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Disentangling the effects of attentional difficulties on fears of social evaluation and social anxiety symptoms: Unique interactions with sluggish cognitive tempo

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Abstract

Although fears of negative and positive social evaluation are hallmark cognitive features of social anxiety, attentional difficulties may exacerbate the relation between fears of social evaluation and social anxiety. Thus, the goal of the current study was to test whether two different types of self-reported attentional difficulties, specifically sluggish cognitive tempo (SCT) and attention-deficit/hyperactivity disorder (ADHD) inattention symptoms, moderate the relation between fears of social evaluation and social anxiety. Participants ($N = 4,756$; $M_{age} = 19.28$ years; 72.7% female) enrolled in five universities across the United States completed self-report measures of fears of negative and positive evaluation and psychopathology symptoms. Results indicated a significant two-way interaction of fear of negative evaluation and SCT in relation to social anxiety symptoms, as well as a significant two-way interaction of fear of positive evaluation and SCT in relation to social anxiety symptoms. In both instances, the associations between fears of negative and positive evaluation in relation to social anxiety became increasingly stronger at higher levels of SCT. Conversely, the interactions between fears of negative and positive evaluation with ADHD inattentive symptoms were non-significant. These results are the first to report that self-reported

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¹Analyses were re-run to determine whether the interaction between ADHD inattention and fears of social evaluation would become significant after removing SCT. Findings showed that the ADHD inattention interaction with fear of negative evaluation ($p = .07$) and fear of positive evaluation ($p = .58$) remained non-significant.

SCT, but not ADHD inattentive symptoms, exacerbate the relation between fears of social evaluation and social anxiety, and suggest that attentional difficulties characteristic of SCT may prolong engagement in fears.

Keywords

sluggish cognitive tempo; attention-deficit/hyperactivity disorder; fears of social evaluation; social anxiety

Social anxiety disorder is one of the most prevalent mental health disorders in adults and is associated with heightened risk of depression, loneliness, substance abuse, and suicide risk (Spence & Rapee, 2016). Due to the debilitating nature of social anxiety, research has sought to identify processes that may explain the development and maintenance of social anxiety. Cognitive-behavioral models highlight fears of negative and positive evaluation as co-occurring cognitive processes in social anxiety (Weeks & Howell, 2012), and these fears have been consistently associated with social anxiety symptoms in adults (Fredrick & Luebbe, 2020). However, research proposes that certain attentional difficulties may prolong fears of social evaluation, which may increase social anxiety symptoms. Although general individual differences in attention such as focusing and shifting abilities have been examined in relation to fears and anxiety (Derryberry & Reed, 2002), it is important to incorporate specific attentional difficulties that are captured by psychopathologies and consistently linked to functional impairment (Williams et al., 2017) as this may have more direct clinical implications. Thus, the current study explored whether two psychopathologies marked by attentional difficulties, attention-deficit/hyperactivity disorder (ADHD) inattentive and sluggish cognitive tempo (SCT) symptoms, would strengthen the relation between fears of social evaluation and social anxiety symptoms.

Fears of Social Evaluation and Social Anxiety

Although social anxiety typically emerges in adolescence, research finds that a moderate percentage of individuals continue experiencing elevated social anxiety symptoms into young adulthood (Beesdo-Baum et al., 2012). Among college students in particular, nearly one in ten report severe social anxiety (Russell & Shaw, 2009) that is linked to impaired social relations and academic achievement (Brook & Willoughby, 2015). One debilitating mechanism underlying social anxiety is persistent fears of social evaluation. Fears of negative evaluation, or the fear of being criticized, humiliated, or rejected, is the primary symptom cluster in the diagnosis of social anxiety disorder (American Psychiatric Association, 2013) and is recognized as the hallmark cognitive feature across theoretical models of social anxiety (Spence & Rapee, 2016). Numerous studies have found adults' self-reported fear of negative evaluation to be associated with elevated social anxiety symptoms in community (Carleton et al., 2010; Weeks & Howell, 2012) and clinical (Fergus et al., 2009; Weeks et al., 2005) samples. In addition to fears of negative evaluation, research over the past decade reports that individuals with social anxiety fear *any* type of evaluation, regardless of the valence of these evaluations (Fredrick & Luebbe, 2020). Specifically, due to perceived interpersonal consequences, individuals with social anxiety have also been

found to experience an apprehension and fear of being positively evaluated (i.e., public recognition, favorable attention) (Weeks et al., 2008; Weeks & Howell, 2012). For instance, college students reporting high levels of both fears of negative evaluation *and* fears of positive evaluation reported more social anxiety, depression, and psychosocial difficulties compared to individuals reporting high levels in only one fear domain (Lipton et al., 2016). Taken together, fears of negative and positive evaluation represent key cognitive processes that increase social anxiety symptoms and co-occurring psychosocial difficulties. However, despite replicated evidence linking fears of negative and positive evaluation to social anxiety, recent evidence suggests that other cognitive factors, like attention difficulties, may exacerbate the relation between fears and symptomatology.

Attentional difficulties, or deficits in the capacity to regulate attention and inhibit task-irrelevant information (Eysenck et al., 2007), are considered vulnerability factors for maintaining maladaptive cognitive processes (e.g., rumination, threat-related attentional biases) involved in internalizing psychopathologies, thereby increasing symptom severity and functional impairment (Derryberry & Reed, 2002; Koster et al., 2011). In line with this possibility, studies have reported strong associations between self-reported attentional difficulties and greater rumination, fears, worry, and internalizing symptoms (Devito et al., 2019; Hsu et al., 2015; Williams et al., 2017). Within the internalizing domain, multiple studies have documented associations between attentional difficulties and greater social anxiety symptoms; specifically, heightened vigilance towards and/or slow disengagement from socially-threatening stimuli is associated with social anxiety symptoms (Klumpp & Amir, 2009; Schofield et al., 2012; Taylor et al., 2016). In addition to being correlated with elevated social anxiety symptoms, a recent study found that the relation between social anxiety symptoms and attentional disengagement from socially-threatening cues during a modified dot probe task was most pronounced for individuals with self-reported poor attentional shifting (e.g., efficiently shifting attention across tasks) (Taylor et al., 2016). Thus, research to date indicates that attentional difficulties, particularly poor attentional disengagement, may increase the experience of fears and social anxiety symptoms.

Although attentional difficulties are an important factor to consider when examining fears and internalizing outcomes (Koster et al., 2011), several limitations in the literature remain. Primarily, the bulk of studies measuring self-reported attention difficulties have relied on global measures (Attentional Control Scale; Derryberry & Reed, 2002), rather than attentional difficulties captured by psychopathology domains and more consistently linked to functional impairment. In fact, recent research has found non-significant associations between self-reported scores on global measures of attentional difficulties and external measures of cognitive or attentional functioning (Williams et al., 2017). Thus, it is important to expand the literature and explore various types of attentional difficulties that are captured by psychopathology domains. Specifically, attention-deficit/hyperactivity disorder (ADHD) inattention symptoms are marked by poor sustained attention, distractibility, forgetfulness, and disorganization (American Psychiatric Association, 2013), and are consistently linked with daily life executive functioning deficits (Becker et al., 2011), neuropsychological indicators of executive functioning difficulties (Kofler et al., 2019), and academic impairment (Dvorsky & Langberg, 2019). Further, studies have found ADHD to moderately co-occur with anxiety symptom (Jarrett & Ollendick, 2008), with recent evidence

documenting stronger associations between ADHD inattentive symptoms with social anxiety, fear, and social avoidance compared to hyperactivity/impulsivity symptoms (Koyuncu et al., 2019). Despite the nature of attentional difficulties in ADHD inattention and associations with social anxiety, an accumulating body of research has identified a cluster of unique attentional difficulties that may be more relevant for understanding interrelations with social anxiety.

Sluggish Cognitive Tempo

Sluggish cognitive tempo (SCT), characterized by excessive daydreaming, mind-wandering, confusion or fogginess, and staring behaviors, is empirically distinct from ADHD inattention and independently associated with internalizing psychopathologies and domains of psychosocial impairment across childhood, adolescence, and adulthood (for a review, see (Becker et al., 2016). Specifically, above and beyond ADHD inattentive symptoms, SCT symptoms have been associated with college students experiencing greater academic impairment (Becker, Langberg, et al., 2014), poorer daily life functioning (Flannery et al., 2017; Wood et al., 2017), and increased suicide risk (Becker, Holdaway, et al., 2018). Moreover, research indicates that SCT may better account for associations with internalizing symptoms, particularly the domain of social anxiety, compared to ADHD inattention in college students. For instance, SCT symptoms have been concurrently associated with more internalizing symptoms (Becker, Burns, Garner, et al., 2018; Becker, Langberg, et al., 2014), general social impairment (Flannery et al., 2017), social withdrawal (Becker, Burns, Garner, et al., 2018), and behavioral inhibition sensitivity (Becker, Schmitt, et al., 2018), even when controlling for ADHD inattentive symptoms. Given that social withdrawal and behavioral inhibition are central features of social anxiety (Spence & Rapee, 2016), SCT may be linked with this specific domain of internalizing psychopathology, though no study has explored direct associations with social anxiety symptoms.

In addition to internalizing symptoms, recent research suggest that SCT is uniquely associated with frequent task-unrelated thoughts, characterized by the pattern of internal thoughts unrelated to the current task (Bozhilova et al., 2018; Lanier et al., 2019). Specifically, studies have shown that adolescent-reported SCT, but not ADHD inattentive or internalizing symptoms, are uniquely related to greater self-reported rumination (Becker et al., 2020) and mind-wandering (Fredrick & Becker, 2020). Moreover, self-reported SCT symptoms been found to be more strongly associated with self-reported mind-wandering and rumination compared to ADHD inattentive symptoms in a large sample of college students (Fredrick et al., 2020). Collectively, these findings indicate that SCT symptoms, more so than ADHD inattentive symptoms, are marked by more mind-wandering and rumination, which are considered key cognitive processes underpinning internalizing psychopathologies (Marchetti et al., 2016).

Taken together, given evidence that SCT is uniquely associated with internalizing symptoms and cognitive processes involved in internalizing symptoms (i.e., mind-wandering and rumination), it is important to explore how ADHD inattention and SCT symptoms contribute to the interrelations between fears of social evaluation and social anxiety. Consistent with research suggesting that attentional difficulties maintain cognitive processes that increase

risk for anxiety development (Derryberry & Reed, 2002), SCT symptoms may exacerbate relations between fears of social evaluation and social anxiety symptoms. For instance, SCT has been characterized by deficits in disengaging from *internal* distractions and thoughts (Becker, Burns, Leopold, et al., 2018; Becker & Willcutt, 2019), whereas ADHD inattention may be characterized by difficulties re-engaging attention following *external* distractions (Adams et al., 2010). Potentially, the unique attentional difficulties underpinning SCT, specifically mind-wandering and rumination, may pose a vulnerability for prolonged fears and increased social anxiety symptoms.

Present Study

The present study is the first to test whether self-reported SCT and/or ADHD inattentive symptoms moderate the relation between fears of social evaluation and social anxiety symptoms.

The study had two primary goals:

1. The first goal was to evaluate whether SCT and ADHD inattentive symptoms would be correlated with self-reported fears of negative evaluation, positive evaluation, and social anxiety symptoms. Consistent with previous research, it was expected that ADHD inattentive symptoms would be significantly correlated with greater fears and social anxiety symptoms (Koyuncu et al., 2019). Although direct relations with SCT symptoms have not been tested, indirect evidence shows that SCT symptoms are uniquely associated with greater social withdrawal, loneliness, and behavioral inhibition sensitivity (Becker, Burns, Leopold, et al., 2018; Becker, Schmitt, et al., 2018). Thus, we anticipated self-reported SCT symptoms to be moderately correlated with greater fears of social evaluation and social anxiety symptoms.
2. The second goal was to test whether SCT and/or ADHD inattentive symptoms would moderate the association between fears of social evaluation and social anxiety. Following research showing that SCT symptoms are more strongly associated with task-unrelated thoughts (e.g., mind-wandering, rumination) compared to ADHD inattentive symptoms (Fredrick et al., 2020), we expected that SCT, but not ADHD inattentive symptoms, would exacerbate the association between fears of social evaluation and social anxiety symptoms. We controlled for hyperactivity/impulsivity symptoms across analyses as some studies have found relations with social anxiety (Sobanski et al., 2007) and task-unrelated thoughts (Lanier et al., 2019), suggesting that hyperactivity/impulsivity may also contribute to interactions between fears and social anxiety symptoms.

Methods

Participants

Participants included 4,756 undergraduates enrolled at five universities in several regions of the United States. Participant ages ranged from 18 to 29 ($M = 19.28$, $SD = 1.50$), with 72.7% of participants identifying as female, 27.1% as male, and 0.1% identifying as other. The

majority of participants identified as White (79.8%), while others identified as Black/African American (7.0%), Asian (6.7%), Biracial/Multiracial (5.2%), Native Hawaiian/Other Pacific Islander (0.7%), or American Indian/Alaska Native (0.5%). Of the total participants, 11.8% identified as Hispanic of Latino. Around half of participants were in their first year of college (51.2%), with the remaining in their second (23.7%), third (15.1%), and fourth or later (9.7%).

Procedure

Data for the current study was collected during the 2018–2019 academic year. The study was approved by each university's local Institutional Review Board (IRB). Participants enrolled in an introductory psychology course when the study was conducted were able to read a brief description of the study posted on the online system SONA and sign up to receive a link to complete questions online via Qualtrics. Four of the five universities administered an online Qualtrics survey with measures of the study included, while students at the fifth university selected available time slots to provide in-person consent and then complete the same survey online on their own time. Following completion of the survey, participants were granted course credit. Debriefing information was generated at the end of the survey.

Measures

SCT Symptoms—The Adult Concentration Inventory (ACI) (Becker, Burns, Garner, et al., 2018) was used to assess self-reported SCT symptoms. The ACI is an adult self-report measure that includes 10 items shown to be statistically distinct from both ADHD inattentive and internalizing symptoms (Becker, Burns, Garner, et al., 2018). Participants rated on a four-point scale (0 = *not at all*, 3 = *very often*) the frequency of SCT behaviors (“I get lost in my own thoughts”) over the past six months. The ACI has demonstrated strong internal consistency and discriminative validity with other psychopathologies in multiple samples of college students (Becker, Burns, Garner, et al., 2018; Fredrick et al., 2018). In the current study, internal consistency was excellent ($\alpha = .90$).

ADHD Symptoms—The Barkley Adult ADHD Rating Scale-IV (BAARS-IV) (Barkley, 2011) was used to assess self-reported ADHD symptoms. The BAARS-IV includes ADHD scales assessing inattention (9 items; e.g., “I have difficulty organizing tasks and activities; $\alpha = .89$) and hyperactivity/impulsivity (9 items; e.g., “I fidget with hands or feet or squirm in seat; $\alpha = .82$). Participants indicate on a four-point scale (0 = *not at all*, 3 = *very often*) how often each statement describes their behavior over the past six months. These subscales have well supported internal consistency and test-retest reliability in young adults samples (Barkley, 2012).

Social Anxiety Symptoms—The Social Interaction Anxiety Scale (SIAS) (Rodebaugh et al., 2007) was used to measure self-reported social anxiety symptoms. Comprised of 20 items, participants report on a five-point scale (0 = *not at all characteristic of me*, 4 = *extremely characteristic of me*) their anxiety in dyads and groups. Example items include “When mixing in a group, I find myself worrying I will be ignored.” Given that the 17 non-reverse scored items are more valid indicators of social anxiety interaction anxiety compared

to entire scale (Rodebaugh et al., 2007), these items were used to calculating the total SIAS score. The SIAS has documented strong internal consistency, factorial validity, and convergent validity with other measures of social anxiety across young adult samples (Weeks et al., 2008). In the present study, internal consistency was excellent ($\alpha = .92$).

Fear of Negative Evaluation—The Brief Fear of Negative Evaluation (BFNE) (Weeks et al., 2005) was used to assess self-reported fear of negative evaluation. Originally a 12-item scale, recent research has shown strong reliability and validity for the 8 non-reverse scored items (Rodebaugh et al., 2004). The BFNE measures fear and apprehension of experiencing negative evaluations from others and is scored on a five-point scale (1 = *not at all characteristic of me*, 5 = *extremely characteristics of me*). The BFNE has demonstrated strong internal consistency, test-retest reliability, and discriminative validity from the Fear of Positive Evaluation Scale (Fredrick & Luebbe, 2020; Weeks et al., 2005). Internal consistency in the present study was excellent ($\alpha = .96$).

Fear of Positive Evaluation—The Fear of Positive Evaluation Scale (FPES) was used to evaluate for self-reported fears of positive evaluation (Weeks et al., 2008). The FPES includes 10 items reported on a ten-point scale (0 = *not at all true*, 9 = *very true*) measuring fear and distress of experiencing anticipated or in-the-moment positive feedback from unfamiliar people, though two reverse-scored items were initially created to detect response bias and are not included when calculating the total FPES score (Weeks et al., 2008). The 8-item FPES has documented strong internal consistency, test-retest reliability, convergent validity with positivity impairments, and discriminative validity from FNE across several adult samples (Fredrick & Luebbe, 2020; Rodebaugh et al., 2012). Internal consistency in the present study was high ($\alpha = .84$).

Analytic Approach

Data Quality Check—An instructional manipulation check (IMC), trap questions, and questions measuring participants' effort were used throughout the survey to improve quality of responses. The IMC question instructs the participant to select a designated answer to a question prior to proceeding the remainder of the survey. In addition to the IMC, trap questions were periodically included in the study which specified the answer the participant to click. Finally, one question at the end of the survey asked participants answer how much effort they put into the entire study. A threshold of 50% accuracy or higher for the trap questions and a self-reported effort rating of 5 or higher on a 0 to 10 scale (0 = *not much effort*, 10 = *my best effort*) was designated. The same threshold has been used in previous college student samples (Becker, Burns, Garner, et al., 2018), and is intended to identify participants who put forth sufficient effort while not excluding participants with occasional attentional lapses. Of the 5,053 participants who completed the survey, 297 (6%) did not meet the threshold criteria for the trap questions and were removed from data analyses. The remaining 4,756 (94%) participants met criteria and were included for the current study.

Data Analyses

Bivariate correlations were conducted to examine correlations among demographic variables, fears of social evaluation, and symptom domains. Because seven participants

identified as “other” when reporting on sex, these participants were not included in the correlation analyses. However, to avoid excluding participants from primary analyses, two dummy code vectors were created with female as the reference group. To evaluate moderation, the PROCESS macro using bootstrapped sampling (5,000 iterations) (Hayes, 2017) was used to test two moderation models. The independent and moderator variables were mean-centered prior to analyses. Specifically, we tested whether SCT and/or ADHD inattentive symptoms would interact with fears of negative and positive evaluation in relation to social anxiety symptoms. Given that all variables were measured continuously, significant interactions were probed via simple slopes analyses by testing the relation between fears of social evaluation and social anxiety at specific levels of either SCT or ADHD inattentive, respectively (i.e., $-1SD$, the mean, and $+1SD$).

Results

Correlation Analyses

Intercorrelations, means, standard deviations, and ranges are presented in Table 1. Age and race were both unrelated to social anxiety symptoms and not considered in primary analyses. However, identifying as female and self-reported ADHD hyperactive/impulsive symptoms were both significantly correlated with greater self-reported social anxiety symptoms and were thus included as covariates in moderation analyses. Replicating past research, fears of negative and positive evaluation were moderately interrelated and each was strongly associated with greater social anxiety symptoms. As expected, SCT and ADHD inattentive symptoms were significantly moderately correlated with greater fear of negative evaluation, fear of positive evaluation, and social anxiety symptoms.

Moderation Analyses

Findings for the moderation analyses are presented in Table 2. First, results of the fear of negative evaluation model indicated that SCT symptoms, but not ADHD inattentive symptoms, moderated the relation between fear of negative evaluation and social anxiety symptoms ($B = .03$, $SE = .02$, $t = 2.01$, $p < .05$, $sr^2 = .02$). After removing the non-significant two-way interaction with ADHD inattention, the SCT and fear of negative evaluation interaction remained significant. To probe the interaction, the pick-a-point approach in PROCESS was used to test the conditional effect of fear of negative evaluation and social anxiety at low levels ($-1SD$), mean levels (mean), and high values ($+1SD$) of SCT. As shown in Figure 1a, simple slope analyses showed that the relation between fear of negative evaluation and social anxiety symptoms became increasingly stronger at higher levels of SCT (low SCT, $b = .40$; mean SCT, $b = .42$, high SCT, $b = .44$, $ps < .001$).

Similarly, results for the fear of positive evaluation model showed that SCT symptoms, but not ADHD inattentive symptoms, moderated the relation between fear of positive evaluation and social anxiety symptoms ($B = .04$, $SE = .01$, $t = 2.27$, $p < .05$, $sr^2 = .03$). SCT symptoms continued to moderate the relation between fears of positive evaluation and social anxiety when removing the non-significant interaction with ADHD inattentive symptoms. To probe the interaction, we examined the relation between fears of positive evaluation on social anxiety symptoms at low levels ($-1SD$), mean levels (mean), and high values ($+1SD$) of

SCT. Similar to the interaction results for fear of negative evaluation, as show in Figure 1b, simple slope analyses reported that the relation between fear of positive evaluation and social anxiety symptoms became increasingly stronger at higher levels of SCT (low SCT, $b = .21$; mean SCT, $b = .22$, high SCT, $b = .23$, $ps < .001$).¹

Discussion

Although fears of social evaluation are hallmark cognitive features of social anxiety symptoms (Fredrick & Luebbe, 2020), research suggests that attentional difficulties are an important individual difference that may exacerbate the relation between fears and anxiety symptoms (Van Bockstaele et al., 2014). Thus, the current study tested whether two related yet distinct attentional dimensions, sluggish cognitive tempo (SCT) and attention-deficit hyperactivity disorder (ADHD) inattentive symptoms, moderated the relation between fears of social evaluation and social anxiety symptoms. Findings showed that self-reported SCT symptoms, but not ADHD inattentive symptoms, exacerbated the relation between fears of social evaluation and social anxiety symptoms in a large sample of college students, controlling for demographics and hyperactivity/impulsivity symptoms. This study is the first to empirically demonstrate that SCT symptoms may be an important cluster of attentional difficulties to incorporate when exploring the interrelations among fears and social anxiety symptoms.

SCT and Social Anxiety

A similar pattern of correlational results emerged such that SCT and ADHD inattentive symptoms were both independently correlated with greater self-reported fears of negative evaluation, fears of positive evaluation, and social anxiety symptoms. To our knowledge, this is the first study to provide empirical support that self-reported SCT symptoms are associated with greater self-reported fears of social evaluation and social anxiety symptoms. These findings converge with past studies in children, adolescent, and college student samples showing SCT to be associated with loneliness (Becker, Burns, Garner, et al., 2018), social withdrawal (Becker, Burns, Leopold, et al., 2018; Marshall et al., 2014), behaviorally inhibition sensitivity (Becker, Schmitt, et al., 2018), and physiological reactivity to perceived peer rejection (Becker & McQuade, 2020). Although these outcomes are correlates and features of social anxiety (Spence & Rapee, 2016), the current study provides support for associations with validated measures of fears of social evaluation and social anxiety symptoms.

SCT, Fear of Social Evaluation, and Social Anxiety

The second goal of the current study was to test whether SCT and/or ADHD inattentive symptoms would exacerbate the relation between fears of social evaluation and social anxiety symptoms. Although prior research had shown that attentional difficulties are associated with increased threat-related attentional biases, fears, and internalizing symptoms

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(Hsu et al., 2015; Koster et al., 2011; Van Bockstaele et al., 2014), past studies relied on global measures of attention problems that did not map onto attention problems as measured via psychopathology constructs such as ADHD inattention and SCT. Findings from the current study showed that self-reported SCT symptoms, but not ADHD inattentive symptoms, exacerbated the relation between fears of social evaluation and social anxiety symptoms. However, it is important to note that effect sizes for interactions were small, and moderation was found in the context of robust main effects, which is consistent with a large body of evidence documenting fears of social evaluation as key cognitive features in social anxiety (Fredrick & Luebbe, 2020; Weeks & Howell, 2012). Nevertheless, findings suggest that SCT may represent a unique cluster of attentional difficulties that prolongs engagement with fears of social evaluation and increase symptoms of social anxiety, though future studies are needed to examine the direct relation between SCT and attentional engagement.

Regarding the types of attentional difficulties characteristic of SCT that are unique from ADHD inattention, internal task-unrelated thoughts may pose a risk for exacerbating fears of social evaluation, which, in turn, may increase social anxiety symptoms. Specifically, research has found that SCT symptoms, compared to ADHD inattentive symptoms, are more strongly associated with self-reported rumination and mind-wandering in adolescents (Becker et al., 2020; Fredrick & Becker, 2020) and college students (Fredrick et al., 2020). These initial findings are in line with researchers' proposals that SCT may be characterized by excessive internal distractibility (Adams et al., 2010) or represent a pathological form of mind-wandering (Barkley, 2014; Becker, Marshall, et al., 2014). Given that rumination and mind-wandering, albeit distinct in valence and cognitive constraint (e.g., mind-wandering may be more spontaneous than rumination), are both considered types of thoughts that are unrelated to the current task (Christoff et al., 2016), individuals with SCT symptoms may experience persistent task-unrelated thoughts and difficulties disengaging from *internal* thought content. Potentially, these unique attentional difficulties may predispose individuals into getting "stuck" and fixating on fears of social evaluation, which may exacerbate relations with social anxiety symptoms. Conversely, attentional difficulties characteristic of ADHD inattentive symptoms, such as disorganization, forgetfulness, and distractibility, may be more related to difficulties re-engaging following *external* content (Adams et al., 2010) and therefore less likely to prolong attention on fears of social evaluation.

As interest in SCT increases, it is important to continue exploring the nature of SCT within broader models of psychopathology. In particular, research suggests that SCT may have transdiagnostic utility for contributing to the development, maintenance, and associated psychosocial impairments within the internalizing realm of psychopathology (Becker & Willcutt, 2019). Findings from the current study indicate that, in addition to directly correlating with social fears and symptoms of social anxiety, SCT may pose a unique vulnerability factor that exacerbates the link between fears and social anxiety. Future research testing SCT as a moderator or mediator of additional internalizing symptoms (e.g., depression, generalized anxiety) and domains (e.g., ruminations, social impairment, suicide risk) would advance our understanding of the SCT construct.

Clinical Implications

Although SCT is not included in current diagnostic nosologies, these findings underscore the importance of considering the impact of SCT in the assessment and treatment of individuals with social anxiety. Cognitive-behavioral treatments for social anxiety prioritize reducing maladaptive attentional processes related to fears of social evaluation through cognitive restructuring and exposure-based techniques (Spence & Rapee, 2016). However, given that SCT has been linked to excessive mind-wandering and rumination (Fredrick et al., 2020), these behaviors may reduce the effectiveness of these interventions because they may heighten attention towards internal experiences (Becker & Willcutt, 2019). Thus, mindfulness-based techniques may be beneficial to aid individuals in reducing SCT-related behaviors by disengaging from internal thoughts, which may facilitate the reduction in fears of social evaluation and subsequent social anxiety symptoms.

Limitations and Future Directions

Despite strengths of the current study, including the large sample size from multiple universities, several limitations are worth noting. First, the cross-sectional nature of the data precludes inferences regarding causality, and future research should test whether SCT symptoms precede fears of social evaluation which, in turn, predict increases in social anxiety and psychosocial impairments. Similarly, although it was assumed that stronger relations between fears of social evaluation and social anxiety would elevate distress (e.g., negative affect and social avoidance), future research should include direct measures of psychosocial impairment. Second, despite fears of social evaluation representing core features of social anxiety (Fredrick & Luebbe, 2020), research has identified other cognitive processes implicated in social anxiety, such as self-focused attention, threat-related attention biases, and post-event rumination (Spence & Rapee, 2016). Exploring whether SCT strengthens the relation between these cognitive processes and social anxiety symptoms, including utilizing laboratory tasks like modified dot probe tasks (Taylor et al., 2016), is an important avenue of future research. Finally, although social anxiety, fears of social evaluation, and SCT are all elevated in college students and associated with multiple types of impairment (Brook & Willoughby, 2015; Flannery et al., 2017; Lipton et al., 2016; Wood et al., 2017), the homogenous sample of college students prevents generalizing to other age groups and clinical populations. Specifically, adolescence is a developmental period characterized by a rise in fears of social evaluation and social anxiety symptoms as a result of increased salience and influence of peer relations (Spence & Rapee, 2016). Additionally, research finds that SCT increases from childhood to adolescence (Leopold et al., 2016). Thus, it is possible that features of SCT (i.e., mind-wandering, lethargic behaviors) may further exacerbate the relation between fears of social evaluation and social anxiety during adolescence, resulting in considerable social impairment. Investigating whether SCT symptoms precede or exacerbate the association between fears and social impairment, in community or at-risk adolescents, is an essential next step for future research.

Conclusion

Findings from the current study are the first to test whether SCT and ADHD inattentive symptoms moderate the relation between fears of social evaluation and social anxiety

symptoms. Specifically, SCT symptoms strengthened the relation between two distinct fears of social evaluation with social anxiety symptoms while controlling for demographics and ADHD symptom dimensions. Conversely, ADHD inattentive symptoms did not moderate the relation between fears of social evaluation and social anxiety. These findings suggest that the unique attentional difficulties present in SCT may strengthen the association between fears and social anxiety symptoms, highlighting the importance of additional studies examining SCT and social functioning.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Highlights

- Attentional difficulties are theorized to strengthen the relation between fears and social anxiety, and it is thus important to explore the impact of various types of attentional difficulties marked by sluggish cognitive tempo (SCT) and attention-deficit hyperactivity disorder (ADHD) inattentive symptoms.
- SCT, but not ADHD inattentive symptoms, exacerbated the associations between fears of negative and positive evaluation in relation to social anxiety symptoms.
- Important to incorporate SCT in future studies examining social anxiety.
- Studies using experimental thought-probe tasks and longitudinal designs are needed.

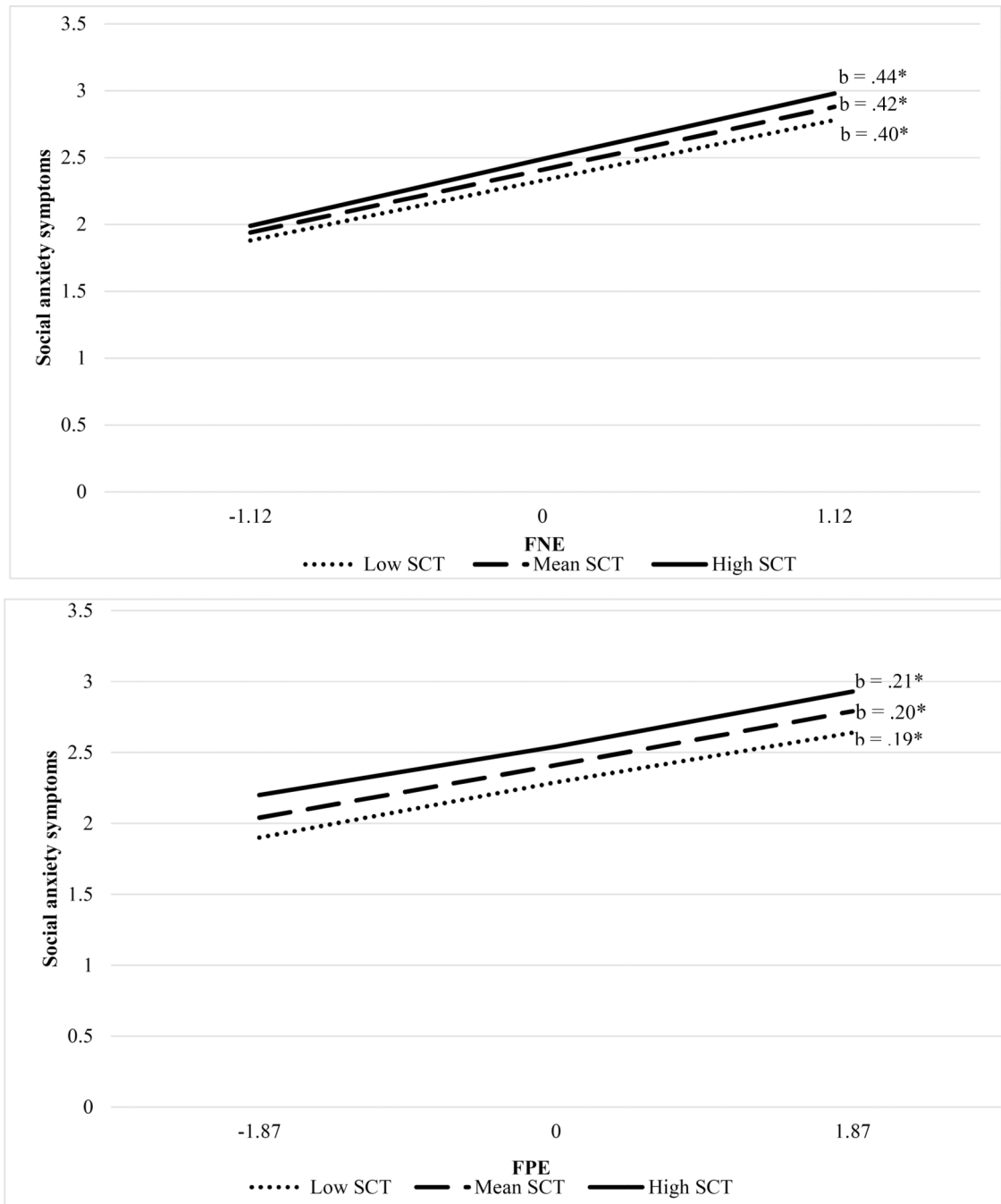


Figure 1. Simple slopes results of SCT Symptoms Strengthening the Association Between Fears of Negative Evaluation (top panel) and Fears of Positive Evaluation (bottom panel) in Relation to Social Anxiety Symptoms.

Table 1

Intercorrelations and Descriptive Statistics Among Psychopathology Dimensions

	1	2	3	4	5	6	7	8	9
1. Age	--								
2. Sex	-.12**	--							
3. Race	-.09**	.03*	--						
4. FNE	-.03	.12**	.05**	--					
5. FPE	.02	.07**	-.03*	.48**	--				
6. SCT	-.03	.11**	-.01	.41**	.33**	--			
7. ADHD-IN	.02	.00	-.01	.37**	.30**	.70**	--		
8. ADHD-HI	-.00	.03	.07**	.26**	.21**	.50**	.56**	--	
9. Social Anxiety	-.01	.08**	-.02	.70**	.59**	.43**	.41**	.25**	--
<i>Mean</i>	19.28	--	--	2.95	4.50	1.25	1.74	1.71	2.41
<i>SD</i>	1.5	--	--	1.13	1.87	.62	.56	.51	.76
<i>Range</i>	18–29	0–1	0–1	1–5	1–10	0–3	1–4	1–4	1–5

Note. Age is calculated in years. For sex, male = 0, female = 1. For race, 0 = non-White, 1 = White. ADHD = attention-deficit/hyperactivity disorder; FNE = fear of negative evaluation; FPE = fear of positive evaluation; HI = hyperactive/impulsive; IN = inattentive; SCT = sluggish cognitive tempo.

* $p < .05$.

** $p < .01$.

Table 2

Moderation Analyses of SCT Symptoms Interacting with Fears of Negative Evaluation (top panel) and Fears of Positive Evaluation (FPE) in Relation to Social Anxiety Symptoms.

FNE					
	<i>b</i>	<i>SE</i>	β	<i>t</i>	<i>sr</i> ²
$F(8,4730) = 653.77^{**}, R^2 = .53$					
D1 Sex	.01	.02	.01	.60	.01
D2 Sex	.04	.20	.00	.18	.00
ADHD-HI	-.06	.02	-.04	-2.99 ^{**}	-.03
FNE	.42	.01	.62	55.49 ^{**}	.56
ADHD-IN	.18	.02	.13	8.43 ^{**}	.08
SCT	.13	.02	.10	6.88 ^{**}	.07
IN \times FNE	-.00	.02	-.00	-.16	-.00
SCT \times FNE	.03	.02	.03	2.01 [*]	.02
FPE					
	<i>b</i>	<i>SE</i>	β	<i>t</i>	<i>sr</i> ²
$F(8,4731) = 440.59^{**}, R^2 = .65$					
D1 Sex	-.05	.02	-.03	-2.36 [*]	-.03
D2 Sex	-.20	.22	-.01	-.93	-.01
ADHD-HI	-.04	.02	-.03	-2.16 [*]	-.02
FPE	.20	.01	.49	41.75 ^{**}	.46
ADHD-IN	.22	.02	.16	9.68 ^{**}	.11
SCT	.20	.02	.17	10.29 ^{**}	.11
IN \times FPE	-.01	.01	-.02	-1.07	-.01
SCT \times FPE	.02	.01	.04	2.27 [*]	.03

Note. D1 sex, 0 = female, 1 = male. D2 sex, 0 = female, 1 = other. ADHD-HI = attention-deficit/hyperactivity disorder hyperactivity-impulsivity symptoms. FNE = fear of negative evaluation. FPE = fear of positive evaluation. ADHD-IN = attention-deficit/hyperactivity disorder inattention symptoms. SCT = sluggish cognitive tempo. IN \times FNE/FPE = interaction term of ADHD inattentive symptoms and fear of negative/positive evaluation. SCT \times FNE/FPE = interaction term of SCT and fear of negative/positive evaluation. *sr*² = squared semi-partial correlations.

^{*} $p < .05$.

^{**} $p < .01$.