Journal of Anxiety Disorders 23 (2009) 167–177

Contents lists available at ScienceDirect

Journal of Anxiety Disorders

Cognitive behavior therapy for generalized social anxiety disorder in adolescents: A randomized controlled trial

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ARTICLE INFO

Article history:
Received 20 February 2008
Received in revised form 12 June 2008
Accepted 13 June 2008

Keywords:
Social anxiety disorder
Adolescence
Social phobia
Cognitive behavior therapy

ABSTRACT

Early identification and treatment of social anxiety disorder (SAD) is critical to prevent development of a chronic course of symptoms, persistent functional impairment, and progressive psychiatric comorbidity. A small but growing literature supports the effectiveness of cognitive behavior therapy (CBT) for anxiety disorders, including SAD, in adolescence. The present randomized controlled trial evaluated the efficacy of group vs. individual CBT for adolescents with generalized SAD in relation to an educational/supportive psychotherapy that did not contain specific CBT elements. All three treatments were associated with significant reductions in symptoms and functional impairment, and in improved social skills. No differences between treatments emerged on measures of symptoms, but the CBT conditions demonstrated greater gains on behavioral measures. The implications of the findings are discussed.

Social anxiety disorder (SAD), also known as social phobia, is characterized by a marked and persistent fear and/or avoidance of social situations in which one fears being negatively evaluated by others or being subjected to embarrassment (American Psychiatric Association, 2000). SAD is divided into two subtypes: generalized and non-generalized. Individuals with generalized SAD experience anxiety across most social situations, whereas those with the non-generalized subtype fear a specific social or performance situation (Hofmann et al., 1999). SAD is widely believed to be among the most prevalent of psychiatric conditions, although most individuals with the disorder are never identified and do not obtain treatment (Chavira, Stein, Bailey, & Stein, 2004; Kessler et al., 1994). Without treatment, SAD tends to follow a chronic, unremitting course. Onset is typically in the early teens, with a mean onset of 15.5 years (Schneier, Johnson, Hornig, Liebowitz, & Weissman, 1992). Although the vast majority of research on SAD has focused on adults, the early onset, chronicity, high levels of comorbidity, and substantial distress and functional impairment associated with the disorder highlight the critical importance of effective early assessment and intervention.

Although children and adolescents often report many types of worries and fears, most of these are transient and do not result in significant impairment in functioning (Muris, Merckelbach, Gadet, & Moulaert, 2000). SAD, however, is associated with high levels of distress and significant functional impairment. Youths with SAD have few friends, limited extracurricular activities, and may have difficulty with school attendance and underachievement (Khalid-Khan, Santibanez, McMicken, & Rynn, 2007). Additionally, SAD in this population is highly correlated with school refusal, selective mutism, and increased comorbidity with depressive, anxiety, somatoform, and substance use disorders (Essau, Conradt, & Petermann, 1999; Last & Strauss, 1990). The social fear characteristic of SAD in youth can cause significant impairment in functioning, and can have long-term detrimental effects due to the disorder's chronic course. See Beidel, Ferrell, Alfano, & Yeganeh (2001), Kashdan and Herbert (2001) and Khalid-Khan et al. (2007) for comprehensive reviews of SAD in childhood and adolescence.

Currently, there is limited research on the psychological treatment of children and adolescents with SAD (Kashdan & Herbert, 2001; Khalid-Khan et al., 2007; Sweeney & Rapee, 2005). To date, most of the psychological interventions for social anxiety in children have been designed to target all anxiety disorders (e.g.,

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0887-6185/$ – see front matter
doi:10.1016/j.janxdis.2008.06.004

mixed anxiety populations). Most of these interventions are derived from cognitive-behavioral models designed for adults (Zaider & Heimberg, 2003), and have generally demonstrated positive results (Barrett, 1998; Barrett, Dadds, & Rapee, 1996; Kendall, 1994; Kendall et al., 1997; Rapee, 2000; Silverman et al., 1999). Relative to untreated controls, treated children are more likely no longer to meet criteria for their specific anxiety disorder following treatment, and to report fewer symptoms of anxiety and greater improvements in comorbid conditions. A notable limitation of this research, however, is that only a small number of studies have examined interventions specifically targeting SAD.

Two cognitive-behavioral treatment programs specifically targeting childhood or adolescent SAD have been developed: (1) cognitive-behavioral group therapy (CBGT) (Albano, Marten, Holt, Heimberg, & Barlow, 1995; Hayward et al., 2000; Spence, Donovan, & Brechman-Toussaint, 2000), and (2) social-effectiveness therapy (SET) (Beidel, Turner, & Morris, 2000b). In addition, "coping cat" child behavior therapy program (Flannery-Schroeder & Kendall, 2000; Kendall, 1990; Kendall, 1994) was designed to target anxiety disorders in general among children, but not SAD specifically. Each of these treatment approaches shares four critical intervention components: psychoeducation, exposure to feared situations, anxiety coping skills (e.g., relaxation techniques, cognitive restructuring, problem-solving), and homework assignments to facilitate consolidation of skills in real-world situations. The CBGT and SET programs are both modeled after established adult protocols and are typically conducted in a group format. The "coping cat" program is typically implemented in an individual format.

The research on these programs is quite promising. In an uncontrolled study of CBGT, Albano et al. (1995) piloted a 16-session multicomponent program for 5 adolescents with a primary diagnosis of SAD (Albano et al., 1995). This program was largely based on successful adult studies (Heimberg, Salzman, Holt, & Blendall, 1993). The program included skill building strategies (Christoff, Scott, Kelley, Baer, & Kelly, 1985), and parental involvement. At 3-months post-treatment, 4 of the 5 youths no longer met criteria for SAD, and at 1-year follow-up all participants were without an SAD diagnosis (Albano et al., 1995). Spence et al. (2000) compared the effectiveness of child-only CBGT ($n = 17$) to CBGT with a parental component ($n = 19$), both relative to a waitlist control (WLC) ($n = 14$). Children aged 7–14 years were randomly assigned to one of the three conditions. The treated children received 12 weeks of therapy with booster sessions at months 3 and 6 post-treatment. Significantly fewer children in both of the active treatment conditions met criteria for SAD at the end of the treatment relative to those in the WLC condition (87% remitted in CBGT with parental involvement, 58% in child-only CBGT, 7% in WLC), and gains were maintained at follow-up. Although no significant differences emerged between the two active treatments, the study was inadequately powered to detect such differences, and there appeared to be a trend favoring CBT with parental involvement. Hayward et al. (2000) compared CBGT ($n = 12$) to a WLC ($n = 23$) in a group of female adolescents. Relative to those in the control condition, treated adolescents had a 50% reduction in social phobia interference ratings; moreover, 45% of treated adolescents no longer met criteria for SAD at post-treatment, compared to 5% of the controls. Although promising in the short-term, at 1-year follow-up no significant differences were present between the treatment and control groups.

Social-effectiveness therapy for children (SET-C) has also demonstrated promising results. This program is delivered in 24 sessions over 12 weeks, with one treatment session per week focused on exposure and the second on social skills training. In an uncontrolled pilot study consisting of 16 children aged 8–12, significant improvements in anxiety symptoms over time were observed (Beidel, Turner, & Morris, 1997). In a subsequent study, Beidel et al. (2000b) compared the effectiveness of SET-C in 50 SAD children to an active, non-SAD specific intervention consisting of test-taking and study skills training. Significant differences were revealed at post-treatment, with 67% of the SET-C children no longer meeting criteria for SAD compared to 5% of those in the control group. Six month follow-up assessments suggested further treatment gains, with 85% of the children in the SET-C group being diagnosis free. Gains were maintained at 5-year follow-up (Beidel, Turner, & Young, 2006).

More recent studies of SAD in youths have examined comparisons of treatment protocols, duration of treatment, and protocol applications to real-world settings. Olivares et al. (2002) and García-López et al. (2002) examined the effects of three different interventions for adolescent SAD in a school setting in Spain. Fifty-nine adolescents were randomized to receive Spanish language versions of SET, CBGT, therapy for adolescents with generalized social phobia (intervención en adolescents con fobia social generalizada, IAFSG), or a no-treatment control group. IAFSG is a school-based CBT intervention consisting of 12 group sessions. Results showed that all three active treatments were superior to the control group in terms of reductions in social anxiety and improvements in social skills and self-esteem at post-treatment and at 1-year follow-up. Within-group analyses revealed that all three active interventions produced significant improvements from pre-treatment to post-treatment. Five year follow-up data demonstrated maintenance of effects in the three treatment conditions (García-López et al., 2006). Other school-based interventions have also demonstrated significant reductions in SAD (Fisher, Masia-Warner, & Klein, 2004; Masia-Warner et al., 2005; Masia-Warner, Fisher, Shrout, Rathor, & Klein, 2007). In another study, Gallagher, Rabian, & McCloskey (2004) randomly assigned 23 children with SAD to a 3-week CBT intervention or WLC. The brief intervention consisted of three 3-h weekly sessions. Results demonstrated positive effects of the program relative to WLC at post-treatment and 3-week follow-up.

The literature on the treatment of SAD in youths is limited but promising. A recent meta-analysis found large effects of CBT programs for childhood SAD, comparable in size to the effects of pharmacotherapy (Segool & Carlson, 2007). There are, however, several noteworthy limitations of the current literature. First, as noted above, most of the studies have not focused specifically on SAD, but rather on mixed groups of youths with various anxiety disorders. Moreover, of the studies that focused on SAD, the majority did not specifically target the more severe generalized subtype of the disorder. Second, most studies focused either exclusively on preadolescent children, or on samples that included both younger children as well as adolescents. There is a general consensus that adolescents with SAD present unique clinical challenges and may be more treatment resistant than younger children, suggesting the importance of a specific focus on adolescents (Kashdan & Herbert, 2001; Rao et al., 2007). Third, most of the studies to date have either been uncontrolled pilot investigations or have compared a single active treatment to a WLC. Such research designs, although representing valuable initial steps, only permit the most basic of conclusions about treatment effects. Fourth, there is a dearth of data on the use of individual treatment with SAD adolescents. Most existing studies have utilized group interventions, and those that have focused on individual treatment have generally focused on younger children. Given the typical onset of SAD in adolescence, as well as the unique challenges associated with the treatment of anxiety disorders at this developmental stage, interventions specifically targeting adolescents are needed. In terms of delivery format, due to

practical difficulties associated with scheduling groups and given data suggesting that individual CBT programs are equally effective as group-based programs for adult SAD (e.g., Mörtberg, Clark, Sundin, & Åberg Wistedt, 2006), the field has moved toward individual treatment of SAD among adults over the past decade. However, it remains to be determined how individual vs. group treatments would compare among adolescents with generalized SAD.

The purpose of this study was to evaluate the effectiveness of CBT relative to psychoeducational-supportive psychotherapy. We predicted that CBT, delivered in either an individual or group format, would result in greater symptom improvement and gains in social skills relative to a psychoeducational-supportive psychotherapy. A secondary purpose was to conduct exploratory analyses on the delivery format of CBT. Given the lack of previous research in this area, we made no specific predictions about the effects of group vs. individual CBT.

1. Method

1.1. Participants

Potential participants were recruited through community media announcements and a network of local school personnel and social service agencies for a psychological treatment program for adolescent social anxiety disorder (SAD) offered under the auspices of a university-based anxiety clinic. Parents of potential participants underwent a preliminary 20-min telephone screening in order to ascertain if their child was likely to meet study inclusion criteria; those who appeared to be eligible were invited to the clinic for further assessment. All participants and their parents were informed of the nature of the study and provided written consent for participation. The adolescent participants were interviewed by trained diagnosticians using the Anxiety Disorders Interview Schedule for DSM-IV: Child Version, a semi-structured interview based on DSM-IV diagnostic criteria (ADIS-DSM-IV:C, Albano & Silverman, 1996). All participants met criteria for a primary diagnosis of the generalized subtype of SAD according to the fourth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (American Psychiatric Association, 2000). Inclusion criteria included age between 12 and 17, literacy in English, and a DSM-IV diagnosis of primary SAD, generalized subtype. To meet criteria for the generalized subtype of SAD, the participant must have reported intense fear and avoidance of at least three distinct types of social situations, resulting in significant impairment in functioning (Herbert et al., 2005; Stemberger, Turner, Beidel, & Calhoun, 1995). The exclusion criteria included a history of mental retardation, pervasive developmental disorder, organic mental disorder, bipolar disorder, a psychotic disorder, or borderline or schizotypal personality disorder. Other Axis I disorders such as generalized anxiety disorder, major depression, or dysthymia were acceptable as long as SAD was judged to be clearly primary to and of greater severity than the secondary diagnosis. Primacy was defined as the disorder with the earliest onset, and severity was defined in terms of the level of symptomatology associated with the condition as well as the degree of impairment attributed to it. Additional exclusion criteria were the presence of imminent suicidal risk (as assessed by the diagnostician using the ADIS-DSM-IV:C and the Beck Depression Inventory), substance abuse or dependence within the past year, or a previous trial of behavior or cognitive behavior therapy for SAD. Due to epidemiological data indicating a high comorbidity of other Axis I disorders with SAD (Schneier et al., 1992), we included participants with secondary comorbid Axis I disorders in order to enhance the external validity of the results.

See Table 1 for a breakdown of demographic variables by treatment condition. The randomized sample was comprised of 73 adolescents (56% female) diagnosed with primary SAD, generalized

Table 1
Demographic and baseline variables by randomized condition

Variables[a]	I-CBT (n = 24)		G-CBT (n = 23)		PST (n = 26)	
	M	S.D.	*M*	S.D.	*M*	S.D.
Age	14.3	2.1	14.6	2.8	15.1	1.4
Grade level	9	2	9	2	10	1
	%	*n*	%	*n*	%	*n*
Gender						
Female	75	18	44	10	54	14
Male	25	6	56	13	46	12
Race/Ethnicity						
African-American	46	11	39	9	50	13
Caucasian	54	13	52	12	34	9
Hispanic	0	0	0	0	8	2
Asian/other	0	0	9	2	8	2
Parents' Marital Status						
Never married	11	2	17	3	14	3
Married	67	12	78	14	64	14
Divorced	17	3	5	1	13	3
Separated	0	0	0	0	9	2
Widowed	5	1	0	0	0	0
Child's Living Situation						
Living with one parent	32	7	35	8	44	11
Living with both parents	64	14	65	15	56	14
Not living with either parent	4	1	0	0	0	0
Comorbid psychiatric diagnosis (% yes)	60	14	50	11	65	15
Concurrent psychotropic medication (% yes)	23	6	9	2	9	2

Note: I-CBT, Individual Cognitive Behavior Therapy; G-CBT, Group Cognitive Behavior Therapy; PST, Psychoeducational-Supportive Therapy; *M*, mean; S.D., standard deviation.

[a] Some variables have missing data.

type. Most of the sample was either Caucasian (47%) or African-American (44%), with the remaining participants being Latino or Asian. Average age was 15 years and grade level was 9. The majority of participants (59%) met criteria for at least one comorbid psychiatric disorder and 26% had two or more comorbid disorders: generalized anxiety disorder ($n = 19$), dysthymia ($n = 15$), specific phobia ($n = 14$), major depressive disorder ($n = 6$), school refusal ($n = 5$), separation anxiety ($n = 3$), obsessive-compulsive disorder ($n = 3$), panic disorder ($n = 2$), post-traumatic stress disorder ($n = 2$), and attention deficit-hyperactivity disorder ($n = 1$). Fifteen percent of the sample was stabilized (i.e., at least 3 months with no change in medication or dosage) on a psychiatric medication regimen (typically an antidepressant) at the start of the study. Treatment attendance was good, with completers attending an average of 10.5 (S.D. = 2.2) out of 12 sessions and 90% regularly completing homework assigned as part of treatment. Twenty-nine percent of patients sought additional treatment for SAD (i.e., psychiatric medications and/or psychotherapy) during the 6-month follow-up period; no patients obtained additional treatment during the active phase of study treatment itself. See Fig. 1 for a depiction of subject flow throughout the study.

1.2. Randomization

Once individuals were enrolled into the study, they were randomly assigned to one of three treatment conditions (see below for description of conditions) using a block design with block sizes of 6. The blocked randomization design helped to ensure balanced sample sizes in each experimental condition as well as to help minimize the "correct guess" probability (successfully anticipating the next randomly assigned treatment). This block randomizing procedure was designed to ensure that participants assigned to receive one of the three treatments did not differ in overall symptom severity or in the average time awaiting treatment, while also avoiding an excessive delay between subjects' initial evaluation and the onset of treatment. Participants were informed of the assigned treatment after the participant was deemed eligible and enrolled in the study.

1.3. Interventions

All three treatment conditions involved 12 weekly sessions of psychotherapy. Therapists were advanced doctoral candidates in clinical psychology trained and supervised by the first author, who is a licensed clinical psychologist with substantial experience in the cognitive-behavioral treatment of SAD. A total of 6 therapists conducted treatment groups, and all therapists ran an approximately equal number of groups in each condition, thereby controlling for any specific therapist effects. Therapists received weekly individual and group supervision for quality assurance and to ensure adherence to the treatment manuals. All groups were audio or videotaped to facilitate supervision and for treatment fidelity; treatment fidelity results are described below.

1.3.1. Group Cognitive-Behavior Therapy (G-CBT)

The G-CBT group met for 2-h sessions each week and were co-led by 2 therapists. Groups ranged in size from 4 to 6 patients. The major treatment components of G-CBT included psychoeducation, breathing retraining, cognitive restructuring, simulated and in vivo exposure to phobic stimuli, and social skills training. The overall format of the group and the exposure and cognitive restructuring components were derived largely from the treatment program developed by Heimberg (1991) and Heimberg and Becker (2002) and was similar to the application of Heimberg's protocol to adolescents described by Albano (1995).

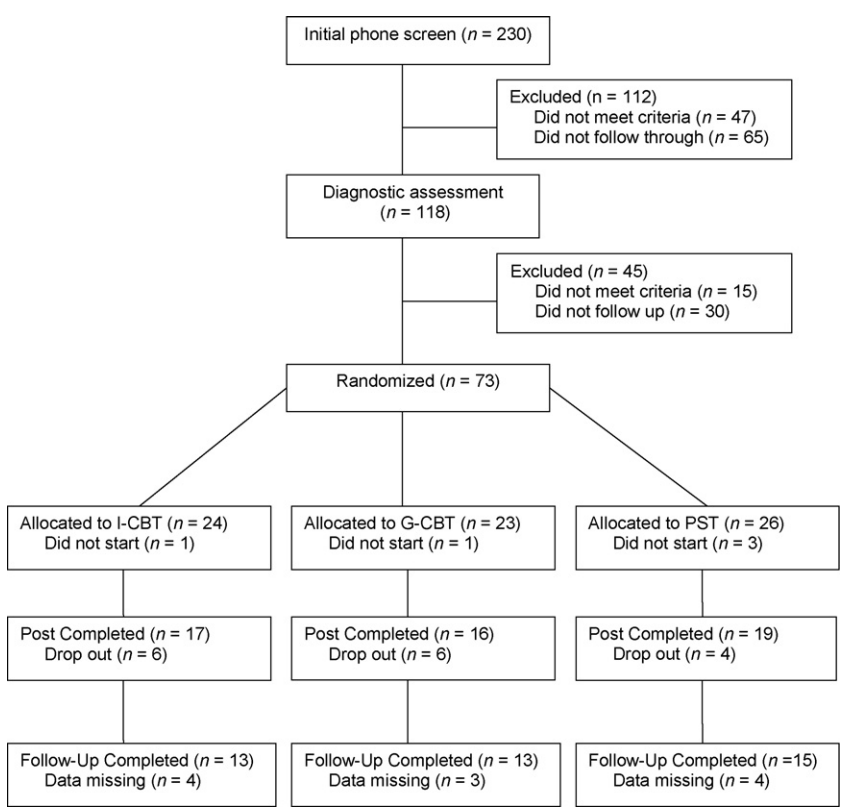

Fig. 1. Subject flow diagram.

1.3.2. Individual Cognitive Behavior Therapy (I-CBT)

Participants in the individual therapy condition met for 1 h per week. The I-CBT program followed the same format and covered the same content as the group program described above.

1.3.3. Psychoeducational-Supportive Therapy (PST)

Like those in the G-CBT condition, participants in the PST group conditions met for 2-h sessions and were co-led by two therapists. PST groups were comprised of 4 to 6 participants. The PST program was based upon the protocol utilized by Heimberg et al. (1990) and Heimberg et al. (1993). The PST program included discussions each session around various topics relevant to SAD. Therapists offered support but did not provide specific advice, teach skills, problem-solve, or assign exposure exercises.

1.4. Assessment

Measures were completed at pre-treatment, post-treatment, and 6-months following termination of treatment. All three groups had identical pre, post, and follow-up assessments. Assessments included a semi-structured interview, various self-report questionnaires, as well as video-taped behavioral assessment tasks. Interviewers, all of whom were doctoral candidates in clinical psychology, were extensively trained in the administration of the instruments via didactic instruction, role plays, observation, and practice ratings of patient videotapes. All diagnoses were confirmed through weekly review of the interview data by the first author. In the event of diagnostic uncertainty, the case was discussed in a team meeting to achieve consensus. Trained interviewers who conducted the outcome assessments were blind to group assignment and assessment occasion. In addition, observers who provided ratings of various social performance indices derived from the behavioral tasks were likewise blind to group assignment and assessment occasion. All self-report measures were well established and widely used in studies of SAD.

1.4.1. Anxiety Disorders Interview Schedule for DSM-IV: Child Version (ADIS-DSM-IV:C; Albano & Silverman, 1996)

The ADIS-DSM-IV:C is a structured interview designed for the assessment of anxiety disorders and other Axis I disorders in children and adolescents. The SAD subsection of the ADIS-DSM-IV:C contains separate ratings made by the child or adolescent during the interview of the severity of the anxiety and avoidance across various social situations. The ADIS-DSM-IV:C has been found to have excellent test–retest reliability in symptom scale scores and good to excellent test–retest reliability for deriving diagnoses (Silverman, Saavedra, & Pina, 2001). High interrater reliability has been reported with a sample of participants with SAD (Silverman & Eisen, 1992; Silverman & Nelles, 1988; Silverman & Rabian, 1995). In addition, the ADIS-DSM-IV:C and the social anxiety diagnosis in particular has demonstrated good concurrent validity with the Multidimensional Anxiety Scale for Children (MASC) (Wood, Piacentini, Bergman, McCracken, & Barrios (2002).

1.4.2. The Clinical Global Impression Scale—Severity (CGI-S: National Institute of Mental Health, 1985)

The CGI-S consists of a 1–7 clinician-rated scale assessing overall symptom severity. The CGI-S scale is commonly used in clinical trials of the anxiety disorders and specifically with social anxiety trials (Davidson et al., 1993; Heimberg et al., 1998; Liebowitz et al., 1992; Schneier et al., 1998; Simpson et al., 1998). It has demonstrated good concurrent validity with both self-report and clinician-administered measures of social anxiety symptomatology and impairment (Zaider, Heimberg, Fresco, Schneier, & Liebowitz, 2003).

1.4.3. Social Phobia Anxiety Inventory for Children (SPAI-C; Beidel, T, & Morris, 1995)

The SPAI-C consists of 26 items rated on a 3-point Likert scale (never or hardly ever, sometimes, most of the time or always). The items assess a range of potentially anxiety-producing situations and assess physical and cognitive characteristics of SAD as well as avoidance behaviors. Nine of the 26 items have sub-items allowing the child to rate his or her distress based on specific characteristics of the interpersonal partner. The SPAI-C was adapted from the adult version of the instrument (Beidel, Turner, Stanley, & Dancu, 1989b). The SPAI-C has been found to have high internal consistency and test–retest reliability (Beidel et al., 1995; Storch, Masia-Warner, Dent, Roberti, & Fisher, 2004). The SPAI-C was also shown to have good discriminative validity, convergent validity, and external validity (Beidel, Turner, & Fink, 1996; Beidel, Turner, Hamlin, & Morris, 2000a). In addition, the SPAI-C has been found to have good sensitivity and specificity (Inderbitzen-Nolan, Davies, & McKeon, 2004).

1.4.4. Social Anxiety Scale for Children (SAS-C; La Greca & Stone, 1993)

The SAS-C consists of 18 self-statements and 4 filler items rated on a 5-point Likert scale. Based on results from factor analysis, the SASC-R yields the following three subscales: Fear of Negative Evaluation, Social Avoidance and Distress for New Situations, and General Social Avoidance and Distress. A parent version of the scale (SAS-P) was also completed in the study. The measure possesses adequate internal consistency and good construct validity (Ginsburg, La Greca, & Silverman, 1998).

1.4.5. Reaction to Treatment Questionnaire (RTQ; Holt & Heimberg, 1990)

The RTQ is a 17-item scale in which 1–10 Likert ratings are made on a variety of dimensions related to patients' expectancies of the treatment. The scale was administered immediately following the first intervention session.

1.4.6. Behavioral assessment

Three standardized 3-min behavioral tasks were administered for assessment of behavioral performance. They included (a) a dyadic role play involving a simulated interaction with a confederate; (b) a triadic role play involving an interaction with two confederates; and (c) an impromptu speech. The first author reviewed the videotapes of all behavioral assessments to ensure standardization. Role play tests are commonly used in the behavioral assessment of social anxiety (Glass & Arnkoff, 1989; Herbert et al., 2005; Herbert, Rheingold, & Brandsma, 2001; Herbert, Rheingold, Gaudiano, & Harwell, 2004b; Herbert, Rheingold, & Goldstein, 2002; McNeil, Ries, & Turk, 1995), and have sufficient reliability and validity for social performance ratings (Arkowitz, Lichtenstein, McGovern, & Hines, 1975; Beidel, Turner, Jacob, & Cooley, 1989a; Merluzzi & Biever, 1987). For this study, the role play interactions and the impromptu speech were videotaped and rated by two trained observers on quality of verbal content, non-verbal behavior, paralinguistic features, and overall social performance using 5-point Likert scales. The observers were blind to assessment time point and treatment condition. Prior to rating tapes, assessors developed anchors for ratings and were trained until a reliability of greater than .80 was achieved. Calculated agreement between raters was high (intraclass correlation $\alpha = .96$) based on reliability checks between the raters on a random sample of 30% of the tapes. Immediately following each role play task, participants were asked to provide a single self-rating of their overall performance using the same 5-point Likert scale.

1.4.7. Subjective Units of Discomfort Scale (SUDS)

Immediately prior to each of the behavioral assessments tasks, participants were asked to provide a rating of anxiety on a 0–100 SUD scale, with higher numbers indicating increased anxiety (Wolpe & Lazarus, 1966). Immediately following each task participants were asked to rate their level of anxiety at that time, as well as their highest level of anxiety during the task. The observers provided a subjective rating of each participant's expressed anxiety for each behavioral assessment task. Reliability of SUDS self-reports of anxiety during an impromptu speech has been shown to be adequate (Beidel et al., 1989a; Beidel et al., 1989b).

1.5. Statistical analyses

We first conducted analyses to test our primary hypothesis that patients receiving CBT (group or individual) would show greater improvement on outcome measures compared to those receiving PST. Secondary analyses were then conducted to explore potential differences between the G-CBT, I-CBT, and PST conditions. Alpha was set at $p < .05$. Hierarchical linear modeling (HLM) (Bryk & Raudenbush, 1987; Raudenbush, Bryk, Cheong, & Congdon, 2004; Singer & Willett, 2003) was used to examine trends in change over time. This approach is especially useful because HLM accommodates missing data in repeated measurements using empirical Bayesian estimates. We first examined overall group trends, regardless of treatment condition, and then conducted analyses to examine if treatment condition accounted for differential symptom change over time. The data were hierarchically structured with 158 self-report assessments nested within 68 participants and 152 behavioral assessments within 68 participants. Coefficients representing assessment level were estimated for each person (level 1) and group differences in these coefficients were estimated (level 2). To assess whether treatment condition predicted change in symptomatology over time, we used the following covariates: time, treatment condition, and time × treatment; interpretation of results focused on the interaction term. All models were random intercept models with a specified unstructured error covariance structure. For our primary analyses, comparing PST to CBT (individual or group), total linear change (β_{11}) consists of three parameters: (1) linear change for individuals, with a treatment value of 0 (i.e., CBT) (γ_{10}); (2) linear change for individuals, with a treatment value of 1 (i.e., PST) (γ_{11}); and 3) unexplained error (μ_1). Effect sizes (Cohen's d) were estimated using t statistics and their corresponding degrees of freedom derived from the HLM analyses (using software developed by Devilly (2005)).

We utilized the d statistic conventions described by Cohen (1988) as follows: small effect = .20, a medium effect = .50, and a large effect = .80. It is important to emphasize that there is currently no agreed upon method of estimating effect sizes in HLM analyses, and that different software programs may calculate somewhat different degrees of freedom (Snijders & Bosker, 1999). Therefore, one should be cautious when attempting to generalize effect sizes across studies. We considered a medium effect ($d = .50$) to represent a clinically meaningful difference between treatments. To have 80% power for detecting a medium effect size ($d = .50$) difference for our primary analyses (CBT vs. PST), a total sample size of approximately 64 was needed.

2. Results

2.1. Preliminary analyses

2.1.1. Sample severity

The overall severity of the current sample was examined by comparing it to the clinical sample described in Beidel et al. (1995). A Student t-test revealed that pre-treatment SPAI-C scores were significantly higher in the current sample ($M = 39.7$, S.D. = 16.8) compared to the Beidel et al. clinical sample ($M = 21.8$, S.D. = 8.5, $t = 8.64$, d.f. = 65, $p < .001$). The difference found was not surprising given that all patients in the current sample were diagnosed with the generalized subtype of SAD, and we utilized minimal subject exclusion criteria. Also, an independent samples t-test revealed no significant difference between male and female pre-treatment SPAI-C scores in the current sample ($p > .05$), which was consistent with the findings of Beidel et al.

2.1.2. Preliminary group comparisons

ANOVAs and post hoc tests revealed no pre-treatment group differences on study measures, age, grade level, or number of sessions attended ($ps > .05$) (see Table 1). Chi square analyses revealed no significant differences between the groups on any of the categorical variables, including gender, race/ethnicity, parental marriage status, follow-up treatments received (i.e., non-study related psychiatric treatment obtained between post-treatment and 6-month follow-up periods), homework completed, or concurrent psychiatric medication usage during the study (all $ps > .05$).

2.1.3. Treatment credibility

The treatment conditions were compared on expectancy for improvement based on participants' initial assessment of treatment credibility using the Reaction to Treatment Questionnaire (RTQ) total score. This measure was completed after the treatment rationale was explained to participants in the first session. A one-way ANOVA showed that the groups did not differ in their assessment of treatment credibility or expectancy for improvement from treatment ($F = 0.14$, d.f. = 2, 51, $p = .87$).

2.1.4. Treatment fidelity

Treatment fidelity was assessed by having independent raters review audio tapes of sessions and rate whether or not various treatment components were covered using standardized rating forms. For example, during session one of I-CBT, raters assessed whether or not the therapist assigned breathing retraining homework according to the prescribed schedule (i.e., 10 min/2 times daily). Approximately 25% of I-CBT, G-CBT, and PST sessions were randomly selected for review, stratified by treatment time point (i.e., early, middle, or late). The number of items correctly covered in sessions was divided by the total number of items assessed to obtain a summary score. Treatment fidelity was excellent: G-CBT = 97%, I-CBT = 100%, and PST = 100%.

2.1.5. Study attrition

A chi square test revealed no differences in drop out rates between groups (I-CBT $n = 6$ or 26%, G-CBT $n = 6$ or 27%, PST $n = 4$ or 17%, $p > .05$). Furthermore, no differences in missing follow-up data between groups were identified (I-CBT $n = 4$ or 24%, G-CBT $n = 3$ or 19%, PST $n = 4$ or 21%, $p > .05$). Finally, no significant differences were found between those who dropped out or had missing follow-up data and those with complete data on any study variables (all $ps > .05$).

2.2. Overall group change

Descriptive statistics for study measures are presented in Table 2. First, analyses were conducted to test for overall group change, regardless of treatment (i.e., null models), as well as the presence of significant within group variability in change.

Table 2
Estimated means and standard deviations for outcome measures by treatment condition

Measures	I-CBT (n = 23)		G-CBT (n = 22)		PST (n = 23)	
	M	S.D.	*M*	S.D.	*M*	S.D.
Self-Report						
SPAI-C						
Pretest	43.27	16.96	36.86	19.48	38.87	13.99
Posttest	32.47	19.08	33.40	14.72	34.34	16.26
Follow-up	32.21	20.77	24.23	17.47	29.78	13.89
SAS-C						
Pretest	58.43	17.73	58.32	15.64	55.36	15.28
Posttest	50.29	17.81	53.81	14.17	48.90	16.63
Follow-up	50.18	15.21	43.62	16.48	46.44	14.71
Parent Report						
SAS-P						
Pretest	61.55	17.16	67.15	9.42	60.83	14.79
Posttest	62.87	16.15	58.73	14.25	55.53	15.55
Follow-up	57.40	18.32	61.08	12.88	47.00	14.21
Clinician-Rated						
CGI						
Pretest	5.05	1.00	4.68	.84	4.55	.67
Posttest	3.13	1.55	3.47	1.64	3.63	1.42
Follow-up	3.27	1.49	2.38	1.26	2.71	1.59
Behavioral Role Play Test[a]						
SUDS (1-100)						
Pretest	57.06	22.04	49.29	19.83	55.78	22.89
Posttest	32.49	19.82	47.14	24.58	44.17	20.23
Follow-up	29.35	14.10	35.85	18.09	34.42	21.79
Self-Ratings of Performance						
Pretest	2.09	.87	2.72	.74	2.42	.69
Posttest	3.49	.77	3.33	.88	2.81	.62
Follow-up	3.31	.50	3.38	.83	2.69	.95
Observer Social Skills Ratings						
Pretest	2.50	.98	2.31	.59	2.22	.75
Posttest	3.00	.92	2.74	.94	2.76	.83
Follow-up	3.23	.77	3.36	1.01	2.44	.54

Note: I-CBT, Individual Cognitive Behavior Therapy; G-CBT, Group Cognitive Behavior Therapy; PST, Psychoeducational-Supportive Therapy; SPAI-C, Social Phobia and Anxiety Inventory-Child Version; SAS-C/P, Social Anxiety Scale-Child/Parent Version; CGI, Clinical Global Impression Scale; SUDS, Subjective Units of Distress Scale; *M*, mean; S.D., standard deviation.
[a] Average of 3 role play tasks.

2.2.1. Symptom severity measures

Participants showed a significant decrease over time in social anxiety symptoms, as measured by the SPAI-C from baseline through follow-up ($\gamma_{10} = -4.87$, $t = -4.39$, d.f. = 66, $p < .001$, $d = 1.08$). The degree of variability of SPAI-C decline was significant ($\mu_1 = 205.35$, $\chi^2 = 409.73$, $p < .001$), indicating differentiation in score change across individuals. We examined the SAS-C and also found a significant decline over time ($\gamma_{10} = -4.94$, $t = -4.60$, d.f. = 65, $p < .001$, $d = 1.14$), as well as significant variability ($\mu_1 = 177.50$, $\chi^2 = 378.34$, $p < .001$). The SAS-P showed a significant overall decline over time from baseline to follow-up ($\gamma_{10} = -0.01$, $t = -3.00$, d.f. = 62, $p = .004$, $d = .76$), though it did not show significant variability ($\mu_1 < .01$, $\chi^2 = 32.66$, $p > .50$), suggesting that individual decline did not vary across participants. A significant linear decrease over time was demonstrated in CGI-S ratings, as reported by clinicians ($\gamma_{10} = -1.05$, $t = -8.84$, d.f. = 66, $p < .001$, $d = 2.18$). Again, a significant variability was observed ($\mu_1 = 104$, $\chi^2 = 144.26$, $p < .001$).

2.2.2. Behavioral assessment measures

Regardless of condition, participants' self-ratings of their performance in role play assessments increased over time ($\gamma_{10} = 0.38$, $t = 5.07$, d.f. = 61, $p < .001$, $d = 1.30$), with significant variability across individuals ($\mu_1 = 0.19$, $\chi^2 = 119.26$, $p < .001$). Participants' average role play SUDS ratings across time points significantly decreased, regardless of condition ($\gamma_{10} = -11.01$, $t = -5.91$, d.f. = 61, $p < .001$, $d = 1.51$), with significant variability across individuals ($\mu_1 = 163.91$, $\chi^2 = 147.29$, $p < .001$). Lastly, average observer rated social skills showed an increase over time ($\gamma_{10} = 0.36$, $t = 4.77$, d.f. = 48, $p < .001$, $d = 1.38$), with significant variability across individuals ($\mu_1 = 0.37$, $\chi^2 = 181.66$, $p < .001$).

2.3. Primary treatment comparisons

Analyses of the overall sample showed a pattern of symptom reduction and functional enhancement over the course of treatment, across a variety of domains, including self-report data, parent report data, and observational ratings from blind assessors. Notably, significant variability was shown among individuals on most measures. The following analyses examined whether individual response differences could be related to treatment condition. Our primary hypothesis was that CBT (regardless of delivery format) would produce greater improvement on outcome measures compared to PST.[1]

2.3.1. Severity measures

Despite overall reduction in social anxiety symptoms as measured by the SPAI-C, results did not show a significant relationship between symptom decline and treatment condition ($\gamma_{11} = 1.37$, $t = 0.64$, d.f. = 65, $p = .522$, $d = .16$). Also, no significant difference was found for treatment condition on the SAS-P total score ($t = -0.98$, d.f. = 61, $p = .33$, $d = .25$) nor on the SAS-C total score ($t = 1.02$, d.f. = 64, $p = .31$, $d = .26$). Finally, no significant differences were shown between conditions over time in CGI-Severity, $t = 0.52$, d.f. = 66, $p = .649$, $d = .13$.

2.3.2. Behavioral assessment measures

Behavioral assessment ratings of subjective overall performance in role plays over time showed a significant relation to treatment condition, $t = -2.30$, d.f. = 60, $p = .023$, $d = .59$, with those in the CBT conditions reporting significantly greater improvement compared to those in PST across time points. No significant difference in average SUDS role plays ratings was found between CBT and PST participants over time, $t = -0.05$, d.f. = 60, $p = .963$, $d = .01$. Lastly, those in CBT had significantly greater improvement in observer-rated social skills in role plays over time compared to those in PST, $t = -2.01$, d.f. = 47, $p = .047$, $d = .59$.

2.4. Secondary analyses

The secondary analyses were conducted to examine potential group differences among the three treatment conditions. These analyses are considered exploratory given the smaller cell sizes. To facilitate between group comparisons among the three conditions, we dichotomously dummy coded treatment by creating the following variables: Individual CBT (0 = no, 1 = yes), Group CBT (0 = no, 1 = yes), and PST (0 = no, 1 = yes). PST served as the control condition when I-CBT and G-CBT were used as main factors (i.e., I-

[1] We also conducted analyses using analyses of covariance (ANCOVAs) between conditions at each time point controlling for pre-treatment scores to check the consistency of our findings. Results were similar to the HLM analyses and thus are only briefly summarized here. For completer only analyses, the CBT condition resulted in significantly higher self-ratings of performance compared with the PST condition at post-treatment ($F = 7.60$, $p < .01$) and at follow-up ($F = 5.54$, $p < .05$). In addition, those receiving CBT showed significantly higher observer-rated social skills compared with the PST group at follow-up ($F = 7.64$, $p < .01$). No other significant differences were found. Results were the same when we reran analyses in the intention-to-treat sample using the last observation carried forward method.

CBT = 0 and G-CBT = 0 represented PST) and G-CBT served as the control condition to facilitate comparison between CBT conditions (i.e., I-CBT = 0 and PST = 0 represented G-CBT).

2.4.1. Symptom severity measures

Results showed non-significant findings for the three treatment group differences over time on the SPAI-C. Further, there was no difference between treatment conditions on the SAS-C and SAS-P total scores. In addition, results showed no significant differences in CGI-Severity score over time according to condition (all $ps > .05$).

2.4.2. Behavioral assessment measures

Significantly greater change over time in average self-rating in role play performance was found between PST and I-CBT ($\gamma_{11} = 0.47$, $t = 3.06$, d.f. = 59, $p = .003$, $d = .80$), suggesting those in I-CBT showed greater improvement. There was no difference between PST vs. G-CBT or I-CBT vs. G-CBT on this measure. Additionally, a significant difference over time was found between I-CBT and G-CBT, with those in I-CBT reporting a lower SUDS over time for the role plays, $t = -2.03$, d.f. = 59, $p = .044$, $d = .53$. There was no significant difference between PST and either CBT condition in change in SUDS ratings. Finally, no significant differences were found between conditions in average social skills ratings across time; although it appeared the trend of greater improvement in G-CBT approached significance as compared to the PST condition, $t = -.84$, d.f. = 46, $p = .068$, $d = .25$.

2.5. Recovery rates

The clinical significance of treatment gains was determined by calculating percentages of patients in each condition who no longer met criteria for social phobia at post-treatment and follow-up. These analyses were conducted using the subsample of completers with available data. Based on the criteria used by Beidel et al. (2000a) and Beidel et al. (2000b), patients were designated as recovered if they met *both* of the following criteria: (1) SPAI-C total score <18 (social phobia diagnostic cutoff score established by Beidel et al., 1995), and (2) CGI rating <4 (below diagnostic threshold based on severity and functional impairment). At post-treatment, there were no significant differences between recovery rates for the I-CBT (29%, $n = 5$), G-CBT (27%, $n = 3$), and PST (16%, $n = 3$) conditions ($p > .05$). However, there was a significant difference between I-CBT (15%, $n = 2$), G-CBT (54%, $n = 7$), and PST (19%, $n = 3$) at follow-up ($\chi^2 = 5.93$, d.f. = 2, $p = .05$), with higher recovery rates for the G-CBT condition; see Fig. 2.

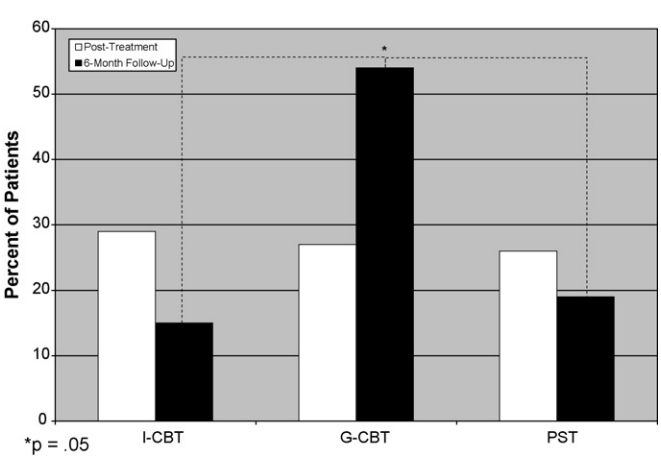

Fig. 2. Proportion of patients recovered following treatment.

3. Discussion

Although a growing literature supports the effectiveness of cognitive-behavioral therapies for youth with anxiety disorders in general, less is known about the efficacy of such treatments for adolescents with SAD in particular. It is not known how individual and group CBT programs for adolescents with generalized SAD compare to one another, or to an active alternative treatment that does not involve specific CBT components. We evaluated three such treatments in a sample of severely impaired adolescents with generalized SAD.

The results revealed that all three treatments were effective in reducing symptoms and distress and in improving psychosocial functioning. In addition, the results were not limited to standardized symptom measures; behavioral assessments likewise revealed significant gains in social performance. Given the severity of this particular sample and the high level of psychiatric comorbidity, these treatment gains were respectable. For example, large effect sizes were demonstrated on self-reported symptoms (e.g. SPAI-C $d = 1.08$), clinician-rated symptoms (e.g., CGI-S $d = 2.18$), and behavioral assessment of social skills (e.g., blind observer ratings $d = 1.30$). These effect sizes are comparable to those reported in other studies of the cognitive-behavioral treatment of adolescent SAD (e.g., Beidel et al., 2000a; Beidel et al., 2000b).

In terms of differential effects of the three treatments, the results were more mixed. On both self-report and clinician-rated measures of symptoms and functioning, no differences emerged across the conditions. With regard to the behavioral data, however, the CBT conditions, considered together, resulted in greater gains than the psychoeducational-supportive treatment. Secondary analyses suggested that individual CBT in particular was more effective than psychoeducational-supportive psychotherapy at post-treatment, although there were no differences between group and individual CBT. In terms of diagnostic recovery, immediately following treatment the recovery rates for individual CBT (29%) and group CBT (27%) were nearly identical. Although apparently greater than the recovery rate for the psychoeducational-supportive condition (16%), this difference did not reach statistical significance. By 6-month follow-up, however, the recovery rate for the group CBT condition grew to 54%, significantly higher than that of either individual CBT (15%) or the psychoeducational-supportive psychotherapy (19%), which did not differ from one another. However, these findings should be interpreted cautiously because they were based on treatment completers only. Although the finding that the psychoeducational-supportive treatment was as effective as the CBT conditions on the symptom measures was surprising, it is worth noting that this was not a "placebo" treatment, but rather an active intervention consisting of relevant group discussions, provision of relevant information regarding social anxiety and related topics, and supportive encouragement to meet personally relevant goals. Although systematic exposure was not included in the protocol, the group format, in which active participation was stressed, provided a type of regular exposure to peers. Considered in this light, the effectiveness of the psychoeducational-supportive intervention is less surprising. Indeed, this finding was similar to that of Heimberg et al. (1990), who likewise found comparable results of group CBT and a similar group supportive psychotherapy on most measures among adults with social phobia.

Overall, these findings are consistent with the larger literature suggesting that relatively brief CBT treatment programs can be effective for many adolescents with generalized SAD. In addition, the results suggest that individual CBT appears to be at least as effective as the more commonly studied group CBT, at least at post-

treatment. However, this conclusion must be tempered by the intriguing finding that group CBT was associated with higher diagnostic recovery rates at follow-up. It may be that the additional exposure to social stimuli afforded by the group CBT program ultimately resulted in a higher percentage of participants making clinically significant gains in the longer term. However, the relatively small number of participants who were available for assessment at follow-up precludes strong interpretations of this finding. The present results are consistent with a study by Manassis et al. (2002), who found comparable efficacy of group and individual CBT in a mixed sample of 9–12 year old children with various anxiety disorders.

Despite the apparently encouraging findings, careful examination of the results suggests that more sobering conclusions are in order. Although improved, most participants nevertheless remained symptomatic at post-treatment. For example, the mean post-treatment score on the SPAI-C was 33.4, well above the mean of non-clinical samples ($M = 13.7$, Beidel et al., 1995). It is significant that the present sample consisted of adolescents with severe symptoms, significant functional impairment, and high rates of comorbidity, all of whom met diagnostic criteria for the generalized subtype of SAD. Most prior studies of childhood or adolescent SAD did not focus specifically on those with this generalized subtype, and included children whose fears were confined to more limited situations (e.g., Gallagher et al., 2004; Spence et al., 2000) and samples that excluded comorbid mood and anxiety disorders (e.g., Hayward et al., 2000). Furthermore, as noted above, our sample reported significantly higher symptoms than the Beidel et al. (1995) sample. It is widely believed that generalized SAD is significantly less responsive to treatment than the specific subtype of the disorder, and that comorbidity further complicates treatment efforts.

There are several limitations of this study. Most importantly, the sample size was relatively small, particularly for comparisons of I-CGT and G-CBT, thereby limiting statistical power and the confidence in the results. Caution is needed when interpreting HLM results in smaller samples. However, we also analyzed the data using more convention ANOVAs and found similar results, somewhat mitigating this potential concern. Furthermore, it is worth noting that small samples are the norm in studies of adolescent SAD due to difficulties with participant recruitment. Despite its high prevalence, SAD among adolescents typically goes unrecognized by parents, school personnel, and others, and these youth rarely self-refer for treatment (Herbert, Crittenden, & Dalrymple, 2004a; Kashdan & Herbert, 2001). In addition, our study design precludes firm conclusions about the specific effects of the treatments due to the absence of an untreated control condition. This concern is mitigated somewhat by the finding across several studies that the symptoms of SAD tend not to improve without treatment in both adults (Chartier, Hazen, & Stein, 1998; Keller, 2001) and youth (Beidel et al., 2000a; Beidel et al., 2000b; Spence et al., 2000). Although not surprising given the high level of symptom severity, psychiatric comorbidity, and low socioeconomic status of this sample, attrition was high, with 29% of participants who began treatment failing to complete treatment, and 27% of treatment completers being lost to follow up. Although anecdotal comments by participants suggest that the treatment was highly acceptable to those who remained in treatment, the reasons for premature termination are not known. Most of those who dropped out attributed their decision to extra-treatment factors such as transportation or scheduling difficulties, but it remains possible that, despite their claims to the contrary, they found the treatment less acceptable or helpful.

On the other hand, the study also possessed several strengths. These included a severely impaired clinical sample with frequently-occurring comorbid conditions, experimental controls for therapist-specific effects, and a multi-modal assessment strategy consisting of self-ratings, ratings by diagnostic interviewers, and behavioral data.

Future research is needed to replicate and extend these findings. More work is needed to determine if individual CBT, which is more feasible in most clinical settings than group treatment, is indeed as effective. Although our results suggest that this is the case, the higher recovery rates at follow-up among those who received group treatment raises questions about this conclusion. Moreover, group treatment may be more cost-effective in some settings. In addition, innovations are needed to maximize treatment gains, as even most of the treatment completers in the present study remained symptomatic. Despite mixed findings in prior studies, incorporating parents into the treatment process may prove useful. Parents can encourage their child to follow through with homework exercises, and can support the adolescent with his or her treatment goals. A combination of individual and group therapy may provide incremental effects by drawing on the potential advantages of each modality. Drawing from the adult literature on SAD, possible innovations might include the use of videotaped feedback (Clark et al., 2003), or the integration of mindfulness and acceptance techniques (e.g., Dalrymple & Herbert, 2007; Herbert & Cardaciotto, 2006). In addition, although little research has examined the efficacy of antidepressant medication in adolescent SAD, the recent Treatment for Adolescents with Depression Study (TADS Team, 2007), which found additive effects of combining fluoxetine with CBT over either monotherapy alone for adolescents with major depression, suggests that evaluation of combined treatment in adolescent SAD is warranted, especially because the comorbidity with depression is very high in this population.

Acknowledgements

This study was supported by National Institute of Mental Health grant R01 MH052232 awarded to Dr. Herbert. We would like to thank Lisa Uebelacker, Ph.D. for her helpful feedback on the statistical analyses.

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