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Sluggish Cognitive Tempo is Associated with Poorer Study Skills, More Executive Functioning Deficits, and Greater Impairment in College Students

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Abstract

Objectives—Few studies have examined sluggish cognitive tempo (SCT) in college students even though extant research suggests a higher prevalence rate of SCT symptoms in this population compared to general adult or youth samples. The current study examined SCT symptoms in relation to two domains related to college student's academic success, study skills and daily life executive functioning (EF), as well as specific domains of functional impairment.

Method—158 undergraduate students ($M_{\text{age}}=19.05$ years; 64% female) completed measures of psychopathology symptoms, study skills, daily life EF, and functional impairment.

Results—After controlling for demographics and symptoms of attention-deficit/hyperactivity disorder (ADHD), anxiety, and depression, SCT remained significantly associated with poorer study skills, greater daily life EF deficits, and global impairment, as well as greater functional impairment in the specific domains of educational activities, work, money/finances, managing chores and household tasks, community activities, and social situations with strangers and with friends. In many instances, ADHD inattentive symptoms were no longer significantly associated with study skills or impairment after SCT symptoms were added to the model.

Conclusion—SCT is associated with poorer college student functioning. Findings highlight the need for increased specificity in studies examining the relation between SCT and adjustment.

Keywords

ADHD; adjustment; adults; anxiety; depression; emerging adults; executive function; sluggish cognitive tempo

Over the past fifteen years, there has been a growing interest in the sluggish cognitive tempo (SCT) construct, which is characterized by symptoms of excessive daydreaming, mental

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fogginess, hypoactivity, lethargy, mental confusion, and apathy (Becker, Marshall, & McBurnett, 2014). Some earlier research suggested that SCT may facilitate the identification of individuals who show attentional problems, but few or no symptoms of hyperactivity-impulsivity (Carlson & Mann, 2002). However, as the literature has grown, it has become clear that at least a subset of SCT symptoms are statistically distinct from ADHD inattentive symptoms (Becker, Leopold et al., 2016). More recently, studies have also found that SCT is distinct from the underlying ADHD constructs (Garner et al., 2014; Lee, Burns, Beauchaine, & Becker, 2015) and statistically distinct from depression, anxiety, and daytime sleepiness (Becker, Luebke, Fite, Stoppelbein, & Greening, 2014; Langberg, Becker, Dvorsky, & Luebke, 2014; Lee, Burns, Snell, & McBurnett, 2014; Willcutt et al., 2014). These findings provide further support for the internal validity of the SCT construct and have provided the foundation for studies examining the external validity of SCT. However, most of the studies in this area to date have been conducted in samples of children and relied on broad measures of adjustment. There is a clear need for additional studies examining SCT in adults, particularly as it has been suggested that SCT may be a psychiatric disorder in its own right (Barkley, 2014, 2016) or a construct of transdiagnostic importance (Becker, Leopold et al., 2016; Becker, Marshall, et al., 2014). Further, a recent study examined SCT over a ten-year period and found a slight but significant increase in SCT symptoms from early childhood through mid-adolescence (Leopold et al., 2016). In addition to the possibility of an increase in SCT symptoms in adolescents and adults, there is some indication that SCT may be particularly elevated in college students specifically. For example, whereas Barkley (2012) estimated that 5.8% of all adults report experiencing elevated SCT symptoms, three recent studies of college students found elevated SCT in 12-14% of their samples (Flannery, Becker, & Luebke, 2016; Wood, Lewandowski, Lovett, & Antshel, 2014). Given these prevalence rates and the possibility that symptoms of SCT, such as daydreaming and absentmindedness, may be particularly problematic for college students facing increased academic demands, it is especially important to examine the external correlates of SCT in this population (Lewandowski, Wood, & Lovett, 2016). The current study contributes to the extant research in this area by examining SCT in relation to college student's study skills and specific domains of functional impairment, as well as global impairment and deficits in daily life executive functioning (EF), in order to better understand how SCT symptoms impact college students' academic success and overall functioning.

SCT and Academic Functioning

Most studies examining SCT in relation to academic functioning have been conducted with children and adolescents. Although some mixed findings have been reported, including some studies failing to find an association between SCT and academic functioning after controlling for ADHD inattention (Becker & Langberg, 2013; Belmar, Servera, Becker, & Burns, 2015), a growing body of literature links SCT to poorer academic functioning above and beyond ADHD symptoms (Langberg, Becker, & Dvorsky, 2014; Lee, Burns, & Becker, 2016; Willcutt et al., 2014). Similar to these studies conducted with children, the two studies to date that have examined SCT in relation to academic functioning in college students both found SCT to be significantly associated with poorer academics (Becker, Langberg et al., 2014; Langberg, Becker, Dvorsky, & Luebke, 2014). In line with these findings, a recent-

meta-analysis found SCT to be significantly correlated with poorer academic functioning (Becker, Leopold et al., 2016). However, studies have varied widely in their assessment of academic functioning, with most studies using broadband rating scales and single-item measures of global academic impairment. As noted by Langberg, Becker, Dvorsky, and Luebke (2014), “school grades are a multidimensional construct that may be influenced by many different factors, including classroom behavior, homework completion, effort, motivation, and attendance” (p. 595). There is similarly a multitude of factors that contribute to global ratings of academic problems/impairment. One especially important aspect of academic functioning is study skills, particularly in college when parents and teachers are less involved in students’ daily activities and structure (Mattanah, Lopez, & Govern, 2011; Pizzolato & Hicklen, 2011). In sum, there is a clear need for studies examining SCT in relation to fine-grained aspects of academic functioning, and the current study is the first to examine SCT in relation to the special domain of study skills.

Although unexamined in relation to SCT, previous research demonstrates that specific study and learning skills, including motivation, time management, use of study aides, and information processing, are associated with academic success in college (Kern, Fagley, & Miller, 1998; Reaser, Prevatt, Petscher, & Proctor, 2007). Moreover, college students with ADHD have shown significant deficits in these study skills as compared to their peers (Gormley et al., 2015; Norwalk, Norvilitis, & MacLean, 2009; Reaser et al., 2007). In fact, a recent study found study skills to mediate the association between ADHD and GPA (Gormley et al., 2015). However, SCT and ADHD symptoms commonly co-occur (Becker & Barkley, in press; Becker, Leopold et al., 2016), and there is emerging evidence that supports the hypothesis that SCT is uniquely related to study skills. SCT is characterized by low motivation, slow processing speed, and errors in information processing, and several recent studies have shown SCT to be related to poor organization and homework problems in youth with ADHD (Langberg, Becker, & Dvorsky, 2014; Marshall, Evans, Eiraldi, Becker, & Power, 2014; McBurnett et al., 2014). It is therefore likely that SCT is also related to study skill deficits, although no study has tested this possibility. A primary objective of the present study was to test the hypothesis that SCT would be associated with poorer study skills in college students, even after controlling for ADHD, anxiety, and depression symptoms.

SCT and Functional Impairment

Studies have begun to examine whether SCT is associated with functional impairment. As noted above, many studies examining SCT in relation to academics have included global (often single-item) measures of functional impairment in the academic domain (Becker, Leopold et al., 2016). These same studies have also examined the relation between SCT and social functioning with global measures of social impairment. These studies were thus unable to examine SCT in relation to more specific aspects of academic or social impairment, and they likewise did not consider functional impairment in other domains such as driving or self-care. Moreover, almost all of these studies were conducted in samples of youth, and it is important to evaluate whether SCT also relates to functional impairment in adulthood.

Only a handful of studies have examined SCT in relation to functional impairment in adults (Barkley, 2012; Becker, Langberg, Luebke, Dvorsky, & Flannery, 2014; Becker, Luebke, & Langberg, 2014; Combs, Canu, Broman-Fulks, & Nieman, 2014; Flannery et al., 2016; Jarrett, Rapport, Rondon, & Becker, 2014; Wood et al., 2014). Combs et al. (2014) found that ADHD inattention and SCT symptoms were both negatively associated with quality of life in a sample of 983 adults, with SCT significantly negatively associated with overall quality of life as well as quality of life in the domains of physical and psychological functioning. Barkley (2012) found that SCT was uniquely associated with adults' overall functional impairment above and beyond ADHD symptoms, and Wood et al. (2014) similarly found a significant relation between SCT and college students' overall impairment when controlling for ADHD symptoms in addition to depression and anxiety symptoms. Relatedly, Jarrett and colleagues (2014) found college students with elevated SCT symptoms to report more overall functional impairment than college students without SCT. In a previous study using data from the same college student participants as the present study, SCT was significantly associated with impairment in the social domain above and beyond other psychopathologies, but a composite measure of social impairment was used and other domains of impairment were not considered (Flannery et al., 2016). Taken together, these studies suggest that SCT is related to functional impairment in college students, but the Wood et al. (2014) and Jarrett et al. (2014) studies both reported on global functional impairment and none of the studies conducted with college students examined multiple, specific impairment domains. Before assessment recommendations or intervention work can begin, it is important to understand the specific domains of impairment associated with SCT. As such, a primary objective of the present study was to examine the association between SCT and specific domains of impairment in college students. In order to place this within the context of the extant literature, an ancillary goal was to also replicate the association between SCT symptoms and college students' global functional impairment. Clarifying the relation between SCT and impairment – and specific domains of impairment – in college students is particularly important for informing the development and evaluation of prevention and intervention strategies.

SCT and Executive Functioning

Researchers have also begun to examine whether SCT is related to problems in daily life EF. EF refers to adaptive or goal-directed behaviors that assist in overriding automatic thoughts or responses (Garon, Bryson, & Smith, 2008). Daily life EFs refer to behaviors related to self-management of time, self-organization and problem solving, self-discipline, self-motivation, and self-activation (Barkley & Fischer, 2011). It is important to better understand how SCT may relate to daily life EF since deficits in EF are strongly linked to academic performance. For instance, in middle school students diagnosed with ADHD, Langberg and colleagues (2013) found EF ratings to be strongly associated with homework problems and school grades, with planning and organization EF domains most strongly related to academics. Similarly, a recent study of EF domains in college students found that impairments in the domains of initiation of complex behavior, planning and organization skills, inhibition, self-monitoring, working memory, task monitoring, and organization of materials were significant predictors of academic procrastination (Rabin, Fogel, & Nutter-

Upham, 2011). Given the influential effects of daily life EF on academic functioning, it is important to understand which psychopathologies are uniquely associated with daily life EF deficits.

Studies examining SCT in relation to youths' daily life EF have reported mixed results. In a sample of young adolescents diagnosed with ADHD, Becker and Langberg (2014) found SCT symptoms to be significantly related to parent-reported metacognitive deficits (e.g., organization, working memory, task initiation) but not behavior regulation deficits (e.g., inhibition, emotional control) above and beyond ADHD symptoms. However, Barkley (2013) found ADHD inattention symptoms to be much more strongly associated than SCT symptoms with EF ratings in a nationally representative sample of children and adolescents. In contrast to studies of youth, SCT symptoms appear to be more consistently associated with poorer daily life EF in adults. In a nationally representative sample of adults, Barkley (2012) found SCT symptoms to be significantly associated with EF in daily life above and beyond ADHD symptoms, and SCT symptoms were more strongly related than ADHD symptoms to problems in self-organization/problem solving, self-restraint, and emotion regulation; ADHD inattention symptoms were more strongly related than SCT symptoms to time management and self-motivation. Jarrett and colleagues (2014) recently expanded upon these findings by examining SCT symptoms in relation to daily life EF in college students specifically, and controlled for ADHD symptoms as well as sleep problems and depression symptoms. Both SCT and ADHD symptoms were uniquely associated with self-reported EF deficits (Jarrett et al., 2014). In a similar study, Wood and colleagues (2014) found that SCT accounted for more variance than ADHD, depression, or anxiety symptoms in overall self-reported EF deficits in a sample of college students. As reviewed above, daily life EF is an influential component of academic functioning (Barkley & Fischer, 2011; Langberg et al., 2013; Rabin et al., 2011), and the prevalence of SCT symptoms appears to be higher in samples of college students compared to general adult samples (Flannery et al., 2016; Wood et al., 2014). However, we are aware of only two other studies that have examined SCT in relation to daily life EF in college students (Jarrett et al., 2014; Wood et al., 2014). Thus, as a secondary objective, we aimed to replicate the Jarrett et al. (2014) and Wood et al. (2014) studies and hypothesized that SCT symptoms would be significantly associated with daily life EF problems in college students, even after controlling for ADHD, anxiety, and depressive symptoms.

The Present Study

To summarize, the primary objective of the present study was to examine SCT in relation to college students' study skills and impairment in specific domains of functioning. In order to place our study in the context of the extant research in this area, our secondary objective was to examine SCT in relation to daily life EF and global functional impairment. Importantly, we examined whether SCT symptoms would be significantly associated with these domains of functioning over and above demographics (i.e., age, sex) and symptoms of ADHD, depression, and anxiety. Given the literature reviewed above, we hypothesized that SCT symptoms would be significantly associated with poorer study skills, functional impairment, and daily life EF deficits, even after controlling for symptoms of ADHD, depression, and anxiety.

Methods

Participants

Participants were 158 undergraduate students enrolled in a public university in the Midwestern United States. Participants ranged in age from 18 to 23 years ($M = 19.05$, $SD = 1.00$) and approximately two thirds were female (64%, $n = 101$). The majority (84%) of participants self-identified as White; the remaining participants self-identified either as Asian/Asian American (7%), Black (5%), or Multiracial (3%). Most participants ($n = 101$) were in their first year of college; the remaining participants were in their second ($n = 38$), third ($n = 13$), fourth ($n = 5$), or sixth ($n = 1$) year of college.

Procedure

This study was approved by the university institutional review board and all interested participants provided informed consent prior to their participation. The participants received individual time-slots and completed the study measures on a computer in a university laboratory. See Flannery et al. (2016) for additional details.

Measures

SCT and ADHD symptoms—Symptoms of SCT and ADHD were assessed with the adult self-report *Barkley Adult ADHD Rating Scale-IV* (BAARS-IV) (Barkley, 2011a). The BAARS-IV includes 18 items that are consistent with the Diagnostic and Statistical Manual of Mental Disorders (4th ed.; *DSM-IV*) (American Psychiatric Association, 1994) symptoms of ADHD that have been updated in their wording to also reflect modifications made in *DSM-5* (American Psychiatric Association, 2013). The BAARS-IV also includes nine symptoms of SCT (e.g., “easily confused,” “prone to daydreaming when I should be concentrating on something or working,” “lethargic, more tired than others”). Using a four-point scale (1 = *not at all*, 4 = *very often*), participants respond to each item with reference to how often each statement best describes their behavior over the past six months. The four-factor structure of the BAARS-IV including separate ADHD and SCT dimensions was established in a nationally representative sample of adults (Barkley, 2011a) and has been replicated in college students specifically (Becker, Langberg, et al., 2014). The subscales of the BAARS-IV have demonstrated satisfactory internal consistency and test-retest reliability over a 2- to 3-week time period (Barkley, 2011a). In the present study, α s = .88, .87, .68, and .83 for the SCT, inattention, hyperactivity, and impulsivity scales, respectively.

Depressive symptoms—Symptoms of depression were measured using the well-validated Center for Epidemiologic Studies Depression Scale—Short Form (CES-D-S) (Radloff, 1977). The CES-D-S is a shortened 10-item self-report version of the 20-item CES-D. Using a four-point scale (0 = *rarely or none of the time [less than 1 day]*, 3 = *most or all of the time [5-7 days]*), participants respond to how frequently they experienced each item (e.g., “I felt that my life had been a failure,” “I felt lonely”) in the past week. In the present study, $\alpha = .80$.

Anxiety symptoms—Symptoms of anxiety were measured using the anxiety subscale of the *Depression Anxiety Stress Scales-21* (DASS-21) (Antony, Bieling, Cox, Enns, &

Swinson, 1998; Lovibond & Lovibond, 1995). This 7-item scale asks participants to respond to each item (e.g., “I was worried about situations in which I might panic and make a fool of myself”) in reference to the past week using a four-point scale (1 = *did not apply to me at all*, 4 = *applied to me very much or most of the time*). The DASS-21 and its subscales demonstrate high reliability and are widely accepted as being valid for use with college-aged participants (Antony et al., 1998; Sinclair et al., 2012). In the present study, $\alpha = .83$.

Study skills—The Learning and Study Strategies Inventory, Second Edition (LASSI-2) (Weinstein & Palmer, 2002) is a self-report measure of high school and college students’ study skills and learning strategies. The college version of the LASSI-2 consists of 80 items that are answered on a 5-point scale (1 = *not at all like me*, 5 = *very much like me*). The LASSI-2 is composed of 10 subscales related to strategic learning (e.g., time management, motivation, concentration, information processing). The revised LASSI (LASSI-2) was designed to update the original LASSI items, broaden the scope of the scales, improve the inter-item correlations, and create national norms on a more representative sample (Prevatt, Petscher, Proctor, Hurst, & Adams, 2006; Weinstein & Palmer, 2002). The LASSI-2 demonstrates acceptable ($\alpha > .70$) internal consistency (Weinstein & Palmer, 2002). Previous research has shown LASSI scores to be concurrently and prospectively associated with students’ GPA (Yip & Chung, 2002), and the LASSI is frequently used by colleges and universities to identify students at risk of poor academic performance (Olaussen & Bråten, 1998). Previous research has shown that the 10 subscales can be divided into three overarching factors (i.e., Affective Strategies, Goal Strategies, Comprehension Monitoring Strategies) that are each associated with academic performance (Cano, 2006), and these three composite scales were used to measure study skills and learning strategies in the present study. The Affective Strategies domain assesses attitudes toward school success (e.g., “I only study the subjects I like”), time management (e.g., “I end up ‘cramming’ for every test”), concentration on school-related tasks (e.g., “Because I don’t listen carefully, I don’t understand some course material”), and motivation for performing school-related tasks (e.g., “When work is difficult, I either give up or study only the easy parts”). The Goal Strategies domain assesses the degree to which students have anxiety about their schoolwork and academic performance (e.g., “Even when I am well prepared for a test, I feel very anxious”), use of test-taking and test preparation strategies (e.g., “When I study for a test, I have trouble figuring out just what to do to learn the material”), and understanding critical or important information (e.g., “During class discussions, I have trouble figuring out what is important enough to put in my notes”). Finally, the Comprehension Monitoring Strategies domain assesses information processing (e.g., “When I am studying a topic, I try to make everything fit together logically”), the student’s use of self-reviewing or monitoring (e.g., “I stop periodically while reading and mentally go over or review what was said”), and the student’s ability to create and use meaningful study aids (e.g., “My underlining is helpful when I review text material”) (Cano, 2006; Weinstein & Palmer, 2002). In the present study, $\alpha = .93$, $.91$, and $.87$ for the affective strategies, goal strategies, and comprehension monitoring strategies scales, respectively. The LASSI-2 was not initially included in the assessment battery, and so LASSI-2 data were only available for a subset of participants ($n = 91$). Participants with and without LASSI-2 data, however, did not differ on psychopathology symptoms (SCT, ADHD, depression, or anxiety), EF, or functional

impairment (all $ps > .10$). Hence, the subsample of participants with LASSI-2 data is considered a representative subsample of the larger sample of participants. To account for these missing data, analyses using the LASSI-2 were conducted using either multiple imputation ($N = 20$ imputations), with all other study variables, age, gender, and ethnicity majority/minority status as predictors in the algorithm for imputation, or full information maximum likelihood (for path analyses).

Functional impairment—The *Barkley Functional Impairment Scale* (BFIS) (Barkley, 2011c) is a 15-item self-report measure of functional impairment in adults. The BFIS has previously demonstrated adequate validity, high internal consistency (α for normative sample = .97), and test-retest reliability over a 2- to 3-week period (overall $r = .72$). Criterion and discriminant validity is well established with the BFIS as mean impairment and domain impairment scores were significantly and substantially associated with ratings of ADHD and daily life EF in the normative sample (Barkley, 2011c). Using a 10-point scale (0 = *Not at all*, 9 = *Severe*), as well as a “does not apply” option, participants indicate how much difficulty they have effectively functioning in 15 major life activities. The domains of impairment included on the BFIS are: home life, work or occupation, social interactions with strangers and acquaintances, relationships with friends, completing chores and household management, in community activities, educational activities, marital or dating relationships, sexual activities, management of finances, operating a motor vehicle, organizing daily responsibilities, taking care of and raising children, maintaining health (e.g., exercise, nutrition, preventative medical and dental care), and daily care (e.g., dressing, bathing, hygienic care). The present study included each of these impairment items with the exception of the “taking care of and raising children” item since this did not apply to the vast majority of students at the university where the research was conducted. Notably, Ns for these items vary from 128 to 157 because participants had the choice to indicate “does not apply.” Because this was an effortful response on the part of the respondent, these values were kept as missing rather than imputed. Consistent with previous research (Barkley, 2012; Wood et al., 2014), we also calculated a mean score of the impairment items as a measure of overall functional impairment.

Executive functioning—The Barkley Deficits in Executive Functioning Scale, Short Form (BDEFS-SF) (Barkley, 2011b) is a 20-item short form version of the 89-item BDEFS. The BDEFS is a self-report measurement assessing the frequency in which adults experience difficulties in EF and includes multiple EF domains, including Self-Management to Time (e.g., “waste or mismanage my time”, “have trouble doing what I tell myself to do”), Self-Organization/Problem Solving (e.g., “I have trouble organizing my thoughts”, “have trouble doing things in their proper order or sequence”), Self-Restraint (e.g., “likely to do things without considering the consequences for doing them”, “have a low tolerance for frustrating situations”), Self-Motivation (e.g., “I do not have the willpower or determination that others seem to have”, “have to depend on others to help me get my work done”), and Self-Regulation of Emotion (e.g., “overreact emotionally”, “I remain emotional or upset longer than others”). Participants respond on a four-point scale (1 = *Never or Rarely*, 4 = *Very often*) with respect to how frequently they displayed certain behaviors (e.g., “Unable to work as well as others without supervision or frequent instruction”) over the past six months. The

BDEFS has demonstrated satisfactory 2 to 3 week test-retest reliability ($r = .84$ for total scale; $.80$ for the total summary score of the BDEFS-SF) and satisfactory validity (Barkley, 2011b). We used the BDEFS-SF in the present study, which was developed to be a quick screening tool for assessing deficits in EF in daily life. The BDEFS-SF includes the four highest-loading items from each of the five subscales described above. The subscales of the BDEFS-SF have shown to correlate highly with their respective counterparts of the BDEFS (r s ranging from $.90$ to $.94$), and the total summary score of the BDEFS-SF is considered the most valid and representative of the normative population compared to the subscale scores of the BDEFS-SF. Criterion validity is well established with the BDEFS-SF, as total EF deficits showed a substantial relationship with ADHD symptoms in the normative sample of adults. For the total summary score of the BDEFS-SF normative sample, $\alpha = .92$ (Barkley, 2011b). In the present study, $\alpha = .93$.

Results

Correlation Analyses

The absolute values of skewness and kurtosis were below 2.0 for all study variables with the exception of the driving and daily self-care/hygiene impairment variables. Square root transformations were applied to these variables, which resulted in absolute values of skewness and kurtosis below 2.0, and these transformed variables were used in analyses. Means, standard deviations, and ranges are shown for all study variables in Table 1. Intercorrelations among variables are shown in Table 2.

Zero-order correlations were examined to determine which independent variables (i.e., SCT, ADHD-inattention, ADHD-hyperactivity, ADHD-impulsivity, depression, and anxiety) and demographic variables (i.e., age and sex) were associated with the dependent variables (i.e., study skills, functional impairment, and EF). As displayed in Table 3, each psychopathology dimension (i.e., SCT, ADHD-inattention, ADHD-hyperactivity, ADHD-impulsivity, depression, and anxiety) was significantly negatively correlated with one or more domains of study skills (i.e., affective strategies, goal strategies, and comprehension monitoring strategies). Recall that these values are pooled estimates from 20 imputed datasets. Depression was the only psychopathology construct that significantly negatively correlated with all three study skills domains (r s ranging from $-.26$ to $-.43$; see Table 3).

With the exception of driving, for which anxiety, ADHD-hyperactivity, and ADHD-impulsivity were the only significant psychopathology correlates, each of the psychopathology dimensions was significantly correlated with each of the functional impairment domains. In addition, age and each of the psychopathology dimensions were significantly positively correlated with EF deficits. Correlations for the psychopathology symptoms ranged from $.28$ for the correlation between ADHD-impulsivity and EF deficits to $.79$ for the correlation between SCT and EF deficits (all p s $< .001$; see Table 3).

Path Analyses

Next, path analyses were conducted to examine whether SCT symptoms were associated with study skills, specific domains of functional impairment, and EF after controlling for

age, sex, and symptoms of ADHD, depression, and anxiety. Path models were calculated by conceptual “family” (e.g., study skills, impairment in work/academic functioning) in order to reduce the total the total number of models conducted. All models were run in a two-step process, with demographic variables, ADHD, depression, and anxiety as predictors in Step 1, and SCT added as a predictor in Step 2. Residuals were allowed to covary. As such, models were just identified and had perfect fit. One participant had complete missing data on all impairment items. As such, analyses included 157 individuals. For participants with sporadic missing items, missing data was estimated using full information maximum likelihood.

Study skills—Table 4 displays the associations between the psychopathology dimensions with study skills. As shown, ADHD-inattention was the only psychopathology dimension significantly negatively associated with affective learning strategies in Step 1. However, when SCT was added to the model in Step 2, the association between ADHD-inattention and affective strategies was reduced, whereas SCT emerged as being the strongest significant predictor of affective learning strategies and accounted for an additional 8% of variance in strategy use.

In terms of goal strategies, ADHD-inattention and anxiety were the only psychopathology dimensions to be significantly associated with poorer goal strategies in Step 1. However, when SCT was added to the model in Step 2, the relations of both ADHD-inattention and anxiety to goal strategies were reduced to nonsignificance. SCT emerged as the only significant predictor of poorer goal strategies, accounting for an additional 9% of variance over and above demographics and other forms of psychopathology (see Table 4).

Finally, with regard to comprehension monitoring strategies, in both the model without and with SCT, both depression and ADHD-impulsivity were associated with poorer comprehension strategies. Conversely, anxiety was actually positively associated with using more comprehension monitoring strategies over and above other forms of psychopathology. Notably, SCT was unrelated to this outcome. (see Table 4).

Functional impairment—Table 5 summarizes the results regarding functional impairment. Given that SCT was not bivariately associated with impairment in driving behavior, this specific domain was not considered in path analyses. As mentioned above, impairment domains were grouped by content and modeled as dependent variables (DVs) in four separate path models to reduce the overall number of models computed. Grouping included: Home Life, Work/Academic Functioning, Social Functioning, and Health Behaviors (see Table 5 for which specific domains were included in each model; note that age and sex were also included in these models but results pertaining to these demographics are not summarized in the tables for simplicity but are summarized in the table notes).

Overall, and after controlling for symptoms of ADHD, anxiety, and depression, SCT was significantly positively associated with functional impairment in 7 of the 13 domains of adult psychosocial functioning (i.e., chores, managing money, work, educational activities, social situations with strangers, social situation with friends, and community activities). Moreover, the associations between ADHD-inattention and functional impairment in the

domains of chores, work, and educational activities were reduced to nonsignificance when SCT was added in Step 2 of these models. For home organization activities, ADHD-inattention remained significant in the presence of SCT in the model, but the effect was reduced considerably. Although significant, SCT's unique contributions above and beyond other forms of psychopathology were modest, as increases in variance accounted for in these models ranged from 2-5% of variance.

With one exception, neither anxiety nor ADHD-hyperactivity was significantly associated with increased functional impairment in the regression models including demographics and other psychopathology dimensions. The one exception was that ADHD-hyperactivity was related to *less* impairment in chores. As mentioned, the sole domain that showed a significant association between ADHD-inattention and impairment was organization. In contrast, ADHD-impulsivity was significantly associated with greater impairment in completing chores, managing money, work/occupation, romantic relationships, daily self-care, and health maintenance. Finally, depression was the most consistent psychopathology dimension to be associated with functional impairment and was significantly associated with increased functional impairment in all but one domain examined (the exception being chores). Moreover, there were two domains (home life and sexual activities) for which depression was the only psychopathology dimension significantly associated with increased impairment.

Overall impairment and daily life EF—To place our findings in the context of the broader literature that has examined similar relations, Table 6 summarizes the results pertaining to overall (mean) functional impairment and daily life EF deficits. Regarding mean impairment, Step 1 of this analysis indicated a significant positive association between depression, ADHD-inattention, and ADHD-impulsivity with overall functional impairment. However, when SCT was added to the model in Step 2, the relation between ADHD-inattention and overall functional impairment was reduced to nonsignificance and SCT emerged as a significant predictor of overall functional impairment, accounting for an additional 2% of variance, along with depression and ADHD-impulsivity.

Regarding EF deficits, anxiety, depression, and ADHD-inattention symptoms were each significantly associated with EF deficits in Step 1. However, when SCT was added to the model in Step 2, the association between depression and EF was no longer significant, the association between ADHD-inattention and EF was greatly reduced, and SCT was the strongest predictor of EF deficits. SCT accounted for an additional 6% of variance in EF deficits.

Discussion

The primary objective of the present study was to examine whether SCT symptoms are significantly associated with poor study skills and specific domains of functional impairment in college students over and above demographics and symptoms of ADHD, depression, and anxiety. In an effort to replicate extant research, the secondary objective was to examine SCT symptoms in relation to global functional impairment and daily life EF deficits. The current study adds to extant research regarding SCT in a number of ways. This is the first

study to examine SCT in relation to multiple, specific impairment domains within a college student sample. Additionally, the component aspects of academic functioning, such as learning and study skills, have not been previously examined in relation to SCT.

Furthermore, two recent studies have found SCT to be significantly related to college students' daily life EF deficits (Jarrett et al., 2014; Wood et al., 2014), and the present study sought to replicate this finding. Overall, findings from this study add to the small but growing literature demonstrating SCT symptoms to be related to a range of functioning and impairment domains in college students, even after accounting for demographics and other psychopathology symptoms.

First, in terms of academic functioning, extant research has demonstrated that SCT is significantly associated with poorer grades in college student samples (Becker, Langberg, et al., 2014; Langberg, Becker, Dvorsky, et al., 2014), and the present study may shed light on one mechanism driving this association. Specifically, and as hypothesized, SCT symptoms were significantly associated with poorer study skills, and the associations between SCT and the affective learning strategy and goal strategy components of study skills remained significant even after controlling for symptoms of ADHD, depression, and anxiety. Of note, the association between ADHD inattention and study skills was reduced to nonsignificance (for affective strategies and goal strategies) when SCT was added to the regression models. SCT is characterized by daydreaming, mental confusion, low motivation, and slowed thinking which may possibly explain the association between SCT and poor affective learning (which includes attitudes towards school success, time management, and concentration) and goal strategies (which includes academic anxiety, use of homework and test-taking strategies, and being able to distill the most critical or important information when learning). Interestingly, SCT was not significantly bivariately associated with comprehension monitoring strategies ($r = -.17$) despite strong inverse relations with both affective learning and goal strategies ($r_s = -.60$ and $-.55$, respectively). The comprehension monitoring strategies domain of the LASSI-2 includes items that assess taking the time to make sure material is understood, the monitoring and reviewing of academic material, and the creation and use of study aids such as underlining. In essence, the comprehension monitoring strategies domain includes study skills that require time and an absence of rushing. It is therefore perhaps not surprising that SCT was unrelated to poor study skills in this domain since SCT is not characterized by rushing and impulsive behaviors but rather slowed behavior and thinking (Barkley, 2014; Becker, 2013; Becker, Leopold et al., 2016). Thus, the slow aspect of SCT may be a primary contributor to academic problems even when comprehension is high (Becker, Ciesielski, et al., 2016; Fenollar Cortés, Servera, Becker, & Burns, 2014; Langberg, Becker, & Dvorsky, 2014; Tamm et al., 2016). Additional research will be needed to replicate the differential finding of the present study that SCT impacts the affective learning and goal strategies study skills domains but not the comprehension monitoring domain. In any event, the present study adds to a growing body of research linking SCT to poorer academic functioning in college students and is also the first study to demonstrate a link between SCT symptoms and poorer study skills specifically.

In addition, the current investigation found SCT symptoms to be significantly associated with impairment in the specific domains of managing chores and other household tasks, managing money/finances, work, educational activities, community activities, and social

situations with strangers/acquaintances as well as with friends. Moreover, the significant associations between ADHD inattention and impairment in managing chores/household tasks, work, and educational activities were each reduced to nonsignificance when SCT was added to the model, providing compelling support for the importance of SCT in relation to these domains of functioning. In contrast, SCT was not significantly associated with multiple other domains of functioning in the regression analyses, including romantic relationships and sexual activities, driving, organization, and daily self-care and health maintenance. Thus, the association between SCT and functional impairment appears to be limited to certain areas of impairment, particularly in the social and work/education domains. However, it should also be noted that even when statistically significant, the effect sizes for SCT in relation to impairment were generally small. A small effect as related to functional impairment may be clinically meaningful, but this of course remains to be established. In addition, across domains, depression was the psychopathology domain most consistently associated with functional impairment in the path analyses (significantly associated with 12 of the 13 impairment domains evaluated, including being the only psychopathology domain in the path analyses to be significantly associated with impairment in home life and sexual activities), and ADHD impulsive symptoms were also associated with multiple domains of functional impairment (6 of 13 domains). Neither anxiety nor ADHD hyperactive symptoms were significantly associated with any functional impairment domain in the path analyses with the sole exception of hyperactivity being associated with *less* impairment in managing chores/household tasks when controlling for demographics and other psychopathology symptoms (perhaps due to a suppression effect). Considered together, findings from this study underscore the importance of simultaneously considering multiple domains of psychopathology, including differentiating between anxiety and depression as well as between hyperactivity and impulsivity. Consistent with previous research (Barkley, 2012; Combs et al., 2014; Jarrett et al., 2014; Wood et al., 2014), the present study also found SCT symptoms to be significantly associated with global (mean) functional impairment. While it is important that our study replicated the finding by others that SCT is significantly associated with young adults' overall functional impairment, results from this study also highlight the need for increased specificity in studies examining the relation between SCT and adjustment.

Finally, SCT was the strongest predictor of self-reported daily life EF deficits among college students in the present study. In fact, when SCT was added to the path model, the association between depression and self-reported EF was no longer statistically significant and the association between ADHD inattention and EF was greatly reduced (β s = .55 and .29 in Steps 1 and 2, respectively). We are aware of only three other studies that have examined SCT in relation to daily life EF in adults, including one nationally representative sample of adults (Barkley, 2012) and two studies with college students (Jarrett et al., 2014; Wood et al., 2014). The extant literature has presented mixed findings as to whether ADHD or SCT is a stronger predictor of adult ratings of daily life EF (Barkley, 2012; Wood et al., 2014). For example, Barkley has suggested that SCT is not a disorder of daily life EF, whereas ADHD represents a serious and pervasive disorder of EF (Barkley, 2014). However, our results provide an important replication of the finding by Wood et al. (2014) showing SCT symptoms to remain significantly associated with overall EF deficits even after accounting

for depression, anxiety, and ADHD symptoms. It is important to note that the one college student study that also included neuropsychological EF assessments (e.g., the Stroop Task, the Conners' Continuous Performance Task) did not find an association between SCT (or ADHD) and college students' neuropsychological test performance (Jarrett et al., 2014). Tests and daily life ratings of EF assess different constructs (Toplak, West, & Stanovich, 2013), though daily life EF ratings are stronger predictors than performance-based EF tests of real-life functioning (Barkley & Fischer, 2011). However, it has been suggested that rating scale measures of EF may more closely assess underlying personality traits as opposed to underlying neurocognitive performance assessed with neuropsychological tests (Buchanan, 2016), making it important for future studies to use multiple methods including both tests and ratings of EF (see Lewandowski et al., 2016, for a discussion of this issue as related to SCT specifically). It will be especially important for future studies to do so in samples that have a wide range of neuropsychological performance. Nevertheless, the present study contributes to the growing body of literature examining SCT and EF, and our findings support future research examining the interplay between specific components of EF and domains of impairment associated with symptoms of SCT.

The findings from the current study should be considered with several limitations in mind. First, the cross-sectional design of the study hinders the ability to draw causal conclusions. Although several studies examining the longitudinal correlates of SCT in children have recently emerged (Becker, 2014; Bernad, Servera, Becker, & Burns, 2016; Bernad, Servera, Grases, Collado, & Burns, 2014), no longitudinal study of SCT in adults exists, making such studies a clear research priority. Additionally, as noted above, the present study relies on self-reported measures of psychopathology, EF, study skills, and functional impairment. Future research should consider multi-method and multi-informant measurements of these domains (e.g., GPA, academic achievement scores, neuropsychological test performance) to more fully test their association with SCT. Such research has just begun to emerge in school-aged children (Bernad et al., 2016; Burns, Becker, Servera, Bernad, & García-Banda, 2016; Lee et al., 2015), adolescents (Smith et al., 2016), and college students specifically (Leopold, Bryan, Pennington, & Willcutt, 2015), and additional studies using a multi-trait, multi-method, and multi-informant approach are certainly needed. Likewise, although there is initial psychometric support for the BAARS-IV SCT scale (Barkley, 2011a, 2012; Becker, Langberg, et al., 2014), it will be important for future studies to assess SCT with measures (including both rating scale and clinical interview measures) that include the SCT items identified in a recent meta-analysis as optimal for differentiating SCT from ADHD inattention (Becker, Leopold et al., 2016). A third limitation of the present study is that it was limited to primarily non-Hispanic White college students from a single university. It will be important for future studies to use a broader sampling strategy to increase representativeness of the college student population, as well as young adults more broadly. It is also important to acknowledge the small sample size of the current study, particularly as other studies examining SCT in general college student samples have utilized notably larger samples. Given the sample size and cross-sectional, self-report design of the present study, the findings should be considered preliminary until replicated in a larger, more representative sample of college students. Relatedly, in order to examine specific domains of impairment, this study included a large number of outcomes. We did not correct for the number of

outcomes examined or the number of predictors included in each model, in part because of the exploratory nature of the study and in part because corrections come with their own limitations and concerns (Perneger, 1998). Nevertheless, increasing the number of predictor and outcome variables increases the number of paths to be tested, which may also increase the probability of a Type 1 error. Despite these limitations, findings from the current study contribute to the limited knowledge base examining SCT in early adulthood, and college students specifically, and if replicated suggest that it may be important to assess for SCT in college student mental health and educational accommodation evaluations.

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Table 1

Means, Standard Deviations, and Ranges for Study Variables

	<i>M</i>	<i>SD</i>	Range
<u>Demographics</u>			
Age	19.05	1.00	18 - 23
Sex	0.64	--	0 - 1
<u>Psychopathology Symptoms</u>			
Anxiety	1.47	0.50	1.00 - 3.29
Depression	1.17	0.52	0.40 - 2.70
ADHD Inat.	1.71	0.53	1.00 - 3.22
ADHD Hyp.	1.87	0.57	1.00 - 3.60
ADHD Imp.	1.65	0.63	1.00 - 4.00
SCT	2.11	0.62	1.00 - 4.00
<u>Learning Strategies</u>			
Affective Strategies	3.08	0.56	1.50 - 4.75
Goal Strategies	3.36	0.53	1.96 - 5.00
Comprehension Monitoring Strategies	2.97	0.46	1.77 - 4.33
<u>Functional Impairment</u>			
Home Life	1.58	2.17	0 - 7
Household/Chores	1.64	1.99	0 - 9
Work	1.61	2.00	0 - 9
Social – Strangers	1.87	2.24	0 - 9
Social – Friends	1.37	1.91	0 - 8
Community Activities	1.61	2.26	0 - 9
Educational Activities	2.12	2.30	0 - 8
Dating/Romantic Relations	1.76	2.39	0 - 9
Money/Bills	1.99	2.13	0 - 9
Driving	0.57	1.31	0 - 7
Sexual Relations	1.34	1.98	0 - 9
Organization	1.81	2.00	0 - 9
Daily Self-Care/Hygiene	0.93	1.58	0 - 7
Maintaining Health	1.79	2.06	0 - 9
Mean Impairment	1.55	1.50	0.00 - 7.10
<u>Executive Functioning (EF)</u>			
Daily Life EF	1.80	0.55	1.00 - 3.45

Note.

N=158. Hyp. = hyperactivity. Imp. = impulsivity. Inat. = inattention. SCT = sluggish cognitive tempo. For sex, men = 0, women = 1.

Table 2

Intercorrelation of Participant Demographics and Psychopathology Symptoms (Independent Variables; Top Panel) and of Learning Strategies, Functional Impairment and Executive Functioning (Dependent Variables; Bottom Panel)

	Proposed Independent Variables								Proposed Dependent Variables																		
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.	21.	22.	23.	24.	25.	26.	
1. Age	--																										
2. Sex	-.27**	--																									
3. Anxiety	.08	.00	--																								
4. Depression	.10	-.01	.69**	--																							
5. ADHD Inattentive	.15	-.15	.48**	.56**	--																						
6. ADHD Hyperactive	.14	-.16*	.47**	.36**	.51**	--																					
7. ADHD Impulsive	.10	-.05	.37**	.21**	.26**	.48**	--																				
8. SCT	.11	-.01	.55**	.58**	.77**	.42**	.22**	--																			
<u>Learning Strategies</u>																											
9. Affective Strategies																											
10. Goal Strategies	.81**																										
11. Comprehension Monitoring Strategies	.24**	.10																									
<u>Impairment</u>																											
12. Home Life	-.42**	-.46**	-.06																								
13. Household/ Chores	-.37**	-.38**	-.09	.42**																							
14. Work	-.52**	-.49**	-.18*	.49**	.55**																						
15. Social – Strangers	-.36**	-.43**	-.22**	.44**	.45**	.58**																					
16. Social – Friends	-.41**	-.49**	-.17*	.51**	.41**	.62**	.75**																				
17. Community Activities	-.35**	-.48**	-.02	.48**	.49**	.50**	.75**	.66**																			
18. Educational Activities	-.57**	-.51**	-.19*	.44**	.47**	.59**	.64**	.65**																			

	Proposed Dependent Variables																		
	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.	21.	22.	23.	24.	25.	26.	
19. Dating/Romantic Relations	-.33**	-.32**	-.30**	.37**	.34**	.44**	.56**	.64**	.39**	.46**									
20. Money/ Bills	-.36**	-.40**	-.04	.54**	.48**	.56**	.57**	.52**	.56**	.54**	.45**								
21. Driving	-.04	-.24**	.09	.31**	.44**	.44**	.36**	.35**	.32**	.26**	.41**	.45**							
22. Sexual Relations	-.16	-.31**	-.21*	.46**	.50**	.46**	.45**	.59**	.55**	.58**	.63**	.50**	.43**						
23. Organization	-.63**	-.52**	-.23**	.54**	.51**	.59**	.54**	.64**	.53**	.71**	.52**	.57**	.27**	.63**					
24. Daily Self-Care/ Hygiene	-.36**	-.40**	-.13	.49**	.42**	.67**	.60**	.69**	.48**	.56**	.47**	.49**	.54**	.56**	.60**				
25. Maintaining Health	-.41**	-.38**	-.05	.41**	.38**	.57**	.49**	.61**	.51**	.62**	.45**	.57**	.39**	.55**	.63**	.70**			
26. Mean Impairment	-.52**	-.56**	-.18*	.66**	.66**	.77**	.79**	.83**	.77**	.79**	.71**	.75**	.54**	.77**	.79**	.79**	.77**		
27. Executive Functioning	-.72**	-.67**	-.31**	.47**	.50**	.62**	.55**	.54**	.53**	.65**	.49**	.50**	.23**	.47**	.65**	.47**	.48**	.70**	

Note.

N=158 for correlations with learning strategies and executive functioning. For learning strategies, pooled estimates for 20 imputed datasets are shown. N ranges from 128-157 for correlations with functional impairment. For sex, men=0, women=1. ADHD = attention-deficit/hyperactivity disorder. SCT = sluggish cognitive tempo.

* $p < .05$.

** $p < .01$.

Table 3

Bivariate Correlations of Participant Demographics and Psychopathology Symptoms with Learning Strategies, Executive Functioning, and Functional Impairment

Variable	Learning Strategies and Executive Functioning							
	Affective Strategies	Goal Strategies	Comprehension Monitoring Strategies	Executive Functioning				
Age	-.04	-.07	-.08	.18 *				
Sex	.05	.05	.13	-.13				
Anxiety	-.36 **	-.43 **	-.05	.60 **				
Depression	-.38 **	-.43 **	-.26 *	.62 **				
ADHD Inat.	-.55 **	-.46 **	-.18	.77 **				
ADHD Hyp.	-.28 *	-.29 *	-.07	.48 **				
ADHD Imp.	-.20 *	-.24 *	.13	.28 **				
SCT	-.60 **	-.55 **	-.17	.79 **				
	Functional Impairment							
	Home Life	Household/ Chores	Work	Social – Strangers	Social – Friends	Community Activities	Educational Activities	
Age	.02	.13	.10	.17 *	.10	.14	.11	
Sex	-.09	-.03	-.02	-.17 *	-.02	-.11	-.02	
Anxiety	.40 **	.35 **	.39 **	.46 **	.48 **	.43 **	.45 **	
Depression	.52 **	.37 **	.49 **	.52 **	.60 **	.55 **	.55 **	
ADHD Inat.	.38 **	.39 **	.53 **	.44 **	.45 **	.42 **	.54 **	
ADHD Hyp.	.21 **	.16 *	.26 **	.29 **	.28 **	.24 **	.34 **	
ADHD Imp.	.16 *	.28 **	.30 **	.21 **	.23 **	.20 *	.27 **	
SCT	.42 **	.46 **	.58 **	.49 **	.52 **	.52 **	.57 **	
	Dating/Romantic Relations	Money/Bills	Driving	Sexual Relations	Organization	Daily Self-Care/ Hygiene	Maintaining Health	
Age	.09	.08	.08	.06	.06	.10	.07	
Sex	-.05	-.09	-.04	-.06	-.14	-.14	-.07	
Anxiety	.52 **	.33 **	.23 **	.40 **	.42 **	.31 **	.37 **	
Depression	.53 **	.40 **	.13	.49 **	.51 **	.38 **	.44 **	
ADHD Inat.	.37 **	.28 **	.03	.42 **	.61 **	.38 **	.35 **	
ADHD Hyp.	.34 **	.33 **	.20 *	.42 **	.34 **	.26 **	.28 **	
ADHD Imp.	.32 **	.33 **	.33 **	.26 **	.21 **	.27 **	.41 **	
SCT	.37 **	.33 **	.08	.38 **	.54 **	.38 **	.35 **	

Note.

N=158 for correlations with executive functioning and learning strategies. For learning strategies, pooled estimates for 20 imputed datasets are shown. *N* ranges from 128-157 for correlations with functional impairment. For sex, men=0, women=1. ADHD = attention-deficit/hyperactivity disorder. Inat = inattention. Hyp = hyperactive. Imp = impulsive. SCT = sluggish cognitive tempo.

*
 $p < .05$.

**
 $p < .01$.

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Table 4

Hierarchical Regression Models of Demographics and Psychopathology Dimensions in Relation to Learning Strategies

	Step 1 Model Summary				Step 2 Model Summary			
	<i>B</i>	<i>SE</i>	β	<i>t</i>	<i>B</i>	<i>SE</i>	β	<i>t</i>
<i>DV: Affective Strategies</i>	$R^2 = .43$				$R^2 = .51, R^2 = .08^{**}$			
Age	0.03	0.04	0.05	0.71	0.03	0.03	0.05	0.86
Sex	-0.01	0.07	-0.01	-0.09	0.04	0.07	0.03	0.55
Anxiety	-0.12	0.10	-0.11	-1.21	-0.02	0.09	-0.02	-0.25
Depression	-0.06	0.10	-0.06	-0.64	-0.01	0.09	-0.01	-0.09
ADHD Inat.	-0.60	0.08	-0.58	-7.30 ^{**}	-0.28	0.07	-0.27	-2.86 ^{**}
ADHD Hyp.	0.07	0.08	0.08	0.95	0.07	0.06	0.07	1.01
ADHD Imp.	-0.06	0.06	-0.07	-1.03	-0.07	0.06	-0.09	-1.30
SCT	--	--	--	--	-0.44	0.09	-0.48	-5.14 ^{**}
<i>DV: Goal Strategies</i>	$R^2 = .42$				$R^2 = .51, R^2 = .09^{**}$			
Age	0.01	0.03	0.01	0.23	0.01	0.03	0.02	0.33
Sex	0.02	0.07	0.02	0.29	0.06	0.07	0.06	0.95
Anxiety	-0.25	0.10	-0.23	-2.61 ^{**}	-0.16	0.09	-0.15	-1.74
Depression	-0.16	0.09	-0.16	-1.74	-0.11	0.09	-0.11	-1.27
ADHD Inat.	-0.36	0.08	-0.36	-4.53 [*]	-0.05	0.09	-0.06	-0.58
ADHD Hyp.	0.04	0.07	0.05	0.58	0.04	0.07	0.05	0.61
ADHD Imp.	-0.09	0.06	-0.11	-1.48	-0.10	0.06	-0.12	-1.78
SCT	--	--	--	--	-0.41	0.08	-0.48	-5.07 ^{**}
<i>DV: Comprehension Monitoring Strategies</i>	$R^2 = .25$				$R^2 = .25, R^2 = .00$			
Age	-0.02	0.03	-0.04	0.54	-0.02	0.03	-0.04	-0.53
Sex	0.14	0.07	0.14	1.96 [*]	0.14	0.07	0.15	2.06 [*]
Anxiety	0.24	0.09	0.26	2.57 [*]	0.26	0.10	0.21	2.89 [*]
Depression	-0.43	0.09	-0.49	-4.75 ^{**}	-0.42	0.09	-0.36	-4.63 ^{**}
ADHD Inat.	-0.07	0.08	-0.08	-0.91	-0.02	0.10	-0.01	-0.19
ADHD Hyp.	-0.08	0.07	-0.09	-1.02	-0.08	0.07	-0.07	-1.02
ADHD Imp.	0.19	0.06	0.26	3.16 ^{**}	0.18	0.06	0.19	3.13 ^{**}
SCT	--	--	--	--	-0.07	0.09	-0.07	-0.82

Note.

Missing data estimated with 20 imputed datasets. Path analyses were just-identified. For sex, men = 0, women = 1. ADHD = attention-deficit/hyperactivity disorder. Inat = inattention. Hyp = hyperactive. Imp = impulsive. SCT = sluggish cognitive tempo.

* $p < .05$.

** $p < .01$.

Table 5
Hierarchical Regression Models of Demographics and Psychopathology Dimensions in Relation to Functional Impairment

	Step 1 Model Summary				Step 2 Model Summary				Step 3 Model Summary			
	B	SE	β	t	B	SE	β	t	B	SE	β	t
<u>HOME LIFE</u>												
DV: Home Life	$R^2=.29$				$R^2=.02$				$R^2=.24$			
Age	-0.12	0.15	-0.05	-0.77	-0.12	0.15	-0.06	-0.79	0.14	0.15	0.07	0.96
Sex	-0.37	0.32	-0.08	-1.17	-0.43	0.32	-0.10	-1.37	0.08	0.31	0.02	0.26
Anxiety	0.29	0.44	0.07	0.68	0.15	0.44	0.03	0.33	0.43	0.42	0.11	1.03
Depression	1.81	0.42	0.43	4.26**	1.74	0.42	0.41	4.10**	0.60	0.40	0.15	1.49
ADHD Inat.	0.46	0.36	0.11	1.25	-0.03	0.46	-0.01	-0.07	1.07	0.35	0.29	3.07**
ADHD Hyp.	-0.18	0.34	-0.05	-0.52	-0.18	0.34	-0.05	-0.52	-0.70	0.32	-0.20	-2.17*
ADHD Imp.	0.10	0.27	0.03	0.37	0.12	0.27	0.04	0.44	0.70	0.26	0.22	2.75**
SCT	--	--	--	--	0.66	0.40	0.19	1.67	--	--	--	--
DV: Money	$R^2=.25$				$R^2=.02^*$				$R^2=.42$			
Age	0.02	0.16	0.01	0.09	0.01	0.16	0.00	0.04	-0.12	0.13	-0.06	-0.96
Sex	-0.15	0.35	-0.03	-0.43	-0.22	0.34	-0.05	-0.65	-0.39	0.27	-0.09	-1.43
Anxiety	-0.13	0.47	-0.03	-0.28	-0.36	0.48	-0.08	-0.74	0.17	0.36	0.04	0.48
Depression	1.39	0.45	0.34	3.11**	1.32	0.44	0.32	2.97**	0.90	0.35	0.23	2.56**
ADHD Inat.	0.06	0.39	0.01	0.15	-0.60	0.51	-0.15	-1.19	1.67	0.30	0.45	5.50**
ADHD Hyp.	0.19	0.37	0.05	0.50	0.18	0.37	0.05	0.50	-0.08	0.28	-0.02	-0.29
ADHD Imp.	0.92	0.31	0.27	3.00**	0.98	0.31	0.29	3.19**	0.16	0.23	0.05	0.69
SCT	--	--	--	--	0.88	0.44	0.25	2.02*	--	--	--	--
<u>WORK/ACADEMIC FUNCTIONING</u>												
DV: Work	$R^2=.37$				$R^2=.03^{**}$				$R^2=.40$			
Age	0.04	0.14	0.02	0.25	0.03	0.14	0.02	0.24	0.09	0.15	0.04	0.63
Sex	0.08	0.30	0.02	0.27	-0.03	0.29	-0.01	-0.09	0.22	0.31	0.05	0.69
Anxiety	0.04	0.40	0.01	0.10	-0.23	0.40	-0.06	-0.57	0.22	0.42	0.05	0.49
									-0.03	0.42	-0.01	-0.07

	Step 1 Model Summary					Step 2 Model Summary				
	<i>B</i>	<i>SE</i>	β	<i>t</i>		<i>B</i>	<i>SE</i>	β	<i>t</i>	
Depression	1.10	0.39	0.28	2.85**		0.97	0.38	0.25	2.55*	Depression
ADHD Inat.	1.39	0.33	0.37	4.17***		0.53	0.43	0.14	1.22	ADHD Inat.
ADHD Hyp.	-0.37	0.31	-0.11	-1.21		-0.34	0.30	-0.10	-1.15	ADHD Hyp.
ADHD Imp.	0.60	0.25	0.19	2.40*		0.63	0.24	0.20	2.63*	ADHD Imp.
SCT	--	--	--	--		1.10	0.37	0.34	3.02**	SCT
SOCIAL FUNCTIONING										
<i>DV: Social - Strangers</i>	$R^2=.34$					$R^2=.03^*$				<i>DV: Social - Friends</i>
Age	0.17	0.15	0.08	1.14		0.17	0.15	0.08	1.13	Age
Sex	-0.58	0.32	-0.12	-1.81		-0.66	0.32	-0.14	-2.11*	Sex
Anxiety	0.68	0.43	0.15	1.59		0.48	0.43	0.11	1.11	Anxiety
Depression	1.41	0.42	0.32	3.37**		1.31	0.41	0.30	3.16**	Depression
ADHD Inat.	0.66	0.36	0.16	1.85		-0.01	0.46	-0.00	-0.02	ADHD Inat.
ADHD Hyp.	-0.13	0.34	-0.03	-0.38		-0.13	0.33	-0.03	-0.38	ADHD Hyp.
ADHD Imp.	0.18	0.27	0.05	0.66		0.20	0.26	0.06	0.76	ADHD Imp.
SCT	--	--	--	--		0.91	0.39	0.25	2.33*	SCT
<i>DV: Community Activities</i>	$R^2=.34$					$R^2=.05^{**}$				<i>DV: Romantic</i>
Age	0.12	0.16	0.05	0.76		0.11	0.15	0.05	0.75	Age
Sex	-0.35	0.33	-0.08	-1.09		-0.48	0.31	-0.10	-1.51	Sex
Anxiety	0.30	0.45	0.07	0.67		-0.01	0.44	-0.00	-0.03	Anxiety
Depression	1.94	0.44	0.44	4.45**		1.78	0.42	0.40	4.21**	Depression
ADHD Inat.	0.62	0.37	0.15	1.66		-0.41	0.46	-0.10	-0.90	ADHD Inat.
ADHD Hyp.	-0.31	0.35	-0.08	-0.90		-0.32	0.33	-0.08	-0.97	ADHD Hyp.
ADHD Imp.	0.24	0.27	0.07	0.88		0.28	0.26	0.08	1.05	ADHD Imp.
SCT	--	--	--	--		1.40	0.39	0.38	3.59**	SCT
HEALTH BEHAVIORS										
<i>DV: Sexual Relations</i>	$R^2=.34$					$R^2=.01$				<i>DV: Daily Self-Care</i>
Age	0.12	0.16	0.05	0.76		0.11	0.15	0.05	0.75	Age
Sex	-0.35	0.33	-0.08	-1.09		-0.48	0.31	-0.10	-1.51	Sex
Anxiety	0.30	0.45	0.07	0.67		-0.01	0.44	-0.00	-0.03	Anxiety
Depression	1.94	0.44	0.44	4.45**		1.78	0.42	0.40	4.21**	Depression
ADHD Inat.	0.62	0.37	0.15	1.66		-0.41	0.46	-0.10	-0.90	ADHD Inat.
ADHD Hyp.	-0.31	0.35	-0.08	-0.90		-0.32	0.33	-0.08	-0.97	ADHD Hyp.
ADHD Imp.	0.24	0.27	0.07	0.88		0.28	0.26	0.08	1.05	ADHD Imp.
SCT	--	--	--	--		1.40	0.39	0.38	3.59**	SCT

	Step 1 Model Summary				Step 2 Model Summary				Step 1 Model Summary				Step 2 Model Summary			
	B	SE	β	t	B	SE	β	t	B	SE	β	t	B	SE	β	t
Age	-0.01	0.14	-0.00	-0.05	-0.01	0.14	-0.01	-0.08					0.02	0.12	0.01	0.16
Sex	0.00	0.31	0.00	0.01	-0.04	0.31	-0.01	-0.12					-0.30	0.24	-0.09	-1.22
Anxiety	-0.30	0.41	-0.07	-0.74	-0.38	0.42	-0.09	-0.91					0.00	0.33	0.00	-0.01
Depression	1.65	0.40	0.42	4.11**	1.62	0.40	0.41	4.05**					0.71	0.32	0.23	2.22*
ADHD Inat.	0.52	0.34	0.14	1.53	0.27	0.44	0.07	0.63					0.59	0.28	0.20	2.14*
ADHD Hyp.	0.49	0.33	0.14	1.47	0.48	0.33	0.14	1.47					-0.06	0.26	-0.02	-0.24
ADHD Imp.	0.44	0.25	0.14	1.72	0.45	0.25	0.14	1.77					0.44	0.21	0.18	2.12*
SCT	--	--	--	--	0.33	0.38	0.10	0.87					--	--	--	--
DV: Health Maintenance	$R^2=.31$				$R^2=.00$											
Age	-0.01	0.14	-0.01	-0.07	-0.01	0.14	-0.01	-0.08								
Sex	-0.14	0.30	-0.03	-0.48	-0.17	0.30	-0.04	-0.56								
Anxiety	0.00	0.41	0.00	-0.01	-0.06	0.41	-0.02	-0.15								
Depression	1.31	0.40	0.33	3.32**	1.28	0.40	0.32	3.23**								
ADHD Inat.	0.43	0.34	0.11	1.26	0.23	0.44	0.06	0.53								
ADHD Hyp.	-0.22	0.32	-0.06	-0.69	-0.22	0.32	-0.06	-0.69								
ADHD Imp.	1.13	0.25	0.35	4.46**	1.13	0.25	0.35	4.49**								
SCT	--	--	--	--	0.26	0.37	0.08	0.70								

Note.

For sex, men = 0, women = 1. ADHD=attention-deficit/hyperactivity disorder. Inat = inattention. Hyp = hyperactive. Imp = impulsive. SCT=sluggish cognitive tempo.

* $p<.05$.** $p<.01$.

Table 6

Hierarchical Regression Models of Demographics and Psychopathology Dimensions in Relation to Overall Functional Impairment and Executive Functioning

	Step 1 Model Summary				Step 2 Model Summary			
	<i>b</i>	<i>SE</i>	β	<i>t</i>	<i>b</i>	<i>SE</i>	β	<i>t</i>
<i>DV: Mean Impairment</i>	$R^2 = .51$				$R^2 = .53, R^2 = .02^{**}$			
Age	0.02	0.09	0.02	0.27	0.02	0.09	0.01	0.23
Sex	−0.16	0.18	−0.05	−0.86	−0.22	0.18	−0.07	−1.23
Anxiety	0.23	0.25	0.08	0.92	0.09	0.25	0.03	0.35
Depression	1.23	0.24	0.43	5.17 ^{**}	1.16	0.23	0.40	4.94 ^{**}
ADHD Inat.	0.67	0.21	0.24	3.21 ^{**}	0.20	0.26	0.07	0.76
ADHD Hyp.	−0.13	0.20	−0.05	−0.65	−0.13	0.19	−0.05	−0.66
ADHD Imp.	0.49	0.16	0.21	3.16 ^{**}	0.51	0.15	0.21	3.34 ^{**}
SCT	--	--	--	--	0.63	0.22	0.26	2.84 ^{**}
<i>DV: Executive Functioning</i>	$R^2 = .67$				$R^2 = .73, R^2 = .06^{**}$			
Age	0.03	0.03	0.05	1.03	0.03	0.02	0.05	1.04
Sex	−0.04	0.06	−0.03	−0.69	−0.07	0.05	−0.07	−1.49
Anxiety	0.24	0.07	0.22	3.22 ^{**}	0.16	0.07	0.15	2.31 [*]
Depression	0.16	0.07	0.15	2.18 [*]	0.11	0.07	0.11	1.71
ADHD Inat.	0.56	0.06	0.55	9.08 ^{**}	0.30	0.07	0.29	4.08 ^{**}
ADHD Hyp.	0.03	0.06	0.03	0.52	0.03	0.05	0.03	0.59
ADHD Imp.	0.00	0.05	0.00	0.01	0.01	0.04	0.01	0.22
SCT	--	--	--	--	0.36	0.06	0.40	5.80 ^{**}

Note.

For sex, men = 0, women = 1. ADHD = attention-deficit/hyperactivity disorder. Inat = inattention. Hyp = hyperactive. Imp = impulsive. SCT = sluggish cognitive tempo.

* $p < .05$.

** $p < .01$.