statistical analyses on the data that were obtained. As a result, this dissertation will instead be presented as a qualitative analysis of four children whose mothers' reports indicated some level of SCT. The above hypotheses were taken into consideration when exploring the data and the discussion will speak to the prevalence of SCT as well as the social functioning, academic functioning, and also the anxiety and depressive symptoms of the children described in this sample.

## **Chapter 3: Method**

### **Overview**

This dissertation examined the presence of SCT and its possible relationship to social and academic functioning and internalizing symptoms of anxiety and depression in a case study of inner-city Latino children. The central topic explored was do SCT symptoms exist within this population of school-aged children? For those children with SCT symptom elevation, how did they present in terms of social functioning, academic functioning, anxiety, and depression symptoms?

### **Design**

This was a qualitative examination of four parent reports indicating varying levels of SCT symptoms in their children.

### **Participants**

Participants were the parents of students enrolled in a public charter school in a large, northeastern city. This school represented a sample of convenience. The majority of the students in the school were of Latino descent. Every eligible first through sixth grade student in the school was invited to participate. There were roughly 40-50 students per grade level, so approximately 250 families had an opportunity to enroll in the study. Parents with multiple children were permitted to fill out questionnaires for each eligible child.

There were thirteen participants who completed this study from September 2017 through March 2018. Of the thirteen, four of the participants endorsed SCT symptoms for their children. Each participant was the child's mother. Three of the participants were born in the United States; the fourth was born in Puerto Rico and immigrated to the United States when she was five years old. One of the households was bilingual (English/Spanish), and the remaining three

spoke exclusively English in the home. Of the children, there were two males and two females. There was one 3<sup>rd</sup> grade student, two 4<sup>th</sup> grade students, and one 5<sup>th</sup> grade student. They ranged in age from 8-10 years old. Each child was born in the United States. None of the children were taking medications regularly.

**Inclusion criteria.** Participants needed to be a parent or legal guardian of a Latino first through sixth grader at the public charter school. The participants needed to be able to read and respond to questionnaires in either English or Spanish. Consent forms and measures were available in both languages.

**Exclusion criteria.** Provided the inclusion criteria were met, there were no specific exclusion criteria for this study.

## Measures

**Demographic questionnaire.** Each participant completed a demographic form about herself and her child including: her age; relationship to the child; her education level; age and gender of child; the child's grade level; language(s) spoken at home; where she was born; where the child was born; any medications the child is regularly taking; and household composition including: who lives in the home and each household member's relation to the child.

**Child and Adolescent Disruptive Behavior Inventory.** (CADBI; Burns, Lee, Becker, Servera, & McBurnett, 2014). The CADBI is available as a parent and teacher report measure of a child's behaviors. The questionnaire asks the respondent to describe how often a child has engaged in particular behaviors in the past month. The complete measure consists of nine scales that measure: SCT, ADHD-I, ADHD-HI, ODD toward Adults, ODD toward Peers, Anxiety, Depression, Academic Functioning, and Social Functioning. In the present study, all scales except for the two ODD scales were used. The measure has been normed on kindergarten

through sixth grade students and translated into multiple languages, including Spanish (Bernad et al., 2014). One strength of using this measure over other measures of SCT that have been developed is that the CADBI examines multiple domains within a single measure, this allows for internal consistency with the scale and anchors, and can help minimize confusion for the respondents (Bernad et al., 2015).

Lee et al. (2013) validated this measure on a sample of 366 teacher and 706 parent ratings of children in kindergarten through sixth grades. All of the ADHD-I symptoms loaded on the ADHD-I factor and did not load on the SCT factor. The SCT scale had a weak association with ADHD-HI and ODD, however, ADHD-I, anxiety, and depression had positive relationships with ADHD-HI and ODD. In addition, SCT predicted academic and social impairment even after controlling for ADHD-I, ADHD-HI, anxiety, and depression. These findings were consistent among parent and teacher ratings. This general pattern appears in additional studies that have also used the CADBI (see Belmar et al., 2015; Bernard et al., 2015; Lee et al., 2014, for examples). CADBI scales also have good 6-week, 12-month, and 2-year test-retest stability (Bernard et al., 2014; Bernard, Severa, Becker, & Burns, 2015; Severa et al., 2015). The nine SCT items have shown convergent and discriminant validity, both in the United States and cross culturally, including Spain and Chile (Becker, & Burns, 2015; Belmar, et al., 2015; Bernad et al., 2015; Burns et al., 2013; Severa et al., 2015). However, no validity studies have been done to date specific to Latinos living in the United States.

Lee et al. (2013) found that the nine SCT items on the CADBI were represented by two factors. The first factor was inconsistent alertness and consisted of: daydreaming, alertness fluctuations, absentmindedness, and losing one's train of thought. The other factor was called slowness and consisted of slowed thinking, slowed behavior, and drowsiness. The SCT

symptom of mental confusion loaded equally on both of the factors. Thus, this study provided support for the multidimensionality of SCT with two factors: cognitive and behavioral using this measure.

The symptoms for most of the scales are rated on a 6-point Likert scale ranging from “almost never (never or about once per month)” to “almost always (many times per day)”. The Academic Functioning and Social Functioning scales are rated on a seven point Likert scale ranging from: “severe difficulty” to “excellent performance (excellent interactions)”. The items on these two scales are reverse keyed so the higher the score the lower the impairment.

**Scoring.** This scale is currently being used as a research scale so there are no norms or cut-off scores available at this time. The acceptable ways of scoring the measure were discussed via email correspondence with the scale’s primary author. For the purpose of the present study a dichotomy was created to facilitate specific item analysis. A response of 0 or 1 on the scale was considered indicative of a “no” response or not exhibiting the behavior or characteristic in question. A score of 2 or above was considered indicative of a “yes” response, or of exhibiting the behavior or characteristic in question.

On the SCT scale, the sum of the items on the scale was added together for a possible total of 45 (9 items with a maximum value of 5 points each). A score of 20 or below was characterized as LSCT and 21 and above was characterized as HSCT.

**Subscales.** The seven subscales that were used in the present study are described below.

**SCT.** The SCT scale consists of nine items that include: daydreams, alertness changes from moment to moment, absent-minded, loses train of thought, easily confused, looks drowsy even after having a good night’s sleep, thinking seems slow, behavior is slow, and lacks energy during activities.



*ADHD-I and ADHD-HI.* There are two different ADHD scales, each consisting of nine items; one scale for symptoms of ADHD-I and the other for symptoms of ADHD-HI. The two ADHD scales are derived from the DSM-5 descriptions of ADHD.

*Social Functioning.* The Social Functioning scale consists of four questions and asks about the child's interactions with: teachers at school, adults in situations other than school, peers in school, and peers outside of school.

*Academic Functioning.* The Academic Functioning scale contains four items: completion of homework, reading skills, arithmetic skills, and writing skills.

*Anxiety.* The Anxiety scale consists of six questions which target a range of anxiety symptoms including: seems anxious about separation from parents, seems anxious about many things, seems anxious about specific objects or situations, seems anxious about contamination, seems anxious about being in social situations, and reports feeling physically uncomfortable when there is not an apparent cause.

*Depression.* The Depression scale consists of six questions to assess for depressive symptomatology including: seems sad, unhappy, or depressed; feels worthless; seems lonely; seems not to enjoy activities anymore; seems to feel hopeless; and seems to lack energy necessary to complete activities.

**Screen for Childhood Anxiety Related Emotional Disorders-Parent.** (SCARED-P; Birmaher et al., 1997). The SCARED is a self-report questionnaire assessing anxiety disorder symptoms in children and adolescents aged 8-18. There are two separate report scales, the SCARED-C (children) and SCARED-P, which was used in the present study. The SCARED measures symptoms of the main classifications of anxiety disorders in the DSM-IV-TR. The core features of the anxiety disorders were unchanged from DSM-IV-TR to DSM-5, and as such

the results can generalize to current diagnostic criteria with ease (APA, 2000; APA, 2013). The full version of the scale has 41 questions. The SCARED-P asks parents to rate their child's anxiety symptoms using a three-point Likert Scale ranging from "not true or hardly ever true" to "very true or often true".

Reliability and validity studies of the SCARED have shown reliable internal consistency with a Chronbach's alpha of .94 (Muris, Schmidt, & Merckelbach, 2000). The SCARED shows good test-retest reliability, with an intraclass correlation coefficient of .86 (Monga et al., 2000; Muris et al., 2000). The SCARED also shows good discriminant validity, both between children with anxiety and non-anxiety disorders and also among individual anxiety disorders (Monga et al., 2000; Muris et al., 2000). In addition, the SCARED shows good concurrent validity in that the SCARED scores correlate highly with scores on other childhood anxiety measures (Muris et al., 2000).

The SCARED is presently available in nine languages, including Spanish. In one epidemiological study (Canals, Hernandez-Martinez, Cosi, & Domenech, 2012) the Spanish version of the SCARED-P showed a reliability using Chronbach's Alpha of .88.

**Scoring.** A sum of all of the responses creates a total SCARED score. A score of 25 or greater may indicate the presence of an anxiety disorder. There are five additional subscales which include: panic disorder, generalized anxiety disorder, separation anxiety, social anxiety, and school avoidance. The corresponding items on each subscale are added together to create specific scores in the same way the total score is obtained.

**Patient Reported Outcomes Measurement Information System Parent Proxy Peer Relationships Short Form.** (PROMIS; Irwin et al., 2012). In addition to the four questions on the CADBI Social Functioning scale, the PROMIS was used to measure social functioning

specific to peer relationships. This is a seven item questionnaire asking parents to rate their child's peer relationships over the past seven days using a five point Likert Scale ranging from "never" to "almost always". The questionnaire includes the following items: my child felt accepted by other kids, my child was able to count on his friends, my child was good at making friends, my child and his friends helped each other out, other kids wanted to be my child's friend, other kids wanted to be with my child, and other kids wanted to talk to my child.

An analysis of all of the parent proxy PROMIS scales revealed that the Peer Relationships scale has a reliability of greater than .90 (Varni et al., 2011). Additionally, this measure is available in multiple languages, including Spanish.

**Scoring.** The sum of the answers on the scale is multiplied by the number of items on the form that was used; this number is then divided by the total number of questions that were answered. That number is then converted to a T-score in a scoring table that is provided by the test manufacturer. The T-score has a mean of 50 and a standard deviation of 10.

### **Procedures/Recruitment**

Participants were asked to respond to questionnaires about their child's behaviors either in a paper and pencil format or online. The respondent was also asked to provide their name along with an email address if they wanted to be entered into a raffle upon completion of data collection.

Extensive efforts were made at recruiting participants for this study over a six month period. Members of the research team attended Back to School Night at the charter school and allowed parents the opportunity to either complete the questionnaires at that time or take the measures home and return them. No parents chose to complete the questionnaires at that time, though some parents took the questionnaires home to complete. Additionally, three separate

pizza nights were offered in which parents and children could come to the school, complete the measures, and have a free pizza dinner. Researchers attended three days of parent teacher conferences with a table set up, again offering parents to fill out the questionnaires at that time or return them later. The questionnaires were then typed up onto Survey Monkey. The school guidance counselor sent a message out on two separate occasions to all parents via the school messaging system inviting them to participate in the study online. Extra incentives were offered including a day in which children of parents who completed the study were allowed to “dress down” (wear plain clothes instead of their uniform), and an additional pizza lunch was also offered to the students. Furthermore, each parent who was given a paper packet was given 1-3 reminder calls to return the packet to the school. The majority of the calls were unanswered, in which case the researcher left a message when possible; though many of the voice mailboxes were full. Some of the numbers were disconnected or no longer in service. Of the calls that were answered some parents indicated that they still had the packet and would complete and return it. One parent said she started the questionnaires but there were too many items and they weren’t interested in finishing it. Another parent who completed the questionnaires online for one of her children was unable to complete them for her other child because she did not have a second device and the survey was restricted to one set of responses per IP address. Finally, a researcher contacted a sister school within the same organization via phone and email to try to expand the study to other schools; no contact was reciprocated.

## **Chapter 4: Results and Discussion**

Seven of the questionnaire packets that were given out were completed and returned, three questionnaire packets were completed at a school pizza night, and an additional three participants completed the questionnaires online. Of the thirteen respondents, there were four who indicated the presence of SCT symptoms for their child. The fewest number of SCT symptoms was 3 and the most was 9 (which is the total number of items on the SCT scale). The presence of SCT symptoms was indicated by any rating of 2 or above on the SCT subscale of the CADBI. A rating of 2 on the CADBI indicates that a symptom occurs several times per week. This 2 or above algorithm was used for each of the additional subscales of the CADBI.

Of the four participants who endorsed SCT symptoms, two of the participants fell into the HSCT range. That means about 15% of the current sample showed HSCT, which is higher than the 6% that was found by Barkley (2013) and hypothesized in the present study. See Table 1 for a comparison of the results for each participant.

### **Participant A**

#### **Demographics**

Participant A was a 33 year old mother, born in Philadelphia, with some college education. Her daughter whose behaviors are described was ten years old. She was also born in Philadelphia and is currently in the 5<sup>th</sup> grade. This family spoke English in the home. Participant A, the child about whom the survey was completed, and the child's father and sister all lived in the home.

#### **CADBI**

**SCT.** Participant A reported that her daughter demonstrates three of the nine behaviors on the SCT scale several times per week (2 on a 0-5 scale): alertness fluctuates, absentminded, and loses train of thought.

Participant A indicated that about once per week (1 on a 0-5 scale) her daughter daydreams during homework or home activities.

Participant A reported that none of the aforementioned SCT symptoms currently cause academic or social difficulties for her daughter.

**Anxiety.** Participant A endorsed two of the symptoms of anxiety as occurring about once per week (1 on a 0-5 scale), which were that her daughter seems anxious about many things, including specific objects or situations.

Participant A indicated that none of the aforementioned anxiety symptoms currently cause academic or social difficulties for her daughter.

**Depression.** Participant A endorsed zero of the seven items on the Depression scale.

**ADHD-I.** Participant A reported that about once per week (1 on a 0-5 scale) her daughter shows five of the nine symptoms of ADHD-I. She endorsed that her daughter has trouble paying attention, makes careless mistakes, is forgetful, easily distracted, and loses things necessary for tasks.

Participant A indicated none of the aforementioned ADHD-I symptoms currently cause academic or social difficulties for her daughter.

**ADHD-HI.** Participant A reported that her daughter demonstrates two of the nine behaviors on the ADHD-HI scale about once per week (1 on a 0-5 scale). Participant A reported that at home her daughter is too loud or noisy and blurts out answers before the question is completed.

Participant A indicated that the aforementioned ADHD-HI symptoms do not cause her daughter academic difficulty but indicated that these symptoms do cause her slight social difficulties.

**Social functioning.** Participant A reported moderately above average (5 on a 0-6 scale) interactions with both parents and adults other than parents. Participant A indicated excellent interactions (6 on a 0-6 scale) with brothers and sisters and other children in the home and community.

**Academic functioning.** Participant A reported moderately above average (5 on a 0-6 scale) ability in arithmetic skills and writing skills. She indicated excellent performance (6 on a 0-6 scale) in completion of homework assignments and reading skills.

## **SCARED**

Participant A's overall SCARED score was a 5. A 25 or greater is the threshold for an anxiety disorder. None of the individual subscales of the SCARED (panic disorder, generalized anxiety disorder, separation anxiety, social anxiety, or school avoidance) approached a level which would be considered clinically significant.

There were five items on the scale that were indicated to be somewhat or sometimes true (1 on a 0-2 scale). Those five items fell into two different anxiety symptom domains. The first domain was social anxiety, and the respondent reported that her child is shy, does not like going places or being around people she doesn't know well, and feels nervous when she is around other people and they have to watch her do something like read aloud. The participant also endorsed one item on the school avoidance scale, which was that her daughter gets headaches when she is at school.

## **PROMIS**

The responses of this measure were converted into a T-score to gain an overall score for the PROMIS. T=50 is the average T-score, and indicates normal peer relationships. Participant A's T-score was in the average range (T=53).

Participant A selected the highest rating, almost always (4 on a 0-4 scale), for six out of the seven items on this questionnaire. Those items included that her daughter: felt accepted by others, others wanted to be with her or be her friend, was good at making friends, could count on her friends, and that she and her friends helped each other out. The final item, other kids wanted to talk to her was endorsed as occurring sometimes (2 on a 0-4 scale).

### **Summary**

Participant A endorsed the fewest number of SCT items with the least severity of the four participants. The pattern of symptoms all fell onto what Lee et al. (2013) found to be the inconsistent alertness factor of SCT. That is, this child's SCT symptomatology (i.e., alertness fluctuates, absentminded, and loses train of thought) is consistent with a cognitive presentation of SCT.

This child is reported to have minimal difficulties with behavior. She only experiences slight social difficulty in terms of blurting out answers to questions and being too loud or noisy at home. In all other domains assessed, this child had no social difficulties and appears to have no difficulty establishing and maintaining relationships with others. Additionally, she is reported to be performing above average to excellent in each of the academic domains assessed.

This child showed no real signs or symptoms of ADHD, aside from some subthreshold forgetfulness and distractibility on the inattentive domain. Her mother also reported a couple of subthreshold ADHD-HI symptoms, though as mentioned above, they only lead to slight social difficulty for her daughter. Those symptoms could be more representative of her SCT than true



ADHD symptoms. For example, due to her difficulty remaining alert and on task so she could be unaware of certain cues in her environment and therefore could be noisy or blurt things out when it may be socially inappropriate to do so. Participant A reported her daughter to have minimal symptoms of anxiety, all of which were subthreshold for any anxiety disorder.

Participant A reported her daughter to have no depressive symptoms.

This child may be good example of someone who is exclusively LSCT, with a cognitive presentation of symptoms. She shows no signs of comorbidity with ADHD, anxiety, or depression. Her few symptoms do interfere slightly with her social functioning. However, she is still able to maintain strong social relationships, both within and outside of the family.

### **Participant B**

#### **Demographics**

Participant B was a 36 year old mother with a high school education. She was born in Puerto Rico and moved to the United States when she was five years old. Her son whose behaviors are described was 8 years old and is in the 3<sup>rd</sup> grade. The family spoke English in the home. Participant B, the child about whom the survey was completed, and the child's father, sister, and two brothers all lived in the home.

#### **CADBI**

**SCT.** Participant B indicated that many times per day (5 on a 0-5 scale) her son has slow behavior and lacks energy during homework or home activities. Participant B endorsed that several times per day (4 on a 0-5 scale) her son is easily confused during homework or home activities. Participant B reported that several times per week (2 on a 0-5 scale) her son's alertness changes.

Participant B endorsed that about once per week (1 on a 0-5 scale) her son has slow thinking and loses train of thought during homework or home activities.

Participant B indicated that the aforementioned SCT symptoms currently do not cause academic difficulties for her son; however, they do currently cause him social difficulties.

**Anxiety.** Participant B indicated that many times per day (5 on a 0-5 scale) her son seems anxious in social situations. Participant B reported that several times per day (4 on a 0-5 scale) her son seems anxious about many things.

Participant B endorsed that about once per week (1 on a 0-5 scale) her son feels physically uncomfortable when there is no apparent cause.

Participant B reported none of the aforementioned anxiety symptoms currently cause academic or social difficulties for her son.

**Depression.** Participant B reported that many times per day (5 on a 0-5 scale) her son seems to lack the necessary energy to do things. Participant B indicated that several times per week (2 on a 0-5 scale) her son seems cranky or irritable for no apparent reason.

Participant B reported that about once per week (1 on a 0-5 scale) her son seems to feel worthless.

Participant B endorsed none of the aforementioned depressive symptoms currently cause academic or social difficulties for her son.

**ADHD-I.** Participant B endorsed seven out of the nine items on the ADHD-I scale. Six or more symptoms of ADHD-I are needed for consideration of a diagnosis.

Participant B reported that many times per day (5 on a 0-5 scale) her son has difficulty keeping his attention focused. Participant B indicated that several times per day (4 on a 0-5 scale) her son does not pay close attention, makes careless mistakes, and that he does not listen

when spoken to directly. Participant B endorsed that about once per day (3 on a 0-5 scale) her son is easily distracted, unorganized, and avoids tasks that require sustained mental effort.

Participant B indicated that several times per week (2 on a 0-5 scale) her son does not follow through on instructions.

Participant B reported none of the aforementioned ADHD-I symptoms currently cause academic or social difficulties for her son.

**ADHD-HI.** Participant B indicated that many times per day (5 on a 0-5 scale) her son talks too much, blurts out answers to questions before the question is completed, and interrupts others.

Participant B reported that about once per week (1 on a 0-5 scale) her son has difficulty waiting his turn in home activities.

Participant B indicated none of the aforementioned ADHD-HI symptoms currently cause academic or social difficulties for her son.

**Social functioning.** Participant B indicated excellent interactions (6 on 0-6 scale) with: parents, adults other than parents, brothers and sisters, and other children in the community.

**Academic functioning.** Participant B reported excellent performance (6 on a 0-6 scale) on her son's completion of homework assignments. Participant B endorsed average performance for grade level (3 on a 0-6 scale) for the remaining academic skills: reading, arithmetic, and writing.

## **SCARED**

Participant B's overall SCARED score was a 35. A 25 or greater is the threshold for an anxiety disorder. A generalized anxiety disorder scale score of 7 or more is the threshold for generalized anxiety disorder; this child's score was a 14. A separation anxiety scale score of 5 or

more is the threshold for separation anxiety disorder; this child's score was a 9. Additionally, Participant B's social anxiety scale score of 7 was approaching significance as a score of 8 or more is the threshold for social anxiety disorder.

Participant B's report indicated that her son met the threshold for generalized anxiety disorder. Participant B endorsed the following items about her son: he is nervous, he is a worrier and worries about: other people liking him, being as good as other kids, things working out for him, how well he does things, things that have already happened, and what is going to happen in the future. She also indicated that people tell him he worries too much.

Participant B's report also indicated that her son met the threshold for separation anxiety disorder. The items she endorsed about her son included: he worries about sleeping alone and is scared to sleep away from home, he has nightmares about something bad happening to him, he worries that something bad will happen to his parents, he doesn't like to be away from his family, and he is afraid to be alone in the house.

Participant B's responses approached the threshold for social anxiety disorder. Participant B indicated that her son exhibits the following symptoms of social anxiety including: it is hard for him to talk with people he doesn't know well, he is shy and feels shy around people he doesn't know well, he feels nervous being around or going to places where there will be people he doesn't know well, and he is nervous when he is with other people and has to do something while they watch him like read aloud in class.

## **PROMIS**

The responses of this measure were converted into a T-score to gain an overall score for the PROMIS. T=50 is the average T-score, and indicates normal peer relationships. Participant B's T-score was more than one standard deviation below average (T=37).

Participant B indicated almost always (4 on a 0-4 scale) that other kids wanted to talk to her son. For the remaining items on the scale, Participant B indicated that sometimes (2 on a 0-4 scale): other kids wanted to be her son's friend or be with him, her son was good at making friends and felt accepted by others his age, her son was able to count on his friends, and that he and his friends helped each other out.

### **Summary**

Participant B did not endorse as many SCT symptoms as some of the other participants in this study. However, the majority of his symptoms occur at least several times per day. Because of the frequency of his symptoms, he was classified as HSCT. Additionally, he presented on the slowness factor outlined by Lee et al. (2013). The most problematic behaviors for him included lacking energy, slowed behavior, and mental confusion, all of which loaded on that behavioral factor. Accordingly, some behavioral concerns did appear in the responses, particularly around ADHD-HI symptoms. This child was reported to talk too much, blurt out answers before a question is completed, and to interrupt others many times per day. All of these symptoms are not only behavioral but also may be perceived as annoying by others; they may contribute more to his deficits in peer relationships than be representative of ADHD.

Participant B endorsed a frequency of at least once per day on seven out of the nine items on the items on the ADHD-I scale, which are enough symptoms for the consideration of ADHD-I. In the absence of quantitative analyses, is unclear whether SCT and ADHD-I are unique constructs for this child and this is a relationship of comorbidity or if they are measuring different aspects of the same construct. However, his significant troubles on the ADHD-I domain seem to be more cognitively based (keeping focused, listening when spoken to) rather

than the behavioral focus of his SCT symptoms, leading one to hypothesize that for him this could be the presentation of two separate, comorbid syndromes.

His peer relationships are significantly less than what would be expected in a school-based sample. As is consistent with some of the literature on SCT, the pattern of peer neglect (Becker, 2013; Carlson & Mann, 2002) may be present by some of Participant B's responses on the PROMIS as she reported that only sometimes (2 on a 0-4 scale) did other kids want to be with her son and be his friend and only sometimes did he feel accepted by other kids. However, on the Social Functioning scale of the CADBI Participant B reported excellent interactions (6 on a 0-6 scale) for each of the domains. The difference between the two scales is the CADBI focuses more on parent, adult, and family relationships while the PROMIS explores peer relationships exclusively. It would appear as if this child has significant difficulty with relationships outside of his home and immediate family, where his social interactions are much better.

This can be interpreted in the light of the significant anxiety that Participant B indicated her son to have. His anxiety scores were the highest of the four participants explored in this study. His general and separation anxiety scale scores on the SCARED met the indication for the respective disorders. His social anxiety score was approaching the threshold for a disorder as well. It is possible his trouble with social situations has an impact on his SCT symptoms, or that his SCT symptoms have led him to have difficulty in social situations. Furthermore, it was reported on the SCARED that he is scared if he sleeps away from home and that he does not like to be away from his family. These worries may further explain his social difficulties; if he does not like to be away from home, it may be more difficult for him to establish relationships with same-aged peers. He may also prefer to be around family because he is so anxious in social

situations that he avoids them, which may cause peers to lose interest in engaging with him, ultimately leading to peer neglect.

Participant B had no major issues with academic functioning, and appeared to be performing at or above what is expected for his grade level. Of the two symptoms of depression that were indicated, the one that was reported to happen many times per day was seems to lack energy necessary to complete tasks or participate in activities. This may fit better in the context of SCT; particularly given that his SCT scores are more behaviorally focused and his most severe SCT symptoms were that he has slow behavior and lacks energy to do things at home. Even though a lack of energy was endorsed on both the SCT and depression scale, his only other depressive symptom was that he sometimes seems irritable or cranky for no reason; he endorsed several other SCT symptoms. Because of this, one may conclude that his lack of energy is more representative of SCT than depression.

Here one can see the presentation of a child who may be considered HSCT in the behavioral domain with multiple comorbidities. He struggles with his peer relationships but does well in relationships with his own family. He also has extremely elevated anxiety scores across multiple domains. He is, however, reported to be performing at what would be expected of him academically and showed minimal signs of depression. This child would likely be considered to have behavioral HSCT with comorbid ADHD-I, generalized anxiety, and separation anxiety disorders. He also has social impairments, likely including peer neglect.

### **Participant C**

#### **Demographics**

Participant C was a 45 year old mother, born in Philadelphia, with a high school education. Her daughter whose behaviors are described was 9 years old and is in the 4<sup>th</sup> grade.

The family spoke both English and Spanish in the home. Participant C, the child about whom the survey was completed, and six other immediate and extended family members lived in the home.

### **CADBI**

**SCT.** Participant C reported that about once per day (3 on a 0-5 scale) her daughter lacks energy during homework or home activities. Participant C indicated that several times per week (2 on a 0-5 scale) her daughter has inconsistent alertness, daydreams, loses train of thought, and is easily confused during homework and home activities.

Participant C endorsed that about once per week (1 on a 0-5 scale) her daughter is absent-minded and has slow thinking and behavior during homework or home activities.

Participant C reported that the aforementioned SCT symptoms currently cause slight academic and social difficulties for her daughter.

**Anxiety.** Participant C indicated that several times per week (2 on a 0-5 scale) her daughter seems anxious about being in social situations.

Participant C reported that about once per week (1 on a 0-5 scale) her daughter seems anxious about many things including separation from her parents and specific objects or situations; she was also reported to feel physically uncomfortable when there is no apparent cause.

Participant C endorsed that the aforementioned anxiety symptoms currently cause slight academic and social difficulties for her daughter.

**Depression.** Participant C indicated that about once per week (1 on a 0-5 scale) her daughter seems to be sad or unhappy, feel worthless, and that she seems irritable or cranky for no apparent reason.



Participant C reported that the aforementioned depressive symptoms currently cause slight academic and social difficulties for her daughter.

**ADHD-I.** Participant C indicated that about once per week (1 on a 0-5 scale) her daughter has difficulty keeping her attention focused, is forgetful or easily distracted, avoids tasks that require sustained mental effort, and does not seem to listen when spoken to directly.

Participant C reported that the aforementioned ADHD-I symptoms currently cause slight academic and social difficulties for her daughter.

**ADHD-HI.** Participant C endorsed that several times per day (4 on a 0-5 scale) her daughter talks too much, blurts out answers to questions before the question is completed, and interrupts others. Participant C indicated that about once per day (3 on a 0-5 scale) her daughter has difficulty waiting her turn at home. Participant C also reported that several times per week (2 on a 0-5 scale) her daughter acts as if she is “driven by a motor” or seems “on the go” during home activities.

Participant C endorsed that about once per week (1 on a 0-5 scale) her daughter is too loud and runs or climbs on things when it is inappropriate to do so.

Participant C indicated that the aforementioned ADHD-HI symptoms currently cause slight academic and social difficulties for her daughter.

**Social functioning.** Participant C endorsed excellent interactions (6 on a 0-6 scale) with brothers and sisters and also with other children in the home and community. Participant C indicated moderately above average (5 on a 0-6 scale) interactions with parents and adults other than parents.

**Academic functioning.** Participant C reported excellent performance (6 on a scale of 0-6) for her child in each of the academic domains listed: completion of homework assignments and reading, arithmetic, and writing skills.

### **SCARED**

Participant C's overall SCARED score was a 19. A 25 or greater meets the threshold for an anxiety disorder. A score of 5 or higher on the separation anxiety scale meets the threshold for separation anxiety disorder; this child scored a 6. A score of 9 or higher meets the threshold for generalized anxiety disorder; her score was approaching significance at an 8.

Participant C's responses indicated that her daughter met the threshold for separation anxiety disorder. Participant C endorsed the following items about her daughter: she worries about sleeping alone and is scared to sleep away from home, she has nightmares and worries about something bad happening to her parents, she is afraid to be alone in the house, and she doesn't like being away from her family.

Participant C's responses on the generalized anxiety disorder scale were approaching clinical significance. Participant C reported the following about her daughter: she is a worrier and worries about: how well she does things, being as good as other kids, other people liking her, things working out for her, and things that have already happened.

### **PROMIS**

The responses of this measure were converted into a T-score to gain an overall score for the PROMIS. T=50 is the average T-score, and indicates normal peer relationships. Participant C's T-score was in the average range (T=56).

Participant C indicated almost always (4 on a 0-4 scale) to the following items about her daughter: other kids want to talk with her, be with her, and be her friend; she is good at making

friends, she can count on her friends, and she and her friends help each other out. Participant C answered often (3 on a 0-4 scale) to the remaining statement that her daughter feels accepted by others her age.

### **Summary**

This child presents with symptoms of SCT occurring at least several times per week, if not daily. She had five symptoms which occurred with moderate frequency; she met this study's criteria for LSCT. Three of her symptoms fell onto the inconsistent alertness factor when item analyzed, one fell onto the slowness factor, and one item loaded equally on both factors (Lee et al., 2013). One may conclude that she has a combined cognitive/behavioral presentation of her SCT symptoms.

She did not endorse any of the ADHD-I symptoms. However, she did endorse five ADHD-HI symptoms. All of her most severe symptoms, that is, those that were reported to happen several times per day, can be grouped together in that they are symptoms that are impulsive and may be disruptive to others. Those included: talking too much, blurting out answers to questions, and interrupting others. Perhaps these are symptomatic of ADHD-HI, or perhaps these behaviors occur for some other reason. One consideration is that her fast talking and interrupting may be more closely related to anxiety than ADHD, as impulsive symptoms can sometimes be a manifestation of anxiety. She may be too anxious when talking to others to think about what she is going to say or when the appropriate time to speak may be, thereby blurting out answers or interrupting others.

This child is considered a worrier by her mother. On the SCARED her mother reported very true or often true that her daughter is a worrier and that she worries about how well she does things. Her generalized anxiety disorder score was one point away from the threshold for

generalized anxiety disorder. Her separation anxiety scale score on the SCARED met the threshold for separation anxiety; however, the question about separation from parents on the CADBI Anxiety scale was not endorsed. Similarly, the one question on the CADBI Anxiety scale that was endorsed had to do with being anxious in social situations, though her social anxiety disorder scale on the SCARED was low at 2 points (8 is the threshold for social anxiety disorder). This child likely has general anxiety concerns that manifest across situations, such as home and social worries.

Despite any social worries, she has good peer relationships. One consideration is that living in a home with six other family members serves as a protective factor to her in some way. Perhaps having so many people in the home has forced her to engage in more social relationships, or has at least given her the opportunity to practice those skills and helped facilitate her ability to establish social relationships with peers. She also has higher than average school performance. However, the behaviors that were endorsed on each of the following scales of the CADBI: SCT, Anxiety, Depression, ADHD-I and ADHD-HI, were reported to cause her slight academic and social difficulty.

This child demonstrates LSCT with a combined cognitive/behavioral presentation. She shows no signs of any ADHD comorbidity. Though she did meet the criteria for separation anxiety disorder and showed many symptoms of generalized anxiety disorder. Her symptoms cause her some problems in school and with friends, though she has likely developed effective coping strategies to assist her across domains.

### **Participant D**

#### **Demographics**

Participant D was a 34 year old mother, born in Philadelphia, with some college education. Her son whose behaviors are described was 9 years old and is in the 4<sup>th</sup> grade. This family spoke English in the home. Participant D, the child about whom the survey was completed, and the child's stepfather, two brothers, and two stepbrothers all lived in the home.

### **CADBI**

**SCT.** Participant D endorsed all nine of the items on the SCT scale. Participant D reported that about once per day (3 on a 0-5 scale) her son's alertness changes, he daydreams and loses train of thought, is easily confused, and looks tired even after getting enough sleep. Participant D indicated that her son sometimes (2 on a 0-5 scale) has slow thinking or behavior, lacks energy, and is absent-minded during homework or home activities.

Participant D reported that the aforementioned SCT symptoms currently cause moderate academic difficulties for her son which has persisted for greater than six months. Participant D indicated that the SCT symptoms currently cause slight social difficulty for her son.

**Anxiety.** Participant D reported that several times per day (4 on a 0-5 scale) her son seems anxious about specific situations, particularly storms. Participant D indicated that about once per day (3 on a 0-5 scale) her son is anxious in social situations. Participant D endorsed that several times per week (2 on a 0-5 scale) her son seems anxious about many things and feels physically uncomfortable where there is no apparent cause.

Participant D reported that about once per week (1 on a 0-5 scale) her son seems anxious about separation from his parents.

Participant D endorsed that the aforementioned anxiety symptoms currently cause moderate academic and social difficulties for her son, which have persisted for greater than six months.

**Depression.** Participant D indicated that several times per week (3 on a 0-5 scale) her son seems sad or depressed, seems to feel hopeless about things, and seems to lack the energy necessary to complete tasks.

Participant D endorsed that about once per week (1 on a 0-5 scale) her son seems to feel worthless and seems irritable/cranky for no apparent reason.

Participant D reported that the aforementioned depressive symptoms currently cause slight social difficulties for her son. Participant D indicated that the depressive symptoms currently cause moderate academic difficulty for her son, which have persisted for greater than six months.

**ADHD-I.** Participant D endorsed all nine of items on the ADHD-I scale. Six or more symptoms of ADHD-I are needed for the consideration of a diagnosis.

Participant D indicated that several times per day (4 on a 0-5 scale) her son is forgetful in daily home activities. Participant D reported that about once per day (3 on a 0-5 scale) her son fails to pay close attention to details or makes careless mistakes, is poorly organized, loses things needed for tasks, has difficulty keeping his attention focused, and is easily distracted. Participant D endorsed that several times per week (2 on a 0-5 scale) her son does not listen when spoken to directly, does not follow through on instructions, and avoids tasks that require sustained mental effort.

Participant D reported that the aforementioned ADHD-I symptoms currently cause moderate academic and social difficulties for her son, which have persisted for greater than six months.

**ADHD-HI.** Participant D indicated that about once per day (3 on 0-5 scale) her son fidgets or squirms in his seat, seems restless during activities when others are seated, and has

trouble waiting his turn at home. Participant D endorsed that several times per week (2 on a 0-5 scale) her son is too loud or noisy and interrupts others at home.

Participant D indicated that about once per week (1 on a 0-5 scale) her son runs or climbs on things when inappropriate to do so and acts as if “driven by a motor” or seems “on the go” during home activities, talks too much, and blurts out answers to a question before it is completed.

Participant D reported that the aforementioned ADHD-HI symptoms currently cause moderate academic and slight social difficulties for her son, which have persisted for greater than six months.

**Social functioning.** Participant D reported moderately above average (5 on a 0-6 scale) interactions with adults other than parents. Participant D endorsed slightly above average (4 on a 0-6 scale) interactions with parents and brothers and sisters. Participant D indicated average interactions (3 on a 0-6 scale) with other children in the home and community.

**Academic functioning.** Participant D endorsed slight difficulty (2 on a 0-6 scale) on completion of homework assignments, and Participant D reported moderate difficulty (1 on a scale of 0-6) in reading, arithmetic, and writing skills.

## **SCARED**

Participant D’s overall SCARED score was an 18. A 25 or greater meets the threshold for an anxiety disorder. None of his subscales indicated a disorder however; two of the scales did approach significance. A score of 9 meets the threshold for generalized anxiety disorder; he scored a 7. A score of 8 meets the threshold for social anxiety; he scored a 6.

Participant D endorsed seven items on the generalized anxiety disorder subscale, which approached clinical significance. Participant D indicated that her son worries about: how well he does things, things working out for him, being as good as other kids, and other people liking him.

Participant D endorsed six items on the social anxiety subscale, which also approached clinical significance. Participant D reported that her son: is shy, especially around people he doesn't know well; doesn't like to be around people he doesn't know; finds it is hard to talk to people he doesn't know well; feels nervous when he is going somewhere where there will be people he doesn't know well, and feels nervous when he has to do something in front of others like read aloud.

### **PROMIS**

The responses of this measure were converted into a T-score to gain an overall score for the PROMIS. T=50 is the average T-score, and indicates normal peer relationships. Participant D's T-score was over 1.5 standard deviations below average (T=34).

Participant D selected sometimes (2 on a 0-4 scale) other kids: want to be with her son, talk to him, and be his friend, and that he is sometimes good at making friends, able to count on his friends, and that her son and his friends sometimes help each other out. Participant D indicated that her son almost never (1 on a 0-4 scale) feels accepted by other kids his age.

### **Summary**

This child was reported to have all of the symptoms indicated on the SCT scale and met the criteria for HSCT. His presentation would be considered to be both cognitive and behavioral, with difficulties on both the inconsistent alertness and slowness factors (Lee et al., 2013).

This child displayed many of the symptoms of ADHD-HI and all of the symptoms of ADHD-I. His difficulties in each of these domains also impose moderate academic difficulty



and slight social difficulty on him. As stated in the literature, those who display both ADHD and HSCT symptoms often have greater deficits than with either symptom set alone, and across more domains of functioning (Barkley 2012b; Barkley 2013; Saxbe & Barkley, 2014). As is noted with Participant D, he was reported to have deficits in social functioning and academic functioning and elevated anxiety symptoms.

Participant D's scores on the PROMIS were significantly below average. One of the hallmark social impairments seen among children with HSCT is peer neglect (Becker, 2013; Carlson & Mann, 2002). This child is almost never accepted by his peers and children only sometimes want to be his friend, as was indicated on the PROMIS. Perhaps some of Participant D's more prominent SCT symptoms (daydreams, loses train of thought, easily confused), inattentive symptoms (forgetful, easily distracted), and hyperactive symptoms (has difficulty waiting his turn, interrupts others) make it more difficult for his peers to want to interact with him, thus contributing to the notion that he is neglected by his peers. In addition, this is a source of anxiety for him, as it was reported on the SCARED that he worries about people liking him.

His symptoms were also reported to cause moderate academic difficulty, consistent with his mother's report across the board that he struggles with academic functioning. Academic impairment appears to be a big source of difficulty for this child. He has moderate difficulty in nearly every domain questioned (reading, arithmetic, and writing) and slight difficult in completing his homework assignments. Not only is this child struggling with his academic performance, but this is also a source of anxiety for him as it was reported on the SCARED that he worries about how well he does things and he worries about being as good as other kids.

On the CADBI his mother reported that several times per day he is anxious about specific objects or situations. His SCARED score approached clinical significance for generalized

anxiety disorder as well. His symptoms of anxiety were also indicated to cause moderate academic and social difficulties for him. He had a slight elevation in his depressive symptoms, too, which may be perpetuated by the peer neglect, academic impairment, and anxiety that he is experiencing.

This is an example of a HSCT child with a combined cognitive and behavioral symptom presentation and comorbid ADHD-I. His generalized anxiety symptoms were approaching clinical significance as well. He also exhibits the other common external correlates of SCT examined in the present study including academic and social impairment.

### **Conclusions**

The above case examples provide support for the continued study of SCT in a Latino population; 30% of this sample evaluated showed symptoms of SCT. Two participants, which were 15% of the children in the current study, met the indication for HSCT. This is higher than the 6% of children in the United States with HSCT in one previous study (Barkley, 2013). The percentage of HSCT found in this sample is closer to that found in a more recent sample of almost 3,000 school children in Barcelona which found a prevalence of 11% (Camprodon-Rosanas et al., 2016b). This study showed that some degree of SCT was prevalent across Latino children of different ages, grade levels, and genders. This study also elucidated the heterogeneous way with which SCT symptoms can present. Symptoms present ranged from three to nine, with varying frequencies of occurrence. One child presented with a mostly behavioral symptom cluster, one with mostly cognitive, and two had a combined cognitive and behavioral symptom presentation.

Each of the participants endorsed one item in common: alertness changes from moment to moment during homework or home activities. SCT has been shown to be multidimensional,

consisting of a cognitive and a behavioral component (Barkley, 2013). While the names assigned to the two dimensions sometimes vary, some studies indicate that the two dimensions can be represented as inconsistent alertness and slowness (Cortes et al., 2014; Lee et al., 2013). For example, Lee, Burns, and Becker (2016) recently suggested that when examining the convergent and discriminant validity of SCT from ADHD-I from preschool to adulthood the common symptoms all appear to reflect inconsistent alertness and slowed thinking/behavior characteristics. This provides preliminary cross-cultural evidence that inconsistent alertness is one of the defining characteristics of SCT.

The distinction between ADHD and SCT could not be made in this study. Though by qualitative analysis, the children studied ranged in terms of ADHD symptomatology from no symptoms to likely meeting the criteria for an ADHD-I diagnosis. The two HSCT children were reported to have enough ADHD-I symptoms to indicate a disorder. This is in line with research that indicates that about 60% of youth with SCT also have ADHD (Barkley, 2013; Saxbe & Barkley, 2014). Research also indicates that when ADHD and SCT are comorbid children have more significant impairment than those children who present with either disorder alone (Barkley 2012b; Barkley 2013; Saxbe & Barkley, 2014). This was demonstrated in the present sample in that the two children with HSCT demonstrated more comorbidities and functional impairments than the LSCT children.

Although none of the children met the indication for ADHD-HI, there were three children who showed three or more symptoms of ADHD-HI. Two of the respondents with endorsements on the ADHD-HI domain indicated that talking too much, blurting out answers, and interrupting others were the most frequently symptoms. Both of those children were also reported to have impairments in their peer relationships. One hypothesis is that those symptoms endorsed on the

ADHD-HI subscale were less related to ADHD-HI directly and more related to their difficulties in peer relationships, as the items endorsed could be considered annoying by others, which may lead to difficulties with peers.

In the literature, the link between social impairment and HSCT is one of the more consistent findings (Becker et al., 2013; Becker et al., 2016). In the present study, the two participants with LSCT did not have significant impairments in their social functioning, though they were each reported to have some difficulty in this domain. Both of the HSCT children had significant impairments in their social functioning. This is similar to findings by Becker (2014) who found that 75% of the students with HSCT had social impairments and only 8% of the LSCT students had social impairments. Peer neglect is often seen in children with SCT (Becker, 2013; Carlson & Mann, 2002). It was reported for both of the HSCT children that other children often did not want to be their friend, which could be a manifestation of peer neglect. These findings lend support to the idea that the severity of SCT plays a role in the presence and severity of social impairment, including peer neglect, among Latino children.

In terms of academic functioning, one child was reported to have moderate difficulty, one average performance, and the other two above average academic performance for their grade level. The impact of SCT symptoms on academic performance also varied from no impact to moderate difficulty. Of the external correlates examined, data regarding the relationship between SCT and academic functioning are most mixed. Carlson and Mann (2002) found that children with ADHD, LSCT, and HSCT did not differ on learning problems. A study by Bauermeister et al. (2012) found a small negative relationship between teacher ratings of SCT and academic achievement when controlling for ADHD symptoms. Still other studies show that HSCT predicts greater impairment in academic functioning (Becker et al., 2013; Becker et al., 2016;

Camprodon-Rosanas et al., 2016b). The inconsistent findings demonstrated in previous literature held true in this sample, as well.

Anxiety symptoms among this group varied from hardly any to likely meeting the criteria for multiple anxiety related disorders. Separation anxiety disorder was the most prominent on the SCARED. This aligns with previous research which has shown that Latino youth not only have a greater risk for developing an anxiety disorder, but they are also more likely to have a diagnosis of separation anxiety than their Caucasian peers (Varela & Hensley-Malone, 2009). One consideration as to why the respondents reported their children to have strong symptoms of separation anxiety pertains to the idea of familismo, which is a strong value in many Latino cultures (Campos et al., 2014). Familismo involves commitment, loyalty and dedication to one's family, as well as spending a lot of time with family members; essentially it is the belief that family comes above all else (Campos et al., 2014). With this importance of family values taken into consideration, it is understandable why Latino children would have a greater tendency to be anxious when away from family members, and therefore be more likely to have symptoms of separation anxiety.

Social anxiety symptoms were present in three of the children and were the most prominent symptoms on the Anxiety scale of the CADBI. This aligns with one study that indicated that SCT was most closely linked to social anxiety because of the social withdrawal and avoidance that often occurs with SCT (Becker et al., 2013). The child with the most anxiety symptoms met the indication for generalized anxiety disorder and separation anxiety disorder and showed subclinical symptoms of social anxiety; he also had HSCT. So there was also some support to the hypothesis that HSCT children would have more anxiety symptoms.

In terms of depression, two of the respondents did not endorse any items on the depression scale, and two did, though to a subclinical degree. Many studies suggest that SCT is more strongly associated with depression than anxiety (Barkley 2012; Becker et al., 2013; Garner et al., 2011; Cortes, Servera, Becker, & Burns, 2014) which did not play out in the present case study. One thing to consider here is that all of the symptoms in this study were parent reports and research shows that children are often better reporters of their internalizing symptoms than parents (Klein, Dougherty, & Olino, 2005). One study examining parent and child reports of SCT found that the child report of SCT was a better predictor of both anxiety and depression (Smith & Langberg, 2017). Additionally, studies of SCT show SCT symptoms increase with age; depressive symptoms are also shown to increase in adolescence, especially for females (Becker et al., 2016). Perhaps the depressive comorbidity with SCT is one that would not be seen until adolescence or early adulthood.

Overall, this case study can further show the need for additional SCT research in the Latino population. 30% of the sample showed some level of SCT, with 15% demonstrating HSCT. The SCT symptoms showed support for the multidimensionality of the construct, and the importance of the cognitive or inconsistent alertness factor. As with existing literature, there was evidence that HSCT led to more impairments than LSCT across several domains of functioning. Both of the children with HSCT had enough ADHD-I symptoms to consider a diagnosis. One of the HSCT children showed significant impairments in social functioning and also met the indication for generalized anxiety disorder and separation anxiety disorder. The other child with HSCT showed significant impairments in academic and social functioning and had multiple subclinical anxiety symptoms. This lends support to the validity of the external correlates of SCT in a Latino population as well.

### **Limitations**

One major limitation of this study was the inability to recruit sufficient participation for quantitative analyses. This speaks to the possible difficulties in obtaining research data from minority populations. There are far fewer studies on Latino children related to ADHD and SCT than there are studies on Caucasian and even African American children. This study attempted to gain a further understanding of SCT in a Latino sample, though fell short of the needed participation to run statistical analyses. Given the dearth of literature on SCT among Latinos it is important to first gain knowledge about the ways in which research participation can be increased in this group and the reasons why research attempts may have been unsuccessful.

Perhaps the language barrier was greater than the researchers anticipated. The measures were available in English and Spanish, though maybe offering Spanish forms was not enough to gain participation. Similarly, maybe research is less understood or not as valued culturally, or parents did not feel comfortable answering personal questions about their children. Some research indicates Latino parents may not believe in a biopsychosocial etiology of psychological disorders and are more likely to hold spiritual beliefs about the origin of disorders (Gerdes et al., 2011; Haack et al., 2010). Perhaps their beliefs about psychological disorders in general hindered their willingness to participate.

One other thought is that the incentives were not culturally appropriate. The researchers offered a pizza dinner to parents and students who participated, however none of the parents who attended ate pizza. Perhaps offering a typical American dish yielded a lower turnout and if a different dinner item was provided, attendance would have been higher. Similarly, maybe offering a gift card of \$100 upon conclusion of the study may not have been as effective as

offering an immediate small compensation to each participant upon completion of the questionnaires.

Despite finding of internal consistency within the scale and anchors on the CADBI (Bernad et al., 2015), some participants may have viewed the qualifiers on the CADBI as difficult to understand, as the qualifiers and their explanations can be confusing for some. For instance, the highest frequency is almost always, with the qualifier that the behavior occurs “many” times per day. The next frequency is very often, with the qualifier that the behavior occurs “several” times per day. This seems like a nominal difference and may be difficult for a respondent to differentiate. Similarly, the lowest value is almost never, and the qualifier is “never or about once per month”, so there is no real way to clearly determine the absence of a behavior using this scale.

Additionally the SCT symptomatology was assessed using a single method, that is, a rating scale. When assessing symptomatology in children it is always preferred to use a multimethod, multisource procedure whenever possible (Gerdes et al., 2011). Given the research on SCT that indicates both parents and teachers make unique, significant contributions in the evaluation of SCT symptoms, the lack of a second informant proved to be a particular limitation in the current study (Barkley, 2013; Barkley 2016). Considering children are often better reporters than parents with regards to internalizing symptoms (Klein et al., 2005), the ideal study would have a comparison of parent, teacher, and child self-report ratings of SCT symptoms.

### **Future Directions**

First and foremost, a future study should recruit a larger sample of Latino participants to statistically validate SCT and its external correlates in a Latino population. However, before that can be achieved, researchers need to ascertain how to best recruit minorities for participation in



research studies. Although language was anticipated to be the largest barrier, offering the survey in Spanish (in addition to English) did not dramatically increase participation. In fact, the majority of the surveys were completed in English. If language was not the biggest barrier, than what was? Perhaps investigating culturally competent beliefs about research and effective incentives, as alluded to earlier, may help to increase participation. Until researchers can figure out the barriers to gaining access to these populations, quality research will continue to suffer.

Additional studies should be conducted to further establish transcultural validity of SCT. Research using different samples of Latinos (a larger sample size, greater geographic diversity of participants, different ages, home schooled, etc.) as well as with different cultures, both in and out of the United States would serve to greatly expand the transcultural validity of SCT.

The CADBI was renamed in early 2018 to the CABI (Child and Adolescent Behavior Inventory), to deemphasize the focus on disruptive behaviors, as SCT and internalizing symptoms are not often associated with disruptive behaviors (Saez, Servera, Becker, & Burns, 2018). After psychometric evaluation some of the scales on the CABI have been changed or added; the SCT scale now consists of 16 items, 13 SCT items that were identified on meta-analysis to best assess the construct, and 3 items targeting mental confusion (Saez et al., 2018). Though the CADBI, used in the present study, is psychometrically valid, (Lee et al., 2013) future research should be done using the current version of the scale.

Future studies should continue to examine the different external correlates of SCT, including those that were examined in the present study (social functioning, academic functioning, anxiety, and depression) both broadly and more specifically. Specific correlates to examine could be SCT as it relates to GPA, quality of friendships, specific demographic variables, types of anxiety (social, generalized, separation, etc.), psychosocial stressors, and

depression using Beck Depression Inventory scores. This could help lead to a better understanding of the different factors that are related to SCT and begin generating hypotheses as to some potential causal factors of SCT.

Research investigating the etiology or biological correlates of SCT, perhaps using sleep studies (Becker et al., 2014) are warranted at this point. A specific area of study could be SCT in relation to brain structure and function (Becker & Langberg, 2013b) particularly to assist in distinguishing SCT and ADHD as separate disorders at the biological level. Studies may also want to investigate any relationship between SCT and catecholamines like dopamine and norepinephrine as each of them are associated with underarousal (Becker et al., 2016).

Currently, there are limited longitudinal data available to look at the stability of SCT symptoms across time. Longitudinal studies will prove important as research on SCT grows to help determine the presentation and stability of SCT across different developmental stages of life. SCT has shown to increase with age and has been established be present from preschool age through adulthood; (Becker et al., 2016) however, no studies have followed a child into adulthood to monitor the trajectory of SCT symptoms. Finally, if SCT eventually becomes a standalone diagnosis, treatment studies will be needed to determine the best ways to assist those with SCT.

Table 1

## Comparison of Results

	<b>Participant A</b>	<b>Participant B</b>	<b>Participant C</b>	<b>Participant D</b>
Child's gender	F	M	F	M
Child's age	10	8	9	9
Child's grade level	5 <sup>th</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	4 <sup>th</sup>
<b>CADBI</b>				
Number of SCT symptoms	3	4	5	9
LSCT/HSCT	LSCT	HSCT	LSCT	HSCT
Cognitive/behavioral symptom cluster	cognitive	behavioral	cognitive/behavioral	cognitive/behavioral
Anxiety domain(s) endorsed	none	generalized, social	social	generalized, specific phobia (storms), social, panic
Number of depressive symptoms (MDD $\geq$ 5 symptoms)	0	2	0	3
Number of ADHD-I symptoms (AHDH-I $\geq$ 6 symptoms)	0	7	0	9
Number of ADHD-HI symptoms (ADHD-HI $\geq$ 6 symptoms)	0	3	5	5
Social interactions (#)	MA - E	E	MA - E	A - E
Academic performance (#)	MA - E	A - E	E	SD - MD
<b>SCARED</b>				
SCARED total $\geq$ 25 may indicate an anxiety disorder	5	35	19	18
Panic $\geq$ 7 may indicate panic disorder	0	3	3	2
GAD $\geq$ 9 may indicate GAD	0	14	8	7
Separation $\geq$ 5 may indicate separation anxiety disorder	0	9	6	2
Social $\geq$ 8 may indicate social anxiety disorder	4	7	2	6
School $\geq$ 3 may indicate school avoidance	1	2	0	1
<b>PROMIS</b>				
T (mean T = 50; SD = 10)	T = 53	T = 37	T = 56	T = 34

Red = significant impairment; Yellow = approaching significant impairment

# SD - severe difficulty; MD - moderate difficulty; SLD - slight difficulty; A - average; SLA - slightly above average; MA - moderately above average; E - excellent

## References

- Adams, Z., Milich, R., & Fillmore, M. (2010). A case for the return of attention-deficit disorder in DSM-5. *The ADHD Report*, 18(3), 1–6. doi:10.1521/adhd.2010.18.3.1
- American Psychiatric Association (1980). *Diagnostic and statistical manual of mental disorders: DSM- III. (3rd ed)*. Washington, DC: American Psychiatric Association
- American Psychiatric Association (1994). *Diagnostic and statistical manual of mental disorders: DSM- IV. (4th ed)*. Washington, DC: American Psychiatric Association
- American Psychiatric Association (2000). *Diagnostic and statistical manual of mental disorders: DSM- IV-TR*. Washington, DC: American Psychiatric Association
- American Psychiatric Association (2013). *Diagnostic and statistical manual of mental disorders: DSM-5*. Washington, DC: American Psychiatric Association
- Barkley, R. (2001). The inattentive type of ADHD as a distinct disorder: What remains to be done. *Clinical Psychology: Science and Practice*, 8(4), 489–493. doi:10.1093 /clipsy.8.4.489
- Barkley, R. (2012a). Distinguishing Sluggish Cognitive Tempo from Attention-Deficit/Hyperactivity Disorder in adults. *Journal of Abnormal Psychology*, 121(4), 978-990. doi: 10.1521/ adhd.2011.19.5.1
- Barkley, R. (2012b). Distinguishing Sluggish Cognitive Tempo from ADHD in children and adolescents: Executive functioning, impairment, and comorbidity. *Journal of Clinical Child & Adolescent Psychology*, 42(2), 161–173. doi:10.1080/15374416.2012.734259
- Barkley, R. (2013). Sluggish Cognitive Tempo (concentration deficit disorder?): Current status, future directions, and a plea to change the name. *Journal of Abnormal Child Psychology*, 42(1), 117–125. doi:10.1007/s10802-013-9824-y

- Barkley, R., DuPaul, G., & McMurray, M. (1990). Comprehensive evaluation of Attention Deficit Disorder with and without hyperactivity as defined by research criteria. *Journal of Consulting and Clinical Psychology, 58*(6), 775–789. doi:10.1037/0022-006x.58.6.775
- Bauermeister, J., Barkley, R., Bauermeister, J., Martínez, J., & McBurnett, K. (2012). Validity of the sluggish cognitive tempo, inattention, and hyperactivity symptom dimensions: Neuropsychological and psychosocial correlates. *Journal of Abnormal Child Psychology, 40*(5), 683–697. doi:10.1007/s10802-011-9602-7
- Bauermeister, J., Matos, M., Reina, G., Salas, C., Martinez, J., Cumba, E., & Barkley, R. (2005). Comparison of the DSM-IV combined and inattentive types of ADHD in a school-based sample of Latino/Hispanic children. *Journal of Child Psychology and Psychiatry, 46*(2), 166–179. doi:10.1111/j.1469-7610.2004.00343.x
- Baytunca, M., Inci, S., Ipci, M., Kardas, B., Bolat, G., & Ercan, E. (2018). The neurocognitive nature of children with ADHD comorbid Sluggish Cognitive Tempo: Might SCT be a disorder of vigilance? *Psychiatry Research*. doi:10.1016/j.psychres.2018.03.038
- Becker, S. (2013). Topical review: Sluggish Cognitive Tempo: Research findings and relevance for pediatric psychology. *Journal of Pediatric Psychology, 38*(10), 1051–1057. doi:10.1093/jpepsy/jst058
- Becker, S. (2014). Sluggish Cognitive Tempo and peer functioning in school-aged children: A six-month longitudinal study. *Psychiatry Research, 217*(1-2), 72–78. doi:10.1016/j.psychres.2014.02.007
- Becker, S. (2017). “For Some Reason I Find it Hard to Work Quickly”: Introduction to the special issue on Sluggish Cognitive Tempo. *Journal of Attention Disorders, 21*(8), 615–622. doi:10.1177/1087054717692882

- Becker, S., Ciesielski, H., Rood, J., Froehlich, T., Garner, A., Tamm, L., & Epstein, J. (2014). Uncovering a clinical portrait of Sluggish Cognitive Tempo within an evaluation for Attention-Deficit/Hyperactivity Disorder: A case study. *Clinical Child Psychology and Psychiatry, 21*(1):81-94. doi:10.1177/1359104514554312
- Becker, S., Fite, P., Garner, A., Greening, L., Stoppelbein, L., & Luebke, A. (2013). Reward and punishment sensitivity are differentially associated with ADHD and Sluggish Cognitive Tempo symptoms in children. *Journal of Research in Personality, 47*(6), 719–727. doi:10.1016/j.jrp.2013.07.001
- Becker, S., Garner, A., & Byars, K. (2016). Sluggish Cognitive Tempo in children referred to a pediatric sleep disorders center: Examining possible overlap with sleep problems and associations with impairment. *Journal of Psychiatric Research, 77*, 116–124. doi:10.1016/j.jpsychires.2016.03.005
- Becker, S., Garner, A., Tamm, L., Antonini, T., & Epstein, J. (2017). Honing in on the social difficulties associated with Sluggish Cognitive Tempo in children: Withdrawal, peer ignoring, and low engagement. *Journal of Clinical Child & Adolescent Psychology, 1–10*. doi:10.1080/15374416.2017.1286595
- Becker, S., & Langberg, J. (2013a). Sluggish Cognitive Tempo among young adolescents with ADHD: Relations to mental health, academic, and social functioning. *Journal of Attention Disorders, 17*(8), 681–689. doi:10.1177/1087054711435411
- Becker, S., & Langberg, J. (2013b). Attention-deficit/hyperactivity disorder and sluggish cognitive tempo dimensions in relation to executive functioning in adolescents with ADHD. *Child Psychiatry & Human Development, 45*(1), 1–11. doi:10.1007/s10578-013-0372-z

- Becker, S., Langberg, J., Luebbe, A., Dvorsky, M., & Flannery, A. (2014). Sluggish Cognitive Tempo is associated with academic functioning and internalizing symptoms in college students with and without Attention-Deficit/Hyperactivity Disorder. *Journal of Clinical Psychology, 70*(4), 388–403. doi:10.1002/jclp.22046
- Becker, S., Leopold, D., Burns, G., Jarrett, M., Langberg, J., Marshall, S., ... Willcutt, E. (2016). The internal, external, and diagnostic validity of Sluggish Cognitive Tempo: A meta-analysis and critical review. *Journal of the American Academy of Child & Adolescent Psychiatry, 55*(3), 163–178. doi:10.1016/j.jaac.2015.12.006
- Becker, S., Luebbe, A., Fite, P., Stoppelbein, L., & Greening, L. (2013). Sluggish Cognitive Tempo in psychiatrically hospitalized children: Factor structure and relations to internalizing symptoms, social problems, and observed behavioral dysregulation. *Journal of Abnormal Child Psychology, 42*(1), 49–62. doi:10.1007/s10802-013-9719-y
- Becker, S., Luebbe, A., Greening, L., Fite, P., & Stoppelbein, L. (2012). A preliminary investigation of the relation between thyroid functioning and Sluggish Cognitive Tempo in children. *Journal of Attention Disorders, 1-7* doi:10.1177/1087054712466917
- Becker, S., Luebbe, A., & Joyce, A. (2015). The Child Concentration Inventory (CCI): Initial validation of a child self-report measure of Sluggish Cognitive Tempo. *Psychological Assessment, 27*(3), 1037–1052. doi:10.1037/pas0000083
- Becker, S., Luebbe, A., & Langberg, J. (2014). Attention-Deficit/Hyperactivity Disorder dimensions and Sluggish Cognitive Tempo symptoms in relation to college students' sleep functioning. *Child Psychiatry & Human Development, 45*(6), 675–685. doi:10.1007/s10578-014-0436-8.

- Becker, S., Marshall, S., & McBurnett, K. (2013). Sluggish Cognitive Tempo in abnormal child psychology: An historical overview and introduction to the special section. *Journal of Abnormal Child Psychology*, *42*(1), 1–6. doi:10.1007/s10802-013-9825-x
- Becker, S., Withrow, A., Stoppelbein, L., Luebbe, A., Fite, P., & Greening, L. (2016). Sluggish Cognitive Tempo is associated with suicide risk in psychiatrically hospitalized children. *Journal of Child Psychology and Psychiatry*, *57*(12), 1390–1399. doi:10.1111/jcpp.12580
- Belmar, M., Servera, M., Becker, S., & Burns, G. (2015). Validity of Sluggish Cognitive Tempo in South America: An initial examination using mother and teacher ratings of Chilean children. *Journal of Attention Disorders*. doi:10.1177/1087054715597470
- Bernad, M., Servera, M., Becker, S. & Burns, G. (2015). Sluggish Cognitive Tempo and ADHD inattention as predictors of externalizing, internalizing, and impairment Domains: A 2-year longitudinal study. *Journal of Abnormal Child Psychology*, *44*(4), 771-85. doi: 10.1007/s10802-015-0066-z.
- Bernad, M., Servera, M., Grases, G., Collado, S., & Burns, G. (2014). A cross-sectional and longitudinal investigation of the external correlates of Sluggish Cognitive Tempo and ADHD-Inattention symptoms dimensions. *Journal of Abnormal Child Psychology*, *42*(7), 1225–1236. doi:10.1007/s10802-014-9866-9
- Birmaher, B., Khetarpal, S., Brent, D., Cully, M., Balach, L., Kaufman, J., & Neer, S. (1997). The Screen for Child Anxiety Related Emotional Disorders (SCARED): Scale construction and psychometric characteristics. *Journal of the American Academy of Child & Adolescent Psychiatry*, *36*(4), 545–553. doi:10.1097/00004583-199704000-00018
- Burns, G., Lee, S., Becker, S., Servera, M., & McBurnett, K. (2014). *Child and Adolescent Disruptive Behavior Inventory – Parent and teacher versions 5.1*. Pullman, WA: Author.



- Burns, G., Servera, M., Bernad, M., Carrillo, J., & Cardo, E. (2013). Distinctions between Sluggish Cognitive Tempo, ADHD-I, and depression symptom dimensions in Spanish first-grade children. *Journal of Clinical Child & Adolescent Psychology, 42*(6), 796–808. doi:10.1080/15374416.2013.838771
- Campos, B., Ullman, J., Aguilera, A., & Drunkel Schetter, C. (2014). Familismo and psychological health: The intervening role of closeness and social support. *Journal of Cultural Diversity and Ethnic Minority Psychology, 20*, 191-201. doi: 10.1037/a0034094
- Camprodon-Rosanas, E., Batlle, S., Estrada-Prat, X., Acena-Diaz, M., Petrizan-Aleman, A., Pujals, E., ... Ribas-Fito, N. (2016). Sluggish Cognitive Tempo in a child and adolescent clinical outpatient setting. *Journal of Psychiatric Practice, 22*(5), 355–362. doi:10.1097/prs.0000000000000177
- Camprodon-Rosanas, E., Ribas-Fitó, N., Batlle-Vila, S., Persavento, C., Alvarez-Pedrerol, M., Sunyer, J., & Forn, J. (2016). Sluggish Cognitive Tempo: Sociodemographic, behavioral, and clinical characteristics in a population of Catalan school children. *Journal of Attention Disorders, 21*(8), 632–641. doi:10.1177/1087054716652477
- Canals, J., Hernández-Martínez, C., Cosi, S., & Domènech, E. (2012). Examination of a cutoff score for the Screen for Child Anxiety Related Emotional Disorders (SCARED) in a non-clinical Spanish population. *Journal of Anxiety Disorders, 26*(8), 785–791. doi:10.1016/j.janxdis.2012.07.008
- Capdevila-Brophy, C., Artigas-Pallares, J., Navarro-Pastor, J., Garcia-Nonell, K., Rigau-Ratera, E., & Obiols, J. (2012). ADHD predominantly inattentive subtype with high Sluggish Cognitive Tempo: A new clinical entity? *Journal of Attention Disorders, 18*(7), 607–616. doi:10.1177/1087054712445483

- Carlson, C., & Mann, M. (2002). Sluggish Cognitive Tempo predicts a different pattern of impairment in the attention deficit hyperactivity disorder, predominantly inattentive type. *Journal of Clinical Child and Adolescent Psychology, 31*(1), 123–129. doi:10.1207/s153744202753441738
- Combs, M., Canu, W., Broman Fulks, J., & Nieman, D. (2013). Impact of Sluggish Cognitive Tempo and Attention-Deficit/Hyperactivity Disorder symptoms on adults' quality of life. *Applied Research in Quality of Life, 9*(4), 981–995. doi:10.1007/s11482-013-9281-3
- Combs, M., Canu, W., Broman-Fulks, J., Rocheleau, C., & Nieman, D. (2012). Perceived stress and ADHD symptoms in adults. *Journal of Attention Disorders, 19*(5), 425–434. doi:10.1177/1087054712459558
- Cortes, J., Servera, M., Becker, S., & Burns, G. (2014). External validity of ADHD Inattention and Sluggish Cognitive Tempo dimensions in Spanish children with ADHD. *Journal of Attention Disorders, 1-12*. doi:10.1177/1087054714548033
- East, P., Delker, E., Lozoff, B., Delva, J., Castillo, M., & Gahagan, S. (2017). Associations among infant iron deficiency, childhood emotion and attention regulation, and adolescent problem behaviors. *Child Development, 89*(2), 593-608. doi:10.1111/cdev.12765
- Eiraldi, R., & Diaz, Y. (2010). Use of treatment services for Attention-Deficit/Hyperactivity Disorder in Latino children. *Current Psychiatry Reports, 12*(5), 403–408. doi:10.1007/s11920-010-0139-1
- Fassbender, C., Krafft, C., & Schweitzer, J. (2015). Differentiating SCT and inattentive symptoms in ADHD using fMRI measures of cognitive control. *NeuroImage: Clinical, 8*, 390–397. doi:10.1016/j.nicl.2015.05.007

- Flannery, A., Becker, S., & Luebbe, A. (2014). Does emotion dysregulation mediate the association between Sluggish Cognitive Tempo and college students' social impairment? *Journal of Attention Disorders*, 1-11. doi: 1087054714527794.
- Flannery, A., Luebbe, A., & Becker, S. (2016). Sluggish Cognitive Tempo is associated with poorer study skills, more executive functioning deficits, and greater impairment in college students. *Journal of Clinical Psychology*, 73(9), 1091–1113.  
doi:10.1002/jclp.22406
- Frick, P., Lahey, B., Applegate, B., Kerdyck, L., Ollendick, T., Hynd, G., ... Waldman, I. (1994). DSM-IV field trials for the disruptive behavior disorders: Symptom utility estimates. *Journal of the American Academy of Child & Adolescent Psychiatry*, 33(4), 529–539. doi:10.1097/00004583-199405000-00011
- Froehlich, T., Becker, S., Nick, T. G., Brinkman, W., Stein, M., Peugh, J., & Epstein, J. (2018). Sluggish Cognitive Tempo as a possible predictor of methylphenidate response in children with ADHD. *The Journal of Clinical Psychiatry*. doi:10.4088/jcp.17m11553
- Garner, A., Marceaux, J., Mrug, S., Patterson, C., & Hodgens, B. (2010). Dimensions and correlates of Attention Deficit/Hyperactivity Disorder and Sluggish Cognitive Tempo. *Journal of Abnormal Child Psychology*, 38(8), 1097–1107. doi:10.1007/s10802-010-9436-8
- Garner, A., Mrug, S., Hodgens, B., & Patterson, C. (2012). Do symptoms of Sluggish Cognitive Tempo in children with ADHD symptoms represent comorbid internalizing difficulties? *Journal of Attention Disorders*, 17(6), 510–518. doi:10.1177 /1087054711431456

- Garner, A., Peugh, J., Becker, S., Kingery, K., Tamm, L., Vaughn, A., ... Epstein, J. (2014). Does Sluggish Cognitive Tempo fit within a bi-factor model of ADHD? *Journal of Attention Disorders*. doi:10.1177/1087054714539995
- Gerdes, A., Lawton, K., Haack, L., & Hurtado, G. (2011). Assessing ADHD in Latino families: Evidence for moving beyond symptomatology. *Journal of Attention Disorders*, 17(2), 128–140. doi:10.1177/1087054711427396
- Graham, D., Crocker, N., Deweese, B., Roesch, S., Coles, C., Kable, J., ... Mattson, S. (2012). Prenatal alcohol exposure, Attention-Deficit/Hyperactivity Disorder, and Sluggish Cognitive Tempo. *Alcoholism: Clinical and Experimental Research*, 37, E338–E346. doi:10.1111/j.1530-0277.2012.01886.x
- Haack, L., & Gerdes, A. (2011). Functional impairment in Latino children with ADHD: Implications for culturally appropriate conceptualization and measurement. *Clinical Child and Family Psychology Review*, 14(3), 318–328. doi:10.1007/s10567-011-0098-z
- Haack, L., Gerdes, A., Schneider, B., & Hurtado, G. (2010). Advancing our knowledge of ADHD in Latino children: Psychometric and cultural properties of Spanish-versions of parental/family functioning measures. *Journal of Abnormal Child Psychology*, 39(1), 33–43. doi:10.1007/s10802-010-9441-y
- Harrington, K., & Waldman, I. (2009). Evaluating the utility of Sluggish Cognitive Tempo in discriminating among DSM-IV ADHD subtypes. *Journal of Abnormal Child Psychology*, 38(2), 173-184. doi: 10.1007/s10802-009-9355-8
- Hartman, C., Willcutt, E., Rhee, S., & Pennington, B. (2004). The relation between Sluggish Cognitive Tempo and DSM-IV ADHD. *Journal of Abnormal Child Psychology*, 32(5), 491–503. doi:10.1023/b:jacp.0000037779.85211.29

- Hinojosa, M., Hinojosa, R., Fernandez-Beca, D., & Knapp, C. (2012). Racial and ethnic variation in ADHD, comorbid illnesses, and parental strain. *Journal of Health Care for the Poor and Underserved, 23*(1), 273-289. doi: 10.1353/hpu.2012.0001
- Hinshaw, S., Carte, E., Sami, N., Treuting, J., & Zupan, B. (2002). Preadolescent girls with Attention-Deficit/Hyperactivity Disorder: II. Neuropsychological performance in relation to subtypes and individual classification. *Journal of Consulting and Clinical Psychology, 70*(5), 1099–1111. doi:10.1037/0022-006x.70.5.1099
- Irwin, D., Gross, H., Stucky, B., Thissen, D., DeWitt, E., Lai, J., ... DeWalt, D. (2012). Development of six PROMIS pediatrics proxy-report item banks. *Health Quality of Life Outcomes, 10*(1), 22. doi:10.1186/1477-7525-10-22
- Jacobson, L., Geist, M., & Mahone, E. (2017). Sluggish Cognitive Tempo, processing speed, and internalizing symptoms: The moderating effect of age. *Journal of Abnormal Child Psychology 46*(1), 127-135. doi:10.1007/s10802-017-0281-x
- Jacobson, L., Murphy-Bowman, S., Pritchard, A., Tart-Zelvin, A., Zabel, T., & Mahone, E. (2012). Factor structure of a Sluggish Cognitive Tempo scale in clinically-referred children. *Journal of Abnormal Child Psychology, 40*(8), 1327–1337. doi:10.1007/s10802-012-9643-6
- Jarrett, M., Gable, P., Rondon, A., Neal, L., Price, H., & Hilton, D. (2017). An EEG study of children with and without ADHD symptoms: Between-group differences and associations with Sluggish Cognitive Tempo symptoms. *Journal of Attention Disorders*. doi:10.1177/1087054717723986
- Jarrett, M., Rapport, H., Rondon, A., & Becker, S. (2014). ADHD dimensions and Sluggish Cognitive Tempo symptoms in relation to self-report and laboratory measures of

- neuropsychological functioning in college students. *Journal of Attention Disorders*.  
doi:10.1177/1087054714560821
- Jimenez, E., Ballabriga, M., Martin, A., Arrufat, F, & Giacobbo, R. (2013). Executive functioning in children and adolescents with symptoms of Sluggish Cognitive Tempo and ADHD. *Journal of Attention Disorders, 19*(6), 507–514. doi:10.1177/1087054713495442
- Kamradt, J., Momany, A., & Nikolas, M. (2017). Sluggish Cognitive Tempo symptoms contribute to heterogeneity in adult Attention-Deficit Hyperactivity Disorder. *Journal of Psychopathology and Behavioral Assessment*. doi:10.1007/s10862-017-9631-9
- Khadka, G., Burns, G., & Becker, S. (2015). Internal and external validity of Sluggish Cognitive Tempo and ADHD inattention dimensions with teacher ratings of Nepali children. *Journal of Psychopathology and Behavioral Assessment, 38*(3), 433–442.  
doi:10.1007/s10862-015-9534-6
- Klein, D., Dougherty, L., Olino T. (2005) Towards guidelines for evidence-based assessment of depression in children and adolescents. *Journal of Clinical Child Adolescence, 34* 412-432.
- Lahey, B. (2001). Should the combined and predominantly inattentive types of ADHD be considered distinct and unrelated disorders? Not now, at least. *Clinical Psychology: Science and Practice, 8*(4), 494–497. doi:10.1093/clipsy.8.4.494
- Lahey, B., Applegate, B., McBurnett, K., Biederman, J., Greenhill, L., Hynd, G., ... Shaffer, D. (1994). DSM-IV field trials for Attention Deficit Hyperactivity Disorder in children and adolescents. *American Journal of Psychiatry, 151*(11), 1673–1685. doi:10.1176/ajp.151.11.1673

- Lahey, B., Applegate, B., Waldman, I., Loft, J., Hankin, B., & Rick, J. (2004). The structure of child and adolescent psychopathology: Generating new hypotheses. *Journal of Abnormal Psychology, 113*(3), 358–385. doi:10.1037/0021-843x.113.3.358
- Lahey, B., Pelham, W., Schaughency, E., Atkins, M., Murphy, A., Hynd, G., ... Lorys-Vernon, A., (1988). Dimension and types of Attention Deficit Disorder. *Journal of the American Academy of Child & Adolescent Psychiatry, 27*(3). 330-335. doi: 10.1097/00004583-198805000-00011
- Lahey, B., Schaughency, E., Frame, C., & Strauss, C. (1985). Teacher ratings of attention problems in children experimentally classified as exhibiting Attention Deficit Disorder with and without hyperactivity. *Journal of the American Academy of Child Psychiatry, 24*(5), 613–616. doi:10.1016/s0002-7138(09)60064-9
- Lahey, B., Schaughency, E., Hynd, G., Carlson, C., & Nieves, N. (1987). Attention Deficit Disorder with and without hyperactivity: Comparison of behavioral characteristics of clinic-referred children. *Journal of the American Academy of Child & Adolescent Psychiatry, 26*(5), 718–723. doi:10.1097/00004583-198709000-00017
- Lahey, B., Schaughency, E., Strauss, C., & Frame, C. (1984). Are Attention Deficit Disorders with and without hyperactivity similar or dissimilar disorders? *Journal of the American Academy of Child Psychiatry, 23*(3), 302–309. doi:10.1016/s0002-7138(09)60508-2
- Langberg, J., Becker, S., & Dvorsky, M. (2013). The association between Sluggish Cognitive Tempo and academic functioning in youth with Attention-Deficit/Hyperactivity Disorder (ADHD). *Journal of Abnormal Child Psychology, 42*(1), 91–103. doi:10.1007/s10802-013-9722-3.

- Langberg, J., Becker, S., Dvorsky, M., & Luebke, A. (2014). Are Sluggish Cognitive Tempo and daytime sleepiness distinct constructs? *Psychological Assessment, 26*(2), 586–597.  
doi:10.1037/a0036276
- Larson, K., Russ, S., Kahn, R., & Halfon, N. (2011). Patterns of comorbidity, functioning, and service use for US children with ADHD, 2007. *Pediatrics, 127*(3), 462–470.  
doi:10.1542/peds.2010-0165
- Lee, S., Burns, G., & Becker, S. (2016a). Can Sluggish Cognitive Tempo be distinguished from ADHD inattention in very young children? Evidence from a sample of Korean preschool children. *Journal of Attention Disorders, 21*(8), 623–631.  
doi:10.1177/1087054716680077
- Lee, S., Burns, G., & Becker, S. (2016b). Toward establishing the transcultural validity of Sluggish Cognitive Tempo: Evidence from a sample of South Korean children. *Journal of Clinical Child & Adolescent Psychology, 1*–8. doi:10.1080/15374416.2016.1144192
- Lee, S., Burns, G., Snell, J., & McBurnett, K. (2013). Validity of the Sluggish Cognitive Tempo symptom dimension in children: Sluggish Cognitive Tempo and ADHD-Inattention as distinct symptom dimensions. *Journal of Abnormal Child Psychology, 42*(1), 7–19.  
doi:10.1007/s10802-013-9714-3
- Leopold, D., Bryan, A., Pennington, B., & Willcutt, E. (2014). Evaluating the construct validity of adult ADHD and SCT among college students: A multitrait-multimethod analysis of convergent and discriminant validity. *Journal of Attention Disorders, 19*(3), 200–210.  
doi:10.1177/1087054714553051
- Leopold, D., Christopher, M., Burns, G., Becker, S., Olson, R., & Willcutt, E. (2016). Attention-Deficit/Hyperactivity Disorder and Sluggish Cognitive Tempo throughout childhood:



- Temporal invariance and stability from preschool through ninth grade. *Journal of Child Psychology and Psychiatry*, 57(9), 1066–1074. doi:10.1111/jcpp.12505
- Loutfi, K., Carvalho, A., Lamounier, J. & Nascimento, J. (2011). ADHD and epilepsy: Contributions from the use of behavioral rating scales to investigate psychiatric comorbidities. *Epilepsy & Behavior*, 20(3), 484–489. doi:10.1016/j.yebeh.2010.12.043
- Ludwig, H., Matte, B., Katz, B., & Rohde, L. (2009). Do Sluggish Cognitive Tempo symptoms predict response to methylphenidate in patients with Attention-Deficit/Hyperactivity Disorder–inattentive type? *Journal of Child and Adolescent Psychopharmacology*, 19(4), 461–465. doi:10.1089/cap.2008.0115
- Marshall, S., Evans, S., Eiraldi, R., Becker, S., & Power, T. (2013). Social and academic impairment in youth with ADHD, predominately inattentive type and Sluggish Cognitive Tempo. *Journal of Abnormal Child Psychology*, 42(1), 77–90. doi:10.1007/s10802-013-9758-4
- McBurnett, K. (2010). *Kiddie-Sluggish Cognitive Tempo Diagnostic Interview Module for Children and Adolescents*. San Francisco, CA: Author.
- McBurnett, K., Clemow, D., Williams, D., Villodas, M., Wietecha, L., & Barkley, R. (2017). Atomoxetine-related change in Sluggish Cognitive Tempo is partially independent of change in Attention-Deficit/Hyperactivity Disorder inattentive symptoms. *Journal of Child and Adolescent Psychopharmacology*, 27(1), 38–42. doi:10.1089/cap.2016.0115
- McBurnett, K., Pfiffner, L., & Frick, P. (2001). Symptom properties as a function of ADHD type: An argument for continued study of Sluggish Cognitive Tempo. *Journal of Abnormal Child Psychology*, 29(3), 207-213. doi: 10.1023/A:1010377530749

- McBurnett, K., Villodas, M., Burns, G., Hinshaw, S., Beaulieu, A., & Pfiffner, L. (2013). Structure and validity of Sluggish Cognitive Tempo using an expanded item pool in children with Attention-Deficit/Hyperactivity Disorder. *Journal of Abnormal Child Psychology*, *42*(1), 37–48. doi:10.1007/s10802-013-9801-5
- Mikami, A., Huang-Pollock, C., Pfiffner, L., McBurnett, K., & Hangai, D. (2007). Social skills differences among Attention-Deficit/Hyperactivity Disorder types in a chat room assessment task. *Journal of Abnormal Child Psychology*, *35*(4), 509–521. doi:10.1007/s10802-007-9108-5
- Milich, R., Balentine, A., & Lynam, D. (2002). The predominately inattentive subtype—not a subtype of ADHD. *The ADHD Report*, *10*(1), 1–6. doi:10.1521/adhd.10.1.1.20569
- Monga, S., Birmaher, B., Chiappetta, L., Brent, D., Kaufman, J., Bridge, J., & Cully, M. (2000). Screen for Child Anxiety-Related Emotional Disorders (SCARED): Convergent and divergent validity. *Depression and Anxiety*, *12*(2), 85-91. doi: 10.1002/1520-6394(2000)12:2<85::AID-DA4>3.0.CO;2-2
- Moruzzi, S., Rijdsdijk, F., & Battaglia, M. (2013). A twin study of the relationships among inattention, hyperactivity/impulsivity and Sluggish Cognitive Tempo problems. *Journal of Abnormal Child Psychology*, *42*(1), 63–75. doi:10.1007/s10802-013-9725-0
- Muris, P., Schmidt, H., & Merckelbach, H. (2000). Correlations among two self-report questionnaires for measuring DSM-defined anxiety disorder symptoms in children: The Screen for Child Anxiety Related Emotional Disorders and the Spence Children's Anxiety Scale. *Personality and Individual Differences*, *28*(2), 333–346. doi:10.1016/s0191-8869(99)00102-6

- Palmer, E., & Finger, S. (2001). An early description of ADHD (inattentive subtype): Dr. Alexander Crichton and “mental restlessness” (1798). *Child Psychology and Psychiatry Review*, 6(02). doi:10.1017/s1360641701002507
- Penny, A., Waschbusch, D., Klein, R., Corkum, P., & Eskes, G. (2009). Developing a measure of Sluggish Cognitive Tempo for children: Content validity, factor structure, and reliability. *Psychological Assessment*, 21(3), 380–389. doi:10.1037/a0016600
- Pfiffner, L., Mikami, A., Huang-Pollock, C., Easterlin, B., Zalecki, C., & McBurnett, K. (2007). A randomized, controlled trial of integrated home-school behavioral treatment for ADHD, predominantly inattentive type. *Journal of the American Academy of Child & Adolescent Psychiatry*, 46(8), 1041–1050. doi:10.1097/chi.0b013e318064675f
- Raiker, J., Greening, L., Stoppelbein, L., Becker, S., Fite, P., & Luebbe, A. (2014). Mediating effect of psychopathy on the risk of social problems among children with ADHD versus Sluggish Cognitive Tempo symptoms. *Child Psychiatry & Human Development*, 46(4), 523–532. doi:10.1007/s10578-014-0493-z
- Reeves, C., Palmer, S., Gross, A., Simonian, S., Taylor, L., Willingham, E., & Mulhern, R. (2007). Brief report: Sluggish Cognitive Tempo among pediatric survivors of acute lymphoblastic leukemia. *Journal of Pediatric Psychology*, 32(9), 1050–1054. doi:10.1093/jpepsy/jsm063
- Robinson, A., Simpson, C., & Hott, B. (2017). The effects of child-centered play therapy on the behavioral performance of three first grade students with ADHD. *International Journal of Play Therapy*, 26(2), 73–83. doi:10.1037/pla0000047

- Sáez, B., Servera, M., Becker, S., & Burns, G. (2018). Optimal items for assessing Sluggish Cognitive Tempo in children across mother, father, and teacher ratings. *Journal of Clinical Child & Adolescent Psychology*, 1–15. doi:10.1080/15374416.2017.1416619
- Saxbe, C., & Barkley, R. (2014). The second attention disorder? Sluggish Cognitive Tempo vs. Attention-Deficit/Hyperactivity Disorder. *Journal of Psychiatric Practice*, 20(1), 38–49. doi:10.1097/01.pra.0000442718.82527.cd
- Servera, M., Bernad, M., Carrillo, J., Collado, S., & Burns, G. (2015). Longitudinal correlates of Sluggish Cognitive Tempo and ADHD-Inattention symptom dimensions with Spanish children. *Journal of Clinical Child & Adolescent Psychology*, 1–10. doi:10.1080/15374416.2015.1004680
- Skansgaard, E., & Burns, G. (1998). Comparison of DSM-IV ADHD combined and predominantly inattention types: Correspondence between teacher ratings and direct observations of inattentive, hyperactivity/impulsivity, slow cognitive tempo, oppositional defiant, and overt conduct disorder symptoms. *Child & Family Behavior Therapy*, 20(1), 1–14. doi:10.1300/j019v20n01\_01
- Skirbekk, B., Hansen, B., Oerbeck, B., & Kristensen, H. (2011). The relationship between Sluggish Cognitive Tempo, subtypes of Attention-Deficit/Hyperactivity Disorder, and anxiety disorders. *Journal of Abnormal Child Psychology*, 39(4), 513–525. doi:10.1007/s10802-011-9488-4
- Smith, Z., Becker, S., Garner, A., Rudolph, C., Molitor, S., Oddo, L., & Langberg, J. (2016). Evaluating the structure of Sluggish Cognitive Tempo using confirmatory factor analytic and bifactor modeling with parent and youth ratings. *Assessment*, 25(1), 99–111. doi:10.1177/1073191116653471

- Smith, Z., Breaux, R., Green, C., & Langberg, J. (2018). Evaluation of the interplay between homework motivation and Sluggish Cognitive Tempo in youth with ADHD: Associations with homework performance. *Journal of Attention Disorders*, 108705471876372. doi:10.1177/1087054718763722
- Smith, Z., & Langberg, J. (2017). Predicting academic impairment and internalizing psychopathology using a multidimensional framework of Sluggish Cognitive Tempo with parent- and adolescent reports. *European Child & Adolescent Psychiatry*, 26(9), 1141–1150. doi:10.1007/s00787-017-1003-1
- Todd, R., Rasmussen, E., Wood., Levy, F., & Hay, D. (2004). Should Sluggish Cognitive Tempo symptoms be included in the diagnosis of Attention-Deficit/Hyperactivity Disorder? *Journal of the American Academy of Child & Adolescent Psychiatry*, 43(5), 588–597. doi:10.1097/00004583-200405000-00012
- Varela, R., & Hensley-Maloney, L. (2009). The influence of culture on anxiety in Latino Youth: A review. *Clinical Child and Family Psychology Review*, 12(3), 217-233. doi: 10.1007/s10567-009-0044-5
- Varni, J., Thissen, D., Stucky, B., Liu, Y., Gorder, H., Irwin, D., ... DeWalt, D. (2011). PROMIS® Parent Proxy Report Scales: An item response theory analysis of the parent proxy report item banks. *Quality of Life Research*, 21(7), 1223–1240. doi:10.1007/s11136-011-0025-2
- Volpe, R., McConaughy, S., & Hintze, J. (2009). Generalizability of classroom behavior problem and on-task scores from the Direct Observation Form. *School Psychology Review*, 38(3), 382-401. doi: 10.1016/j.jsp.2010.09.005

- Wählstedt, C., & Bohlin, G. (2010). DSM-IV-defined inattention and Sluggish Cognitive Tempo: Independent and interactive relations to neuropsychological factors and comorbidity. *Child Neuropsychology, 16*(4), 350–365. doi:10.1080/09297041003671176
- Weiss, M., Worling, D., & Wasdell, M. (2003). A chart review study of the inattentive and combined types of ADHD. *Journal of Attention Disorders, 7*(1), 1-9. doi: 10.1177/108705470300700101
- Wietecha, L., Williams, D., Shaywitz, S., Shaywitz, B., Hooper, S., Wigal, S., ... & McBurnett, K. (2013). Atomoxetine improved attention in children and adolescents with Attention-Deficit/Hyperactivity Disorder and dyslexia in a 16 week, acute, randomized, double-blind trial. *Journal of Child and Adolescent Psychopharmacology, 23*(9), 605-613. doi: 10.1089/cap.2013.0054
- Willard, V., Hardy, K., Allen, T., Hwang, E., Gururangan, S., Hostetter, S., & Bonner, M. (2013). Sluggish Cognitive Tempo in survivors of pediatric brain tumors. *Journal of Neuro-Oncology, 114*(1), 71–78. doi:10.1007/s11060-013-1149-8
- Willcutt, E., Chhabildas, N., Kinnear, M., DeFries, J., Olson, R., Leopold, D., ... Pennington, B. (2013). The internal and external validity of Sluggish Cognitive Tempo and its relation with DSM–IV ADHD. *Journal of Abnormal Child Psychology, 42*(1), 21–35. doi:10.1007/s10802-013-9800-6
- Willcutt, E., Chhabildas, N., & Pennington, B. (2001). Validity of the DSM-IV subtypes of ADHD. *The ADHD Report, 9*(1), 2–5. doi:10.1521/adhd.9.1.2.16970
- Willcutt, E., Nigg, J., Pennington, B., Solanto, M., Rohde, L., Tannock, R., ... Lahey, B. (2012). Validity of DSM-IV Attention Deficit/Hyperactivity Disorder symptom dimensions and subtypes. *Journal of Abnormal Psychology, 121*(4), 991–1010. doi:10.1037/a0027347

Wood, W., Lewandowski, L., Lovett, B., & Antshel, K. (2014). Executive dysfunction and functional impairment associated with Sluggish Cognitive Tempo in emerging adulthood.

*Journal of Attention Disorders, 21*(8), 691–700. doi:10.1177/1087054714560822

Wood, W., Potts, H., Lewandowski, L., & Lovett, B. (2016). Sluggish Cognitive Tempo and speed of performance. *Journal of Attention Disorders, 21*(8), 684–690.

doi:10.1177/1087054716666322