Psychopathology And Functional Impairment In Adolescents With Social Anxiety Disorder

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PSYCHOPATHOLGY AND FUNCTIONAL IMPAIRMENT IN ADOLESCENTS WITH SOCIAL ANXIETY DISORDER

by

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ABSTRACT

Although social anxiety disorder is most often diagnosed during adolescence, few investigations have examined the clinical presentation of this disorder exclusively in adolescents. Prior studies have demonstrated that some clinical features of SAD in adolescents are unique relative to younger children with the condition. Furthermore, the extant literature on daily functional impairment in this population is limited. In this investigation, multiple areas of functioning were examined in adolescents with SAD (n = 16) and normal control adolescents (n = 14): specific social skills, subjective distress and physiological reactivity during one speech performance task and one social interaction task; alcohol use and expectancies; subjective and objective quality of sleep; and daily distressing social activities. No differences were observed in sleep actigraphy, self-reported sleep difficulties, alcohol use, or alcohol expectancies. Adolescents with SAD reported greater distress during both analogue tasks relative to NC adolescents. During the speech task, adolescents with SAD exhibited significantly greater speech latency (4.42 seconds vs. 1.75 seconds) and spoke significantly less (83.09 seconds vs. 167.75 seconds) than NC adolescents. Additionally, SAD participants manifested greater skin conductance during the speech task. During the social interaction, adolescents with SAD asked significantly fewer questions (2.20 vs. 7.07) and required significantly more confederate prompts (2.33 vs. 1.14) to stimulate interaction. Finally, adolescents with SAD reported more frequent anxiety-provoking situations in their daily lives and greater avoidance of these situations, including answering questions in class, assertive communication, and interacting with a group.

The findings are discussed with respect to the current understanding of alcohol use, quality of sleep, and social functioning in adolescents with SAD.

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ADIS-C/P	Anxiety Disorders Interview Schedule – Child/Parent Version
ANCOVA	Analysis of covariance
CEOA	Comprehensive Effects of Alcohol
EDA	Electrodermal skin activity
HR	Heart rate
MANCOVA	Multivariate analysis of covariance
MSC	Mean skin conductance
NC	Normal control
NSI	Negative self-image
SAD	Social anxiety disorder
SCR	Skin conductance response
SET-C	Social Effectiveness Therapy for Children
SIT	Social interaction task
SPAI-C	Social Phobia and Anxiety Inventory for Children
SPT	Speech performance task
SS	Sleepiness Scale
SSHS	School Sleep Habits Survey
SWPB	Sleep/Wake Problems Behavior Scale
TLFB	Time-Line Follow-Back

CHAPTER ONE: INTRODUCTION

Social fears are relatively common, as 24.1% of respondents in a recent U.S. survey reported at least one lifetime social fear (Ruscio et al., 2008). Social anxiety disorder (SAD) is typified by a pattern of excessive fear of social situations or performances in which an individual may be scrutinized by others (APA, 2013). Public speaking, meeting new people, and speaking up during a meeting/class are common distressful situations for people with SAD (Ruscio et al., 2008; Turner, Beidel, & Townsley, 1992). Although additional psychiatric disorders often co-occur among people with SAD (Kessler, Stang, Wittchen, Stein, & Walters, 1999; Regier, Rae, Narrow, Kaelber, & Schatzberg, 1998; Ruscio et al., 2008), for many individuals the onset of SAD predates the onset of comorbid psychiatric conditions (Schneier, Johnson, Hornig, Liewbowitz, & Weissman, 1992).

The prevalence of SAD within the general population is among the highest of all the anxiety disorders. Recent estimates have placed its 12-month and lifetime prevalence at approximately 7% and 12% in community samples, respectively (Kessler et al., 2005), and without treatment, the course of the disorder spans decades (Reich, Goldenberg, Vasile, Goisman, & Keller, 1994). Although initial research focused on adult samples, the average age of onset of SAD is during adolescence (Beidel, 1998), typically between 15 and 16 years of age (Thyer et al., 1985; Turner et al., 1992). The disorder also occurs in children as young as age 8 (Beidel, Turner, & Morris, 1999). Within youth specifically, observed prevalence of SAD ranges from approximately 1% (Costello et al., 1996) to 5.4% (Shaffer et al., 1996) in community

samples and even higher rates have been reported from clinical samples (Kendall & Warman, 1997).

Preliminary descriptions of the psychopathology and clinical presentation of SAD largely excluded children and adolescents (Beidel et al., 1999).When interests shifted to SAD in youth, studies initially focused on pre-adolescent children, demonstrating consistency in clinical presentation between children and adolescents (Beidel, 1991; Beidel et al., 1999; Bernstein, Bernat, Davis, & Layne, 2008; Spence, Donovan, & Brechman-Toussaint, 1999).

Ironically, relatively few studies have examined the psychopathology of SAD exclusively in adolescent samples, even though adolescence marks the average age of onset. The majority of studies of SAD psychopathology in youth utilize samples combining children and adolescents. However, the small sample of extant comparisons of adolescent SAD and childhood SAD reveal features unique to each group. Adolescents with SAD reported significantly higher fear ratings across all situations and reported significantly higher ratings of avoidance than children with the same disorder (Rao et al., 2007). A significantly larger percentage of adolescents endorsed at least moderate avoidance of social situations, including "asking a teacher a question," "attending social activities," "working with a group," "walking in the hallways," and "dating." Furthermore, adolescents endorsed more loneliness than young children, suggesting a greater impact of their fear on their social functioning when compared to younger children. In contrast, children had longer speech latencies during a role-play task and were rated as significantly less skilled as well as more anxious than adolescents during social interaction and speech. Therefore, even if adolescents have more severe clinical symptoms and may be suffering more overall impairment,

it appears that they are able to socially engage somewhat more effectively than their younger counterparts.

As expected, epidemiological and clinical samples of adolescents with SAD report excessive fear and avoidance in social and performance situations (Beidel et al., 2007; Essau, Conradt, & Petermann, 1999). When encountering these situations, adolescents with SAD frequently report increased physiological arousal (Anderson & Hope, 2009; Essau et al., 1999). Perceived physiological arousal, however, often does not coincide with actual physiological reactivity. In one investigation, despite differences in perceived physiological reactivity, there were no group differences between adolescents with SAD or no disorder on measures of heart rate reactivity or blood pressure change when interacting with another person or giving a speech (Anderson & Hope, 2009). Similar findings were reported when heart rate reactivity was assessed among normal controls, subclinical socially anxious adolescents, and adolescents with SAD (Anderson, Veed, Inderbitzen-Nolan, & Hansen, 2010). These findings suggest that perceptions of increased physiological arousal produce significant distress among adolescents with SAD, though they may not experience actual increased physiological arousal in laboratory settings. However, assessing more than one channel of physiology may be necessary to accurately determine the existence of increased physiological response.

One area where the clinical presentations of children and adolescents with SAD may show some distinction is in the realm of cognitions. Although socially anxious youth do not report significantly more thoughts than controls while reviewing videos of their social performance, adolescents as a whole report significantly more thoughts than children (Alfano,

Beidel, & Turner, 2006). Among adolescents with SAD, negative performance thoughts during a role-play task were exclusive to a small proportion (20%) of the sample (Alfano et al., 2006). In an investigation examining Clark and Wells's (1995) cognitive model of the development and maintenance of social anxiety, adolescents in one control group (negative self-image group [NSI]) were instructed to imagine and hold a negative self-image (e.g., an embarrassing social experience) while completing two social tasks (Alfano, Beidel, & Turner, 2008). Despite holding negative self-images, the NSI group reported significantly fewer thoughts than the SAD group, and did not differ from controls who were not instructed to hold a negative self-image on any measures of anxiety or performance. Additionally, there were no differences among groups in the quantity of negative thoughts reported. These findings do not support the causal role of negative self-imagery in the development and maintenance of SAD.

Consistent with other developmental stages, SAD in adolescents is associated with social skill deficits such as reduced facial gaze and increased response latencies during social interactions (Alfano et al., 2008). Furthermore, social anxious adolescents are rated by independent raters and rated themselves less effective (i.e., less skilled) than normal controls during read-aloud tasks, an impromptu speech, and role-play tasks (Beidel et al., 2007; Inderbitzen-Nolan, Anderson, & Johnson, 2007). A potential drawback of previous social skill examinations, however, lies in the global independent ratings used. An assessment of more specific behaviors would significantly enhance our knowledge of social behaviors in youth with SAD.

Collectively, these data highlight our understanding of the clinical presentation of social anxiety disorder in adolescents. Even less is known about how this disorder impairs daily functioning in social interactions, leisure time, and school/work (Beidel et al., 2007; Essau et al., 1999). Furthermore, limitations in the studies to date affect their ability to reach definitive conclusions. For example, one assessment of social skill (Beidel et al., 2007) uses a structured role-play task that may not represent typical adolescent interactions, potentially reducing external validity. Further, assessment of social skill consisted mostly of broad ratings (i.e., effectiveness, social skillfulness, and assertiveness) that may be difficult to compare across studies (Beidel et al., 2007; Inderbitzen-Nolan et al., 2007). Additionally, subjective overall functioning (i.e., quality of life perceptions) specific to adolescents with SAD has not yet been described, though this age group has been included in general evaluations of quality of life.

Another area of functioning that warrants further exploration is alcohol use. The current understanding of the co-occurrence of alcohol use and SAD, based on studies of varying methodology (e.g., prospective and retrospective) and from variable samples (e.g., undergraduates and clinical samples), suggests that the onset of social anxiety often predates that of alcohol use and dependence and that individuals with elevated social anxiety drink to cope with fears of negative evaluation (Buckner et al., 2008; Buckner & Schmidt, 2009; Carrigan & Randall, 2003; Kessler et al., 1997; Merikangas, Avenevoli, Acharyya, Zhang, & Angst, 2002; Morris, Stewart, & Ham, 2005). While these studies provide retrospective evidence of substance use during adolescence among individuals with SAD as well as prospective risks of alcohol use

in adulthood, only one investigation to date has documented current alcohol use among adolescents with social anxiety. Blumenthal and colleagues (2010) found a positive correlation (r = .47) between social anxiety and coping-related drinking motives specifically in an adolescent sample. Socially anxious adolescents in this study reported increased motivation to consume alcohol to cope with their difficulties. However, determination of elevated social anxiety was based on self-report, and it was not clear that participants met criteria for SAD. Moreover, a motive to drink may not necessarily translate into drinking behavior; therefore, this data may not provide an accurate description of alcohol use among adolescents with SAD.

Quality of sleep is an additional important correlate of daily functioning, given the cognitive and mood disturbances associated with chronic sleep problems. Several studies have demonstrated a relationship between clinical anxiety and sleep difficulties among adult samples, with mixed findings on the relationship between SAD and quality of sleep (Brown, Black, & Uhde, 1994; Buckner, Bernert, Cromer, Joiner, & Schmidt, 2008; Marcks, Weisburg, Edelen, & Keller, 2010; Papadimitriou & Linkowski, 2005). Among youth samples, sleep problems have been more strongly associated with generalized anxiety disorder or separation anxiety disorder than SAD (Alfano, Ginsburg, & Kingery, 2007; Chorney, Detweiler, Morris, & Kuhn, 2008). For instance, youth diagnosed with generalized anxiety disorder in one study reported the greatest rate (87%) of difficulty sleeping, while 27% of youth diagnosed with SAD reported difficulty sleeping (Alfano, Pina, Zerr, & Villalta, 2010). In a study using an objective assessment of quality of sleep (Forbes et al., 2008), youth diagnosed with anxiety disorders had poorer quality of sleep than youth diagnosed with major depressive disorder as assessed by polysomnography.

Specifically, youth with anxiety disorders experienced significantly more awakenings and spent significantly longer periods of time awake during the night. Nevertheless, a small proportion of participants in this investigation had a primary diagnosis of SAD and statistical analyses were not reported for individual diagnostic groups. Thus, it is unclear from the extant literature whether adolescents with SAD experience both objective and subjective sleeping difficulties, particularly in anticipation of or following an anxiety producing social event (e.g., an upcoming presentation or an embarrassing situation during the day; Chorney et al., 2008).

Given the limitations in the current literature, the present study aimed to further elucidate the clinical presentation as well as the functional impairment and related characteristics of SAD in adolescents, data that may be used subsequently to evaluate the effectiveness of psychosocial interventions. In this investigation, adolescents with SAD or no disorder were compared in various areas of functioning, such as alcohol use and expectancies, overt social behavior, physiological reactivity to a social situation and performance (heart rate [HR] and electrodermal skin activity [EDA]), and objective as well as subjective quality of sleep. The study had the following hypotheses:

- Adolescents with SAD will exhibit poorer overt social behaviors during each of two social tasks than controls.
- Adolescents with SAD will exhibit higher HR and greater EDA than controls during a speech performance task and higher HR than controls during a social interaction.
- Adolescents with SAD will report more frequent and larger quantities of alcohol use than controls.

- Adolescents with SAD will report greater social performance and tension reduction alcohol expectancies.
- Adolescents with SAD will exhibit poorer objective and subjective quality of sleep than controls.

CHAPTER TWO: METHOD

Participants

Participants were recruited via community advertisements targeting "friendly" or "shy" adolescents seeking treatment aged 13 to 17 years old. To be included in the study, socially anxious adolescents had to have a primary diagnosis of SAD. Adolescents with suicidal ideation or a primary diagnosis other than SAD were excluded and referred to appropriate service providers in the community. Adolescents with secondary or comorbid diagnoses were included as long as SAD was the primary diagnosis. Sixteen socially anxious adolescents aged 13 to 17 (M = 14.81, SD = 1.47) were included in the SAD group. Secondary diagnoses in the socially anxious group consisted of generalized anxiety disorder (18.75%), dysthymic disorder (12.5%), major depressive disorder (12.5%), specific phobia (6.25%), and selective mutism (6.25%). Fourteen normal control (friendly) adolescents (NC) ranging in age from 13 to 17 (M = 15.07, SD = 1.54) were included who did not meet diagnostic criteria for any current Axis I diagnosis. The groups did not differ significantly in age, $t(28) = .470$, $p = .642$ or household income, $t(28) = -.265$, $p = .793$. Although the control group was more balanced across ethnicities, both groups consisted predominantly of Caucasians (SAD: 68.8%, controls: 42.9%). The SAD group also included Latinos/Hispanics (25%) and 1 Asian American (6.2%). There were Latinos/Hispanics (21.4%) in the control group as well as African Americans (35.7%). The groups did not differ statistically in ethnic composition, $\chi^2(3) = 7.514$, $p = .057$. However, there were more females in the SAD group than the control group and more males in the control group than the SAD group,

and the difference was statistically significant, $\chi^2(1) = 5.129$, $p = .024$. See Table 1 for sample characteristics.

Diagnostic Assessment

Participants and their parents were assessed separately by doctoral-level clinical psychology students with the Anxiety Disorders Interview Schedule – Child/Parent Version (ADIS-C/P; Silverman & Albano, 1996), a semistructured diagnostic interview. Interviewers determined diagnoses by considering information provided by both the parents and the adolescents. Disagreements between parent- and child reports were resolved using clinical judgment per ADIS-C/P guidelines. Twenty percent of the parent and child interviews were assigned to a second blinded rater to determine inter-rater reliability for the primary diagnosis, which was…

Overall Assessment Strategy

Each adolescent completed a comprehensive assessment designed to assess the functional impairment of SAD in an adolescent sample. The assessment included self-report and behavioral assessments of social and global impairment as described below.

Social Functioning

Behavioral Assessment

Two counterbalanced behavioral tasks were used to assess social functioning – one to assess behavior during a social interaction and a second to assess behavior during a public

performance. The behavioral tasks were digitally recorded using the Noldus Observer System. Specific behaviors were coded for each task by undergraduate raters who were trained to acceptable reliability by the first author. Twenty-five percent of the recorded behavioral tasks were coded by a second rater for reliability.

The social interaction task (SIT) examined social skill in a situation that adolescents may encounter in daily living. Study participants joined an undergraduate confederate playing with an entertaining video game console (Nintendo Wii) for 10 minutes. Participants were informed that they could choose to end the task at any time. The undergraduate confederates were provided with specific prompts (see Table 2) to use throughout the task to ensure that each interaction was standardized. Participant behaviors coded during this task were: escape, speaking latency, time to first spontaneous verbalization, number of spontaneous comments, number of questions asked, and duration of speech. Specific definitions of these behaviors may be found in Table 3. The intraclass correlation for the SIT coded behaviors was excellent (ICC = .99).

The speech performance task (SPT) assessed performance, anxiety and avoidance behaviors while speaking in front of a small audience. Participants were given 7 possible topics (e.g. favorite subjects in school, favorite movies) to discuss during the speech. Participants were instructed to speak for up to 10 minutes and informed that the task would last at least 3 minutes. Participants were notified via a blue light that 3 minutes had elapsed. Speaking after this point was optional, and participants were given a "STOP" card to display if they wanted to end the task. Participants were given 3 minutes to prepare prior to the task onset. At this point, participants were removed from the study room and four audience members entered, most

frequently comprised of 2 female and 2 male undergraduate research assistants who did not interact with participants during the task. Participants were led into the study room after the audience was in place and were allowed to refer to the topic sheet during the task. The task was ended early if participants exhibited severely overwhelming distress. During the SPT, the following behaviors were coded: speaking latency (seconds), duration of speaking (seconds), escape (task ended prior to 3 minutes), and number of topics discussed. The intraclass correlation was excellent (ICC = .99).

Physiological Assessment

In addition to social behavior, HR was assessed during both behavioral tasks and EDA was assessed during the SPT. The MindWare Ambulatory system was used to collects physiological data wirelessly. Three electrodes were placed on the torso to measure HR and two were placed on the fleshy areas of participants' non-dominant hand to assess EDA. The placement of the electrodes to measure EDA precluded the assessment of EDA during the SIT due to the increased likelihood of artifact. The electrodes were connected to a PDA that wirelessly transmitted data to acquisition software on a desktop computer. A 10-minute baseline period preceded the first behavioral task, and a 5-minute recovery phase was implemented prior to the second behavioral task to allow physiological activity from the first task to return to pre-task levels.

Self-Report of Anxiety

Subjective distress was assessed by self-ratings of anxiety recorded prior to and following each behavioral task using a 9-point Likert scale ranging from 0 (i.e., completely calm and relaxed) to 8 (i.e., extreme fright—terror).

Social Anxiety and Avoidance

The Social Phobia and Anxiety Inventory for Children (SPAI-C; Beidel, Turner, & Morris, 1995) assessed self-report social anxiety in adolescents across a variety of situations, including physiological, behavioral, and cognitive responses to social situations. The SPAI-C has excellent psychometric properties, as evidenced by its internal consistency (Cronbach's alpha = .95), two-week test-retest reliability (r = .86), and convergent validity with a measure of trait anxiety (r = .50; Beidel et al., 1995, Beidel, Turner, & Fink, 1996). Internal consistency was excellent (Cronbach's alpha = .98) in the present sample.

Anxiety Journal

Participants were given a list of social situations derived from the SAD section of the ADIS-C/P and asked to log their participation/avoidance of daily social encounters. Participants rated their perceived distress on a 9-point scale ranging from not anxious at all (0) to extremely anxious (8). Socially anxious events were defined as social interactions resulting in anxiety rating of at least 3.

General Functional Impairment

Quality of Sleep

Sleep actigraphy, using Micro Sleep Watch actigraphs (Ambulatory Monitoring, Inc., New York), estimated quality of sleep. These actigraphs resemble wrist watches and include an event-marker function that allows users to identify distinct periods (i.e., periods of sleep). Participants wore an actigraph on the non-dominant wrist for a period of at least 7 days and nights while maintaining their daily schedule. Participants were instructed to use the event marker function when attempting to fall asleep and again when waking in the morning. Participants were also instructed to maintain a sleep log to note bedtimes, waking times, and events that may have affected sleep quality (e.g., illness or significant life stressors). Raw data collected by the actigraphs were organized into 1-minute epochs and were analyzed by accompanying ActionW software. The two variables from actigraphy selected for analyses were wake minutes (duration of time awake during the designated period of time) and sleep efficiency (percentage of time scored as sleep [as opposed to awake] between onset of sleep to offset of sleep). These indices of sleep have demonstrated the highest reliability in adolescent samples (Acebo et al., 1999). Additionally, participants completed the School Sleep Habits Survey (SSHS; Wolfson & Carskadon, 1998; Wolfson et al., 2003), a self-report measure of quality of sleep developed specifically for use with adolescent samples. The SSHS assesses other aspects of functioning as well (e.g., depressive symptomology and academic functioning) and contains 63 items with varied response options (e.g., yes and no responses as well as numerical responses).

Items on the SHSS address multiple aspects of sleep, including bed- and wake times and sleep duration. Two subscales of SHSS were the primary focus: the Sleepiness Scale (SS) that consists of 10 items on the SHSS examining difficulties staying awake or falling asleep in different situations, and the Sleep/Wake Problems Behavior Scale (SWPB) that contains 15 items measuring recent erratic sleep/wake times. These subscales have demonstrated acceptable internal reliability (.70 and .75, respectively; Wolfson & Carskadon, 1998) among adolescent samples. Furthermore, the SHSS has been shown to be a valid measure of sleep habits in adolescents as evidenced by correlations with actigraphy data and self-report sleep on total sleep time (.53 and .61, respectively), sleep onset time (.70 and .76, respectively), and sleep offset time (.77 and .71, respectively; Wolfson et al., 2003). Internal consistencies for the SS and SWPB were acceptable (Cronbach's alpha = .65 and .54, respectively) in the present sample.

Alcohol Use

The Time-Line Follow-Back (TLFB; Sobell, Sobell, Leo, & Cancilla, 1988) is a calendar-based method that assesses substance use over a specified period of time. Interviewers assisted the participants in estimating the days on which alcohol was consumed as well as recalling the number of standard drinks consumed within the previous month. Interviewers used anchors (i.e., social events and holidays) to facilitate more accurate recall by participants. The participants were informed that a report of more than 2 drinking occasions in the previous 30 days would be reported to their parents to ensure their safety. The TFLB has acceptable test-retest reliability (>.80) on several drinking measures (e.g., total number of drinks and drinks per drinking day) over intervals of up to 90 days in length (Sobell et al., 1988). Although the TLFB

is commonly used with adult samples, test-retest reliabilities in adolescent samples range from 0.87 to 0.92 for drinking days and drinks per occasion (Levy et al., 2004). Finally, the Comprehensive Effects of Alcohol (CEOA; Fromme, Stroot, & Kaplan, 1993) was given to assess for beliefs and subjective evaluations about the effects of alcohol. The CEOA is a self-report measure that consists of 38 items, each of which are rated on a 4-point scale to assess expectancies (1 = disagree and 4 = agree) and a 5-point scale to assess subjective evaluations of the effects of alcohol (1 = bad and 5 = good). The items of the CEOA have been demonstrated to load well onto four positive factors (Sociability, Sexuality, Tension Reduction, and Liquid Courage) and three negative factors (Cognitive and Behavioral Impairment, Risk and Aggression, & Self-Perception) for both expectancies and subjective evaluations (Fromme et al., 1993; Valdivia & Stewart, 2005). Each of these factors has exhibited acceptable reliability estimates, ranging from 0.59 to 0.81 for the expectancy items, and 0.64 to 0.82 for the subjective evaluation items (Fromme & D'Amico, 2000; Valdivia & Stewart, 2005). For the purposes of this study, items that form the Sexuality factor were not administered to participants. Internal consistency for the expectancy scale was excellent (Cronbach's alpha = .91) in the present sample.

CHAPTER THREE: RESULTS

Statistical Analysis

Initial analyses of demographic variables revealed a significant difference for sex ratio; therefore, group differences were examined with multivariate analysis of covariance (sex as the covariate)[1] on selected groups of dependent variables, followed by ANCOVA when the overall MANCOVA statistic was significant at $p < .05$. Social behaviors and physiological variables were assessed separately for each behavioral task. Given that many individuals experience some discomfort during a public speech task, analyzing data from the tasks in one MANCOVA could have masked important differences in the social interaction.

Social behaviors during the SIT were assessed with a 2 group (SAD vs. NC) x 6 behaviors (six coded behaviors during the SIT) MANCOVA. Similarly, a 2 (group) x 3 (three coded behaviors during the SPT) assessed group differences during the SPT. A chi square was used to examine differences in escape behavior (yes/no) between groups only during the SPT, as all participants completed the entire 10-minute SIT.

Group differences in task HR were examined with 2 (group) x task minutes repeated measures ANCOVAs, covarying for baseline HR (final minute of baseline) in addition to sex. Mean skin conductance (MSC) was selected to represent EDA, and similar analyses were conducted to assess differences in MSC during the SPT only. The quantity of EDA skin

[1] All analyses were also conducted with sex as a between-subjects factor and outcomes were unaffected.

conductance responses (SCR), which are rapid increases in EDA of at least .05 microsiemens, per minute were evaluated with an independent-samples t-test.

Self-report of distress during the behavioral tasks was examined using two 2 (group) x 2 (anxiety ratings pre- and post-behavioral task) repeated measures ANCOVAs ratings.

Self-report of anxiety was examined in a 2 (group) x 2 (frequency of journal socially anxious events and journal avoided activities) MANCOVA.

The SS score and SWPB score from the SSHS as well as the two actigraph-measured variables were examined in a 2 (group) x 4 (quality of sleep measures) MANCOVA. Alcohol use was not reported in the SAD sample, and very few NCs reported use; therefore, no analyses were conducted for alcohol use variables. Alcohol expectancies were assessed in a 2 (group) x 2 (CEOA Sociability and Tension Reduction totals) MANCOVA.

Quality of Sleep

One participant in the NC group did not complete the actigraphy assessment. Overall quality of sleep did not differ between SAD and NC participants, $F(4, 23) = .920$, $p = .469$, $\eta_p^2 = .138$. Means and standard deviations for each of the sleep variables are presented in Table 4.

Alcohol Expectancies

Tension reduction and sociability alcohol expectancies collectively were not different between groups, $F(2, 26) = .163$, $p = .850$, $\eta_p^2 = .012$. Means and standard deviations for all alcohol expectancies are contained in Table 5.

Self-Report of Anxiety

One SAD participant did not complete the anxiety journal. The overall MANCOVA revealed a main effect for group indicating that SAD and NC participants differed in their report of daily anxiety-provoking situations, $F(2, 25) = 3.619$, $p = .042$, , $\eta_p^2 = .225$. Follow-up analyses indicated that participants with SAD reported a greater frequency of social activities that caused at least mild to moderate anxiety, including speaking to a stranger, interacting with a group, and answering questions in class in class, $F(1, 26) = 5.518$, $p = .027$, $\eta_p^2 = .175$. Additionally, participants with SAD reported avoiding significantly more social activities, including using assertiveness skills, writing on the whiteboard in class, eating in front of others, and starting or joining in on a conversation, $F(1, 26) = 5.754$, $p = .024$, $\eta_p^2 = .181$. Descriptive statistics for the journal data are found in Table 6.

Self-Report of Distress

For the SIT, there was an overall main effect of group for self-ratings of distress, $F(1, 27) = 5.790$, $p = .023$, $\eta_p^2 = .177$. Subsequent analyses indicated that there was a trend toward higher pre-SIT distress ratings in participants with SAD, $F(1, 27) = 3.972$, $p = .056$, $\eta_p^2 = .128$. Participants with SAD reported significantly greater distress ratings following the SIT, $F(1, 27) = 4.671$, $p = .040$, $\eta_p^2 = .141$. There was also an overall effect of group for SPT-related distress ratings, $F(1, 27) = 9.094$, $p = .006$, $\eta_p^2 = .252$. While pre-SPT distress ratings did not differ between groups, Participants with SAD reported significantly greater distress

following the SPT than NC participants, $F(1, 27) = 8.922$, $p = .006$, $\eta_p^2 = .248$. Means and standard deviations for anxiety ratings pre- and post-behavioral tasks are contained in Table 7.

Social Behaviors

One SAD participant did not speak during the SIT, and two participants with SAD did not speak during the SPT. These participants were withheld from the omnibus analyses of the social behaviors during the tasks.

SIT

For the SIT social behaviors, the F value fell just outside of the traditional p value, indicative of a main effect for group, $F(6, 21) = 2.400$, $p = .063$, $\eta_p^2 = .407$. Although individual analyses are not traditionally conducted when the omnibus outcome is not significant, in this case, exploratory analyses were conducted because this study represents the first attempt to examine social behaviors in this group using this paradigm. The results indicated that participants with SAD asked fewer questions, $F(1, 26) = 11.238$, $p = .002$, $\eta_p^2 = .302$ and received more confederate prompts relative to NC participants, $F(1, 26) = 5.208$, $p = .031$, $\eta_p^2 = .167$. The groups did not differ on measures of speaking duration, speaking latency, spontaneous verbalization latency, or number of spontaneous comments. Chi square analyses indicated that participants with SAD were significantly less likely to make any spontaneous verbalizations during the 10-minute task (6 SAD versus 1 NC), $\chi^2(1) = 3.846$, $p = .050$. Data from the SIT are contained in Table 8.

SPT

There was a significant overall effect for group on the coded social behaviors from the SPT, $F(3, 23) = 8.480$, $p = .001$, $\eta_p^2 = .525$. Follow-up analyses for the individual behaviors indicated that participants with SAD exhibited significantly longer speaking latencies, $F(1, 25) = 5.109$, $p = .033$, $\eta p^2 = .170$, and spoke for shorter durations than NC participants, $F(1, 25) = 21.616$, $p < .001$, $\eta p^2 = .464$. However, number of speech topics discussed did not differ between groups. Finally, an examination of escape behavior during the SPT revealed that participants with SAD were significantly more likely to discontinue the task prior to the 3-minute mark (8 SAD versus 0 NC), $\chi^2(1) = 9.545$, $p = .002$. Means and standard deviations for the SPT coded behaviors are contained in Table 9.

Physiological Assessment

Two socially anxious participants did not have HR data available for either behavioral task due to equipment malfunction. One socially anxious participant also did not have EDA data available for the SPT due to equipment malfunction. Four additional participants with SAD discontinued the SPT too quickly to be included in the physiological analyses, and two participants with SAD did not exhibit any speaking behavior during the speech task[2]. SPT physiological data from the remaining participants were reduced to 30-second means and analyzed through 3 minutes, as available data decreased dramatically after this point due to participants' decision to end the task.

[2] Identical analyses were performed while excluding the two participants that did not speak, and the physiological outcomes were unaffected.

SIT

During the SIT, SAD and NC participants did not differ in HR, $F(1, 24) = .540$, $p = .470$, $\eta_p^2 = .022$. See Table 10 for means and standard deviations of HR during each minute of the SIT.

SPT

SAD and NC participants did not differ in HR during the SPT, $F(1, 20) = .157$, $p = .696$, $\eta_p^2 = .008$ (Table 11); however, there was a significant group difference in MSC level, $F(1, 20) = 5.901$, $p = .024$, $\eta_p^2 = .219$. Follow-up analyses indicated that the participants with SAD had a significantly higher MSC level during every 30-second segment of the SPT, suggestive of heightened physiological arousal. In addition, differences in SCR approached significance, $t = -1.578$, $p = .058$, as participants with SAD manifested more SCR than NC participants during the SPT. Means, standard deviations, and statistics for the individual ANCOVAs are displayed in Table 12. Graphical representations of MSC level and SCR per minute during the SPT are displayed in Figures 1 and 2, respectively.

CHAPTER FOUR: DISCUSSION

The purpose of this investigation was to closely examine how SAD, during the time of adolescence, might impact areas of daily functioning. The areas targeted for examination, which were based on gaps in the extant literature, included alcohol use and expectancies, quality of sleep, social behavior in daily social situations, behavioral indicators of social skill during social and performance tasks, and physiological reactivity during these same tasks. The results indicated that in comparison to controls, adolescents with SAD do not experience ongoing sleep difficulties and do not report alcohol consumption or expectancies that deviate significantly from the reports given by NC adolescents. However, adolescents with SAD do exhibit impairments in social functioning as well as social skills deficits and greater sympathetic activation during a public speaking task.

A multi-modal approach was used to assess quality of sleep in this investigation. Specifically, participants completed a subjective (e.g., self-report) and an objective (e.g., actigraph) measure of quality of sleep. Over the course of approximately one week, adolescents with SAD attained 7.36 hours of sleep on average per night and 94.29% sleep efficiency and did not report sleep difficulties, consistent with their NC peers and consistent with reports of normal sleep in adults with SAD (Brown et al., 1994). Alfano and colleagues (2010) found sleep difficulties in 27% of youth with SAD; however, that sample was considerably younger (mean age of 9.6 years). Quality of sleep appears to differentiate youth with SAD from youth with other anxiety disorders—namely generalized anxiety disorder and separation anxiety disorder—where

poor sleep is self-reported and/or objectively observed to occur with much greater frequency (Alfano et al., 2007; Alfano et al., 2010; Alfano, Reynolds, Scott, Dahl, & Mellman, 2013; Chase & Pincus, 2011), and suggests that SAD may be distinctive on this dimension.

Adolescents with SAD do not report high levels of general arousal on a daily basis. Rather, their anxiety is elicited/precipitated by situations where there is a high likelihood of negative evaluation. Thus, it appears logical that, for adolescents with SAD, sleep disruption might not occur in the absence of an upcoming distressing event. In an attempt to address this issue, the actigraphy sleep data were also examined qualitatively while referencing anxiety-provoking events in the daily anxiety journal, as suggested by Chorney and colleagues (2008). Unfortunately, the format of this investigation did not allow for assessment of all participants during times of stress (e.g., national testing exams such as the SAT). We did, however, attempt to examine sleep data in those days listed in the diary as containing a stressful event. There was no obvious relationship between either the frequency or the type of anxiety-provoking social activities reported and quality of sleep among participants with SAD.

This study also examined alcohol use among adolescents with SAD. Participants with SAD did not report a greater frequency or quantity of alcohol consumption in the past month than NC participants. Alcohol use was not reported by participants with SAD, whereas 2 (14%) NC participants reported at least one drinking episode in the past 30 days. This lack of alcohol use among teenagers with SAD is not without precedent. Prior examinations of the relationship between social anxiety and alcohol use among undergraduate college students have also found

negative relationship between alcohol consumption and severity of social anxiety (Morris et al., 2005).

Furthermore, contrary to expectations, there were no group differences on ratings of sociability and tension reduction beliefs about alcohol use. It was expected that adolescents with SAD would report greater sociability and tension reduction beliefs, as a prior investigation reported that elevated social anxiety predicted an increased motivation to drink alcohol for coping-related effects among adolescents (Blumenthal et al., 2010). One reason for the different outcomes is that the current study used a carefully diagnosed clinical sample, whereas Blumenthal and colleagues used a community-based non-clinical sample selected by report of 30-day alcohol use. The community sample may not have included any adolescents meeting diagnostic criteria for SAD.

One explanation for the absence of alcohol use in adolescents with SAD is that severe social anxiety, in adolescents or undergraduates, suppresses the relationship between alcohol expectancies and alcohol use (Eggleston, Woolaway-Bickel, & Schmidt, 2004). Absolute avoidance of social situations prevents access to alcohol's availability as a coping mechanism (Ham & Hope, 2005). The effect of avoidance may be particularly pronounced in adolescents, given adolescents' reduced access to alcohol and relatively low base rates of 30-day alcohol use in early to mid-adolescence (Johnston, O'Malley, Bachman, & Schulenberg, 2012).

Consistent with prior investigations of adolescent SAD (Beidel et al., 2007; Inderbitzen-Nolan et al., 2007), adolescents with SAD reported significantly more distress (i.e., anxiety) during a social interaction and a public performance task. In contrast to the prior investigations,

this study examined molecular social behaviors that contribute to the overall ratings of reduced social effectiveness described in the prior literature. Although the omnibus test for the SIT coded behaviors was not significant, this study was the first to examine these behaviors collectively in adolescents and, keeping the limitations in mind, exploratory analyses revealed that adolescents with SAD appeared less engaged socially during the SIT, as they asked fewer questions and required more confederate prompts to engage in conversation. Given that these prompts were delivered only after 2 minutes of silence from participants, these findings are consistent with prior observations of infrequent spontaneous comments among adolescents with SAD (Schwartz, Snidman, & Kagan, 1999) and provided further support for the limited social repertoire.

During the speech task, adolescents with SAD delivered speeches that were much shorter in duration, despite discussing nearly the same number of topics as NC adolescents. Thus, adolescents with SAD progressed quickly through several different speech topics, almost as if they were *naming* the topics rather than *discussing* them in detail. Additionally, and consistent with prior investigations in child (Kagan, Reznick, & Snidman, 1987) and adult (Beidel, Rao, Scharfstein, Wong, & Alfano, 2010) populations, adolescents also exhibited significantly greater speech latency and were significantly more likely (50% to 0%) to escape the speech task. Collectively, these findings indicate that adolescents with SAD experience significant deficits in social skill, which likely contributes to the severe distress they endorse when engaged in social interactions. Accordingly, as suggested by Beidel and colleagues (2007), interventions for adolescents with SAD that do not target social skill enhancement in addition to anxiety reduction may be less effective.

With respect to physiological assessment, this study expanded upon prior investigations by assessing two channels of physiology. HR, which is influenced by both sympathetic and parasympathetic activity, did not differ between groups during either task, consistent with prior physiological assessments of socially anxious adolescents (Anderson & Hope, 2009; Anderson et al., 2010) and adults with SAD (Beidel, Turner, & Dancu, 1985; Turner, Beidel, & Larkin, 1986). With respect to cardiovascular reactivity, adults with SAD were found to exhibit increased systolic blood pressure reactivity during a speech task (Beidel et al., 1985), but blood pressure was not assessed in this investigation.

Throughout the speech task, adolescents with SAD manifested significant autonomic arousal as measured by higher mean skin conductance levels. EDA is a measure of sympathetic (i.e., fight-or-flight) activation; therefore, this observation is consistent with other reports of elevated subjective distress and self-perceived increased physiological reactivity during speech tasks among adolescents with SAD (Anderson & Hope, 2009; Anderson et al., 2010; Essau et al., 1999). The divergent physiological outcomes may be due to the different autonomic systems that influence these channels of physiology. While both HR and EDA are stimulated by the sympathetic nervous system, HR is also affected by the parasympathetic nervous system, which generally works to reverse the sympathetic response.

Finally, with respect to daily social activities, adolescents with SAD reported more frequent anxiety-provoking situations and greater avoidance of these situations. The social situations that were distressing to participants with SAD included speaking to strangers, participating in class, asking the teacher for help, assertiveness opportunities (e.g., asking

someone to change their behavior) and interacting with a group. Similar to children with clinically-significant social anxiety (Beidel, Neal, & Lederer, 1991), journal reports indicate that adolescents with SAD are faced with socially distressful events frequently. On average, participants with SAD reported 15 distressing and 6 avoided daily social events. Their distress is likely to discourage further social activity, leading to avoidance that hinders socialization during a stage of development when socializing and establishing a social network in various settings are critical (Eder & Nenga, 2003).

The present investigation is not without limitations. First, there was an unequal distribution of males-to-females between groups. Although an effort was made to account for this statistically, there are fundamental physiological (Salameh et al., 2008; Silvetti, Drago, & Ragonese, 2001) and perhaps behavioral differences between sexes that may have influenced the findings. Additionally, the participants' stage of pubertal development was not assessed. Puberty is a time during which rapid hormonal changes associated with physiological and sleep pattern alterations that vary by sex (Campbell, Grimm, de Bie, & Feinberg, 2012; Carskadon, 2011; Stores, 2009), and age is not always the best indicator of progression through puberty. Third, self-report of alcohol use may have been suppressed by the informed consent process. Participants in both groups were informed that drinking on greater than two occasions in the past month would be reported to their parent(s) as per Institutional Review Board requirements. Thus, participants may have been discouraged from reporting any alcohol use. Fourth, the number of subjects was lower than desired, which was particularly evident in the SIT analyses; however, sufficient power was available to detect significant differences in a range of effect sizes (ηp^2 =

.147 to .525). Nevertheless, larger samples would be important in replication efforts. Finally, the SIT was designed to simulate a more typical social situation encountered by adolescents than the turn-based role-play tasks used in prior assessments of social skill; however, the task may have not demanded much social interaction because the participants' attention was drawn to the video game. Even so, participants with SAD reported significantly greater distress during the SIT and behavioral differences were observed, indicating that the task was effective at simulating an actual social situation. Additionally, the format of the SIT did not allow for assessment of EDA, which appears to be an important indicator of physiological distress. Playing the Wii requires hand movements, which in turn produces so many movement artifacts as to render the data uninterpretable. Future investigations may improve upon the SIT used here by designing an analogue social situation that minimizes movement artifact (e.g., social interaction while playing a board game).

Despite these limitations, the data from this investigation provide important contributions to the current understanding of SAD in adolescents. This study was the first attempt to broadly assess impairment in adolescents with SAD using diverse assessment strategies. Future studies may build upon the assessment of alcohol use and sleep to identify circumstances under which substance use and sleep difficulties develop in socially anxious adolescents. Additionally targeting assessment of sleep during specific times during the school year that are likely to create stress for adolescents with SAD (standardized testing, first week of a new school). Furthermore, the molecular social behaviors observed during the analogue social situations here begin to clarify the specific social skill deficits that contribute to impaired social functioning in

adolescents with SAD. They present a picture of reduced effectiveness during public performance and a limited ability to engage in social interaction with an unfamiliar person. Given the apparent social skill deficits in adolescents with SAD, interventions for this group should target social skill improvement in addition to anxiety reduction. Social Effectiveness Therapy for Children (Beidel, Turner, & Morris, 2000) is an example of a behavioral intervention that includes exposure therapy for anxiety reduction and social skills training for adolescents. The intervention has been found to be as effective as medication for reducing distress (Beidel et al., 2007a); however, youth who receive SET-C also demonstrate improved social skill.

APPENDIX A: FIGURES

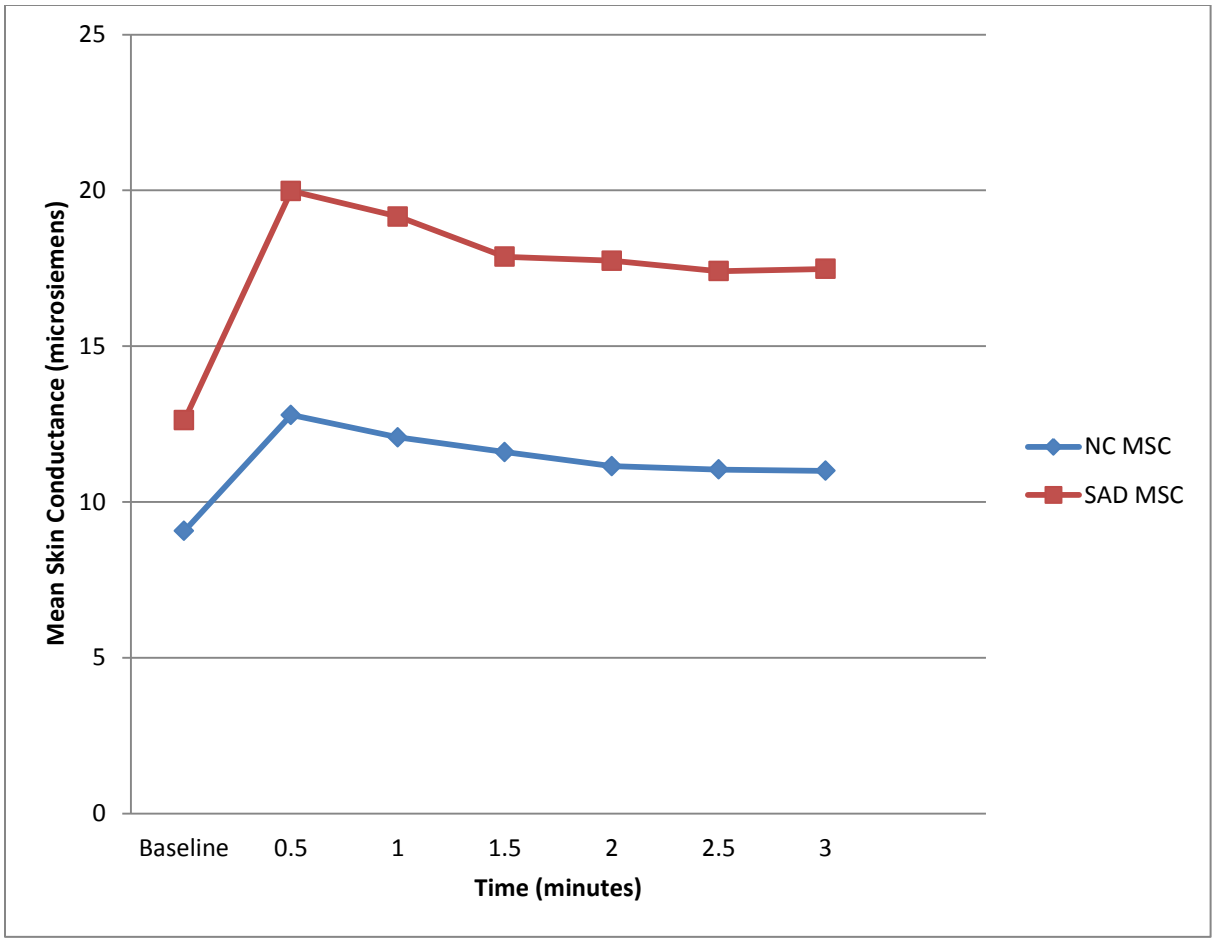

Figure 1 Plot of Mean Skin Conductance during the Speech Performance Task

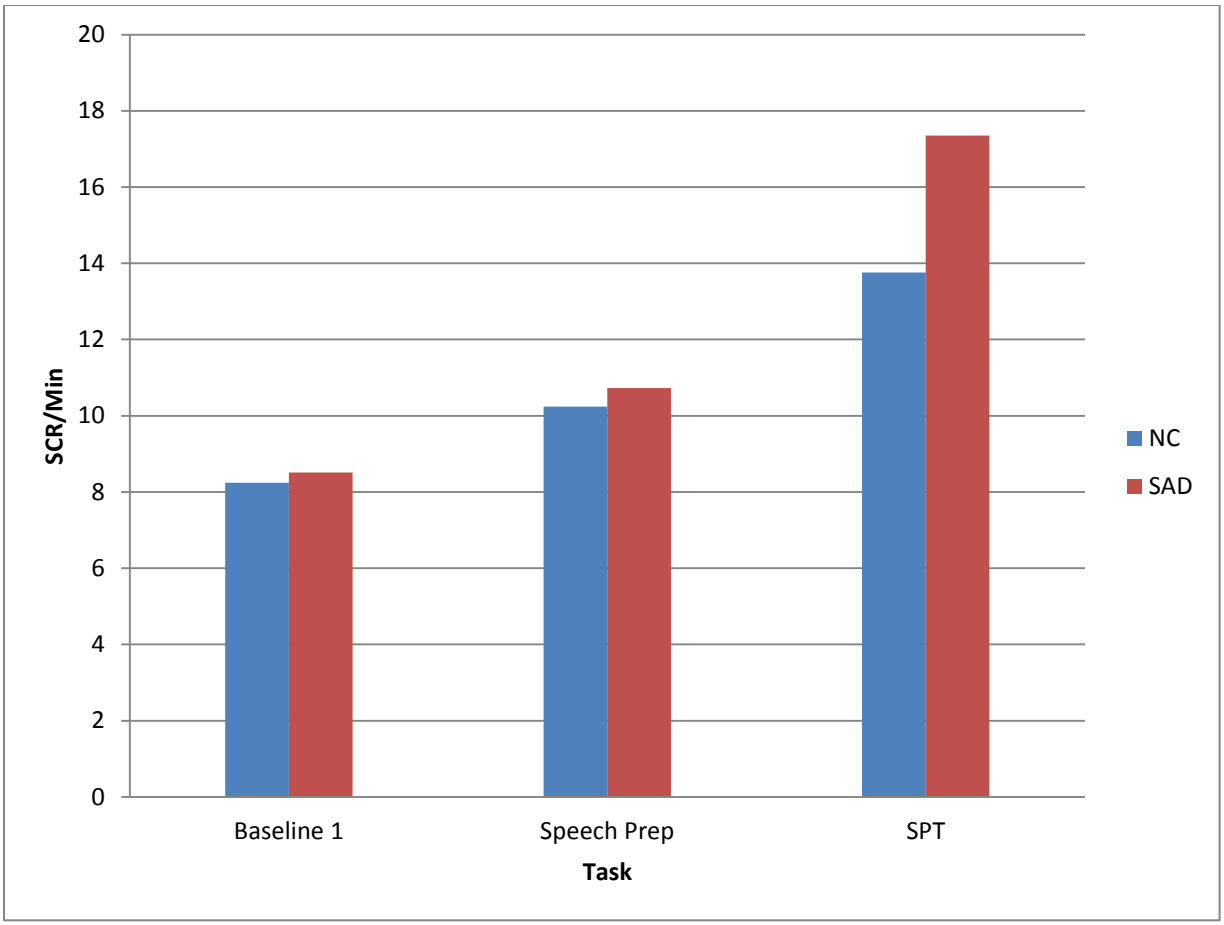

Figure 2 Chart of Skin Conductance Responses during Assessment

APPENDIX B: TABLES

Table 1 Sample Characteristics

	NC (N = 14)	SAD (N = 16)	χ^2 or t-test
Age	15.07 (1.54)	14.81 (1.47)	.470
Sex (% Male)	10 (75%)	6 (37.5%)	5.129*
Race			7.514
Caucasian	6 (42.9%)	11 (68.8%)	
African American	5 (35.7%)	0	
Latino/a	3 (21.4%)	4 (25%)	
Asian/Pac. Isl.	0	1 (6.2%)	
Household Income (x100)	77.5 (46.5)	86.5 (119.1)	-.265
SPAI-C Total	8.14 (6.03)	27.18 (9.33)	-6.527**

*$p < .05$; **$p < .001$; SPAI-C: Social Phobia and Anxiety Inventory for Children

Table 2 Social Interaction Task Confederate Prompts

Time (minutes into task)	Prompt
0[a]	"Hey what's up? My name is _____."
2[b]	"Want to play Wii with me?"
4[c]	"Have you ever played Wii before?"
6	"What grade are you in?"
8	"What school do you go to?"
10	"Do you play any sports?"

[a]All participants received the first prompt.
[b]Prompt was given if participant did not join the confederate on the Wii after two minutes.
[c]All prompts from this point forward were given if the participant had not spoken in the previous two minutes (excluding responses to prompts).

Table 3 Behaviors Coded During the Social Interaction Task

Behavior	Definition
Speaking Latency	Time elapsed (seconds) until participant speaks
Time to First Spontaneous Verbalization	Time elapsed (seconds) until participant makes a statement or question that is not in response to a question
Number of Spontaneous Comments	Quantity of spontaneous comments
Duration of Speaking	Time spent (seconds) speaking
Number of Prompts Needed	Quantity of prompts used during the interaction
Number of Questions Asked	Quantity of questions asked

Table 4 Actigraphy and SSHS Descriptive Statistics

	NC (N = 13)	SAD (N = 16)	*F*(4, 23)	*p*	η_p^2
Days Assessed	7.77 (2.65)	7.69 (1.35)			
Overall			.920	.469	.138
Actigraphy					
Wake Minutes	65.80 (27.68)	50.71 (24.56)			
Sleep Efficiency	91.46 (3.90)	94.29 (3.50)			
SSHS Scales					
SS Total	13.92 (3.62)	14.12 (2.58)			
SWPB Total	17.15 (4.74)	18.94 (5.90)			

SSHS: School Sleep Habits Survey; SS: Sleepiness Scale; SWPB: Sleep/Wake Problems Behavior Scale. Efficiency values are in percentage.

Table 5 CEOA Descriptive Statistics

Expectancy	NC (N = 14)	SAD (N = 16)	*F*(2, 26)	*p*	η_p^2
Overall			.163	.850	.012
Positive					
Sociability	2.73 (0.74)	2.51 (0.79)			
Tension Reduction	2.64 (0.73)	2.37 (1.02)			
Liquid Courage	2.48 (0.91)	2.37 (0.82)			
Negative					
CBI	3.01 (0.59)	3.09 (0.71)			
Risk & Aggression	2.67 (0.71)	2.36 (0.79)			
Self-Perception	2.64 (0.52)	2.61 (0.83)			

CEOA: Comprehensive Effects of Alcohol; CBI: Cognitive and Behavioral Impairment

Table 6 Self-Reported Anxiety and Avoidance in the Anxiety Journal

	NC (N = 14)	SAD (N = 15)	*F*(1, 26)	*p*	η_p^2
Anxious events	3.14 (4.64)	15.20 (12.83)	5.518	.027	.175
Avoided activities	.57 (1.02)	6.20 (7.57)	5.754	.024	.181

Table 7 Self-Reported Distress during the Behavior Tasks

	NC (N = 14)	SAD (N = 16)	*F*(1, 26)	*p*	η_p^2
SIT			5.790	.023	.177
Pre	1.43 (1.40)	2.81 (1.97)	3.972	.056	.128
Post	.93 (1.14)	2.91 (2.22)	4.671	.040	.147
SPT			9.094	.006	.252
Pre	1.21 (1.42)	2.28 (1.71)	2.366	.136	.081
Post	4.21 (2.01)	6.62 (1.54)	8.922	.006	.248

SIT: Social Interaction Task; SPT: Speech Performance Task

Table 8 Social Interaction Task Coded Behaviors Descriptive Statistics

Behavior	NC (N = 14)	SAD (N = 16)	*F*(1, 26)	*p*	η_p^2
Prompts	1.14 (1.41)	2.33 (1.63)	5.208	.031	.167
Speaking latency	14.28 (32.88)	40.60 (95.19)	3.071	.091	.106
Speaking duration	46.11 (33.97)	40.79 (48.57)	.525	.475	.020
Spontaneous verbalization latency	97.80 (157.72)	271.51 (268.84)	2.586	.120	.090
Spontaneous comments	8.14 (8.02)	7.53 (12.04)	.233	.633	.009
Questions	7.07 (6.68)	2.20 (2.11)	11.238	.002	.302

Latency and duration values in seconds.

Table 9 Speech Performance Task Coded Behaviors Descriptive Statistics

Behavior	NC (N = 14)	SAD (N = 14)	*F*(1, 25)	*p*	η_p^2
Speaking latency	1.75 (2.02)	4.42 (4.76)	5.109	.033	.170
Duration of speech	167.75 (38.38)	83.09 (44.83)	21.616	<.001	.464
Number of topics discussed	3.93 (2.92)	4.5 (2.41)	1.086	.307	.042

Latency and duration values in seconds.

Table 10 Heart Rate Descriptive Statistics during the Social Interaction Task

Segment	NC (N = 14)	SAD (N = 14)	$F(1, 24)$	p	η_p^2
Overall			.540	.470	.022
1	90.06 (15.97)	95.48 (16.64)			
2	88.54 (15.53)	90.81 (15.34)			
3	90.79 (14.57)	92.84 (14.41)			
4	91.88 (15.45)	91.99 (13.95)			
5	91.94 (16.39)	94.79 (12.23)			
6	93.26 (16.89)	95.04 (12.89)			
7	92.02 (18.19)	94.74 (12.86)			
8	94.18 (17.00)	95.56 (12.66)			
9	91.77 (17.27)	96.66 (11.36)			
10	93.03 (16.23)	98.67 (12.09)			

Heart rate measured in beats per minute.

Table 11 Heart Rate Descriptive Statistics during the Speech Performance Task

Segment	NC (N = 14)	SAD (N = 10)	$F(1, 20)$	p	η_p^2
Overall			.157	.696	.008
1	105.30 (18.06)	104.60 (19.92)			
2	104.88 (17.47)	101.25 (19.94)			
3	99.66 (13.75)	100.87 (18.16)			
4	99.49 (18.04)	99.88 (19.10)			
5	100.95 (17.60)	102.63 (16.87)			
6	98.20 (16.11)	100.95 (18.18)			

Heart rate measured in beats per minute.

Table 12 Mean Skin Conductance Descriptive Statistics during the Speech Performance Task

Segments	NC (N = 14)	SAD (N = 11)	$F(1, 21)$	p	η_p^2
1	12.79 (6.35)	19.98 (6.16)	4.798	.040	.186
2	12.07 (5.63)	19.16 (6.32)	6.508	.019	.237
3	11.60 (5.53)	17.87 (5.81)	5.107	.035	.196
4	11.15 (5.48)	17.74 (6.13)	5.476	.029	.207
5	11.04 (5.48)	17.41 (5.72)	6.261	.021	.230
6	11.00 (5.43)	17.48 (6.22)	6.084	.022	.225

Mean skin conductance measured in microsiemens.

APPENDIX C: IRB APPROVAL LETTER

University of Central Florida Institutional Review Board
Office of Research & Commercialization
12201 Research Parkway, Suite 501
Orlando, Florida 32826-3246
Telephone: 407-823-2901 or 407-882-2276
www.research.ucf.edu/compliance/irb.html

Approval of Human Research

From: **UCF Institutional Review Board #1**
FWA00000351, IRB00001138

To: **Franklin Mesa**

Date: **August 02, 2012**

Dear Researcher:

On 7/25/2012, the IRB approved the following human participant research until 7/24/2013 inclusive:

Type of Review:	IRB Continuing Review Application Form
Project Title:	Adolescent Functioning Study
Investigator:	Franklin Mesa
IRB Number:	SBE-11-07717
Funding Agency:	
Grant Title:	
Research ID:	N/A

The Continuing Review Application must be submitted 30days prior to the expiration date for studies that were previously expedited, and 60 days prior to the expiration date for research that was previously reviewed at a convened meeting. Do not make changes to the study (i.e., protocol, methodology, consent form, personnel, site, etc.) before obtaining IRB approval. A Modification Form **cannot** be used to extend the approval period of a study. All forms may be completed and submitted online at https://iris.research.ucf.edu .

If continuing review approval is not granted before the expiration date of 7/24/2013, approval of this research expires on that date. When you have completed your research, please submit a Study Closure request in iRIS so that IRB records will be accurate.

Use of the approved, stamped consent document(s) is required. The new form supersedes all previous versions, which are now invalid for further use. Only approved investigators (or other approved key study personnel) may solicit consent for research participation. Participants or their representatives must receive a copy of the consent form(s).

In the conduct of this research, you are responsible to follow the requirements of the Investigator Manual.

On behalf of Sophia Dziegielewski, Ph.D., L.C.S.W., UCF IRB Chair, this letter is signed by:

Signature applied by Joanne Muratori on 08/02/2012 02:58:51 PM EDT

IRB Coordinator

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