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Generic versus Disorder Specific Cognitive Behavior Therapy for Social Anxiety Disorder in Youth: A Randomized Controlled Trial Using Internet Delivery

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ABSTRACT

The study examined whether the efficacy of cognitive behavioral treatment for Social Anxiety Disorder for children and adolescents is increased if intervention addresses specific cognitive and behavioral factors linked to the development and maintenance of SAD in young people, over and above the traditional generic CBT approach.

Participants were 125 youth, aged 8-17 years, with a primary diagnosis of SAD, who were randomly assigned to generic CBT (CBT-GEN), social anxiety specific CBT (CBT-SAD) or a wait list control (WLC). Intervention was delivered using a therapist-supported online program.

After 12-weeks, participants who received treatment (CBT-SAD or CBT-GEN) showed significantly greater reduction in social anxiety and post-event processing, and greater improvement in global functioning than the WLC but there was no significant difference between CBT-SAD and CBT-GEN on any outcome variable at 12-weeks or 6-month follow-up. Despite significant reductions in anxiety, the majority in both treatment conditions continued to meet diagnostic criteria for SAD at 6-month follow-up. Decreases in social anxiety were associated with decreases in post-event processing.

Future research should continue to investigate disorder-specific interventions for SAD in young people, drawing on evidence regarding causal or maintaining factors, in order to enhance treatment outcomes for this debilitating condition.

1. Introduction

Social Anxiety Disorder (SAD: previously Social Phobia) is one of the most common anxiety disorders experienced by young people, with lifetime prevalence rates estimated at 8.6% (Burstein et al., 2011; Lawrence et al., 2015). According to DSM-5 (American Psychiatric Association, 2013), the core defining features of SAD include fear or anxiety in social situations where the individual is exposed to possible scrutiny by others and a fear of acting in a way that will be negatively evaluated by others (either resulting from the individual's own behavior or from showing anxiety symptoms such as blushing, trembling or sweating). Young people with SAD fear situations such as school talks, sport and musical performances, as well as social interactions such as meeting new people, joining in conversations, asking for help in shops or at school, and going to parties or other gatherings (Beidel et al., 2007; Rao et al., 2007). Although the average age of onset is around 9.2 years (Burstein et al., 2011), children as young as three years of age have been found to experience SAD (Rapee et al., 2010). Unfortunately, the disorder tends to persist if left untreated (Burstein et al., 2011; Weissman et al., 1999), with onset prior to age 11 years of age increasing the risk of persistence into adulthood (Beesdo et al., 2007; Wittchen & Fehm, 2003).

The experience of SAD in young people is associated with numerous deleterious social, academic and psychological consequences, such as loneliness, depression, friendship problems, and school refusal (Beidel, Turner, & Morris, 1999). SAD in youth is comorbid with a significant number of mental health problems, particularly other anxiety disorders and depression, and with substance use in older adolescents (Beesdo-Baum et al., 2012; Burstein et al., 2011; Wittchen, Stein, & Kessler, 1999). Some longitudinal studies suggest that SAD actually precedes some mental health issues, being a risk factor for later substance abuse and

depression (Beesdo et al., 2007; Black et al., 2015). Thus, early intervention is of utmost importance so that long-term adverse consequences can be averted.

The majority of studies examining the impact of cognitive behavioral therapy (CBT) in the treatment of anxiety disorders, including SAD, have involved a generic approach that targets underlying causal and maintaining problems that are common to a range of anxiety disorders. Therapy components typically include psycho-education about anxiety, coping strategies (e.g. relaxation; problem solving; identification and modification of maladaptive thoughts) and graded exposure to feared situations. These interventions are generally manualized and the same intervention content is used irrespective of the presenting anxiety problem (Barrett, Lowry-Webster, & Turner, 2000; Kendall & Hedtke, 2006; Rapee, Abbott, & Lyneham, 2006; Rapee et al., 2000; Silverman et al., 1999; Waters et al., 2009).

Overall, there is a good deal of evidence to support the efficacy of a generic approach in treating anxiety disorders, with a recent meta-analysis indicating significant benefits (Bennett et al., 2013). However, recent studies suggest that outcomes following such interventions are weaker for youth with SAD than for other types of anxiety disorders. Children with SAD typically demonstrate a slower rate of change and are less likely to be free of a SAD diagnosis after treatment compared to youth with other anxiety disorders (Crawley et al., 2008; Ginsburg et al., 2011; Hudson, Keers, et al., 2015; Hudson, Rapee, et al., 2015; Norton & Price, 2007). Indeed, in a collation of data from multiple sites, Hudson, Keers, et al. (2015) found that children with a primary diagnosis of SAD were nearly twice as likely as children with GAD to retain their primary diagnosis immediately after generic CBT and at 12-month follow-up. Similarly, Hudson, Rapee, et al. (2015) in a study of 842 children with anxiety disorders found that only 22.3% and 30.7% of those with a primary diagnosis of SAD were free of this diagnosis after treatment and at follow-up respectively. In comparison, over 40% of children with other types of primary anxiety diagnosis were free of their primary diagnosis after treatment, which increased to around 56-57% by 3 to 12 month follow-up. The

weaker treatment outcomes for children with SAD could not be explained by differences in age nor comorbid depression.

It is important to consider why children with SAD might respond less favourably to generic anxiety treatments compared to youth with other types of anxiety disorders. One possibility is that the generic approach does not focus sufficiently upon changing the cognitive and behavioral factors that are involved in the development and maintenance of SAD. A recent empirical review by (Spence & Rapee, 2016) noted that while SAD is associated with many of the risk factors linked to other types of anxiety disorder, such as parental over-control and over-protection (Ollendick, Benoit, & Grills-Taquechel, 2014) and adverse life events (Bögels & Brechman-Toussaint, 2006; McLaughlin et al., 2012), research also indicates that there are unique factors that are important in explaining the development and maintenance of SAD specifically. For example, Spence and Rapee (2016) reviewed evidence to show that young people with SAD are more likely to show deficits in social skills and to experience adverse social outcomes than non-anxious children or those with other types of anxiety disorder. They tend to have fewer friends, to be less well-liked by peers, and to be neglected, actively rejected and victimized by peers. Spence and Rapee (2016) expanded current adult theories of the maintenance of SAD (Clark & Wells, 1995; Rapee & Heimberg, 1997) to propose an evidence-based model of the development and maintenance of SAD during childhood and adolescence. This model proposed that a vicious cycle develops in which poor social skills tend to lead to adverse social outcomes that, in turn, result in anxious emotions, avoidance behaviors, and maladaptive beliefs and thoughts relating to one's social competence and social interactions. In response to adverse social experiences, young people come to believe that they are deficient, stupid, and unattractive, with little ability to control the outcomes of social situations. They come to regard other people as highly critical, with extremely high standards, and who observe their every action (an "audience" effect). Such maladaptive beliefs about the self and others are proposed to contribute to a range of cognitive

biases and distortions before, during and after challenging social interactions, including biases in attention, expectations, interpretations, and evaluations. Increased vigilance to social situations, expectations that one will perform in a humiliating or embarrassing way, beliefs that others will appraise and respond negatively, and expectations that the outcome of social situations will be terrible, are all suggested to contribute to the further experience of anxiety. Furthermore, high levels of self-focused attention and consequential distraction away from the social task are likely to impair social performance. After social interactions, socially anxious individuals tend to interpret the response of others and the quality of their own performance as being worse than it actually is. They are also likely to engage in maladaptive post-event processing (PEP) which refers to the tendency to recall and ruminate about perceived negative aspects of previous social situations. Not surprisingly, feared social interactions are likely to be avoided where possible. Such avoidance, in combination with rejection and isolation by peers, may serve to reduce opportunities for further learning and practice of social skills. Thus, the cycle is perpetuated.

Generic CBT approaches for treating child and adolescent social anxiety assume that the psycho-education, cognitive restructuring, coping skills, and exposure components of treatment will be sufficient to address the factors that maintain SAD. We propose in the present paper that the treatment of SAD in youth is more likely to be effective if the intervention focuses more specifically upon the cognitive and behavioral factors that are implicated in its development and maintenance. We acknowledge that generic CBT programs for child anxiety include elements to increase awareness and modification of maladaptive cognitions before, during and after challenging social interactions, but they do not typically include information about self-focussed attention, with exercises to shift attention focus from the self to the social task, nor provide specific training in the reduction of post-event processing. Neither do they include systematic content to enhance social skills.

With children and adolescents, several studies have evaluated CBT interventions for SAD that included social skills training (Albano et al., 1995; Beidel, Turner, & Morris, 2000; Donovan et al., 2015; Garcia-Lopez et al., 2006; Masia Warner et al., 2007; Olivares et al., 2002; Ost, Cederlund, & Reuterskiold, 2015; Spence, Donovan, & Brechman-Toussaint, 2000). A recent meta-analysis reported by Scaini et al. (2016) noted that the effects of interventions that included social skills training tended to be more effective than those that did not. However, examination of effect sizes associated with the CBT interventions that included social skills training suggest that there is still considerable room for improvement and studies have not directly compared the generic approach with that including social skills training.

In terms of attempts to change the maintaining cognitive factors of SAD, Melfsen, Kühnemund, et al. (2011) developed and evaluated an intensive cognitive therapy intervention for youth aged 8-14 years based on the Clark and Wells (1995) model. This approach differed from the cognitive challenging element included in most generic CBT treatments for childhood SAD in that it included a) methods to addess the child's own thoughts, images, attentional strategies, safety behaviors and symptoms specifically related to social anxiety, b) experiential exercises to reduce self-focused attention and safety behaviors and to illustrate their maladaptive effects, c) systematic training in externally focused attention, d) strategies aimed at reducing distorted self-imagery, and e) exposure to feared situations as behavioral experiments in which the validity of negative expections is tested, while omitting habitual safety behaviors and self-focused attention. After twenty, 50-min individual sessions and 4 parent sessions, 33% of youth in the cognitive therapy condition compared to 0% in the waitlist condition were free of their SAD diagnosis. Those in the cognitive therapy condition also showed significantly greater reductions in social anxiety symptoms and socially anxious cognitions than the waitlist. Unfortunately, there was no follow-up and therefore it is not known whether these effects were maintained or improved upon over time. There was also no comparison with generic CBT.

Ingul, Aune, and Nordahl (2013) subsequently compared the effects of individually tailored and delivered cognitive therapy based on the Clark and Wells model, with traditional group-based generic CBT, and with an active placebo (social interaction group) in adolescents with SAD. After treatment, 70%, of the individual cognitive therapy, 21% of the traditional group CBT, and 28% of the attention placebo conditions showed reliable, clinical reductions in social anxiety symptoms. At 12-month follow-up, 73% of the individual cognitive therapy and 53% of group CBT conditions had no SAD diagnosis, although this difference was not statistically significant. It is difficult to draw firm conclusions from this study, however, as it confounded mode of delivery (group versus individual delivery) and content of treatment. Nevertheless, the results are consistent with the view that modifying the negative perceptual and processing biases associated with SAD provides relatively strong and lasting reductions in SAD symptoms.

Although the studies reviewed above reveal positive outcomes for SAD treatments in young people that include social skills training, or that include cognitive components, in comparison to no-intervention or waitlist control, the results suggests that there is still room for improvement. Thus, the question remains as to whether treatment designed specifically to tackle both cognitive and behavioral causal and maintaining factors associated with SAD will be more effective than traditional generic CBT approaches. We propose here that effective intervention for SAD needs to address both aspects. To date, the efficacy of SAD-specific therapy that combines both cognitive and behavioral components is yet to be compared with generic CBT with socially anxious children and adolescents. However, a study by Rapee, Gaston, and Abbott (2009) with adult social phobics showed significantly larger effects for an intervention that specifically targeted the cognitive and behavioral maintaining factors of SAD compared with a more traditional cognitive behavioral program.

The aim of the present study was to compare the relative efficacy of traditional generic CBT for youth anxiety with a SAD-specific intervention that aimed to tackle the cognitive

and behavioral factors associated with SAD. Specifically, the intervention included social skills training, and modification of self-focused attention and maladaptive cognitions that occur before, during and after feared social interactions. The mode of delivery, number of treatment sessions, and number of therapy tasks was held constant across treatment conditions. Treatment was delivered on an individual basis using internet delivery, with brief therapist support. The use of online delivery of treatment in the present study was intended to enable us to reach the sufficiently large sample of young people required to compare effects across active interventions. The efficacy of the therapist-assisted, online generic CBT program for youth anxiety used in the current study has been demonstrated in several randomized controlled trials (eg. March, Spence, & Donovan, 2009; Spence et al., 2011; Spence et al., 2006). These studies demonstrated significantly greater reductions in anxiety for the online-program compared to a waitlist control, with effects maintained or further enhanced during follow-up (March et al., 2009). Benefits were also equivalent to those found from clinic-delivery of generic CBT, with approximately 78% of those receiving the internet intervention being free of their primary diagnosis at 12-month follow-up (Spence et al., 2011). It should be noted that participants in these studies presented with one or more anxiety disorders of varying types, including some with SAD.

There is also a strong case for use of the internet to deliver social skills training as it can be used to present i) information about the nature and importance skills in an interactive manner, ii) videotaped illustrations specific skill usage by other young people, iii) instructions for practice in real world contexts, and iv) monitoring charts for homework completion. Although not specifically evaluated with children with SAD, computer or internet delivery of social skills training has been shown to produce significant improvements in social skills with children in regular classrooms and youth with autism spectrum disorders (Beaumont, Rotolone, & Sofronoff, 2015; Craig et al., 2015; Sanchez et al., 2014; Tan, Mazzucchelli, & Beaumont, 2015).

Specifically, we proposed that in comparison to generic CBT, treatment outcomes would be greater for an CBT intervention for youth anxiety that included social skills training, cognitive therapy components that focus specifically upon reducing self-focused attention, and greater focus on reducing maladaptive pre- and post-event processing of social tasks. We hypothesised that, at 12-week assessment and 6-month follow-up, children receiving the SAD-specific treatment program would show greater reductions in SAD symptoms, lower rates of SAD diagnoses, and greater improvements in global functioning than children receiving the generic program. Both active interventions were predicted to show significantly greater improvements on these measures than the waitlist control group at 12-week assessment.

The study also predicted that the SAD-specific intervention would result in significantly greater improvements in the variables that it aimed to change (as assessed by measures of social skills and PEP), than the generic CBT approach or the WLC. In turn, we proposed that changes in social skills and PEP would be associated with reductions in social anxiety.

Method

1.1.   Participants

Participants were 125 youth (75 females, 50 males) aged between 8-17 years ($M = 11.28$, $SD = 2.68$) who met DSM-5 (American Psychiatric Association, 2013) criteria for a primary diagnosis of SAD on the Anxiety Disorder Interview Schedule for Children (ADIS-C/P; Albano and Silverman, 1996; see below for details). Details about demographic characteristics are provided in Table 1. The demographic profile of the sample was broadly representative of the Australian census population in terms of country of origin and indigenous status, but of higher average income.

Selection criteria included being aged 8-17 years; minimum reading age of 8 years; speaking English fluently; having access to a computer and the internet; and meeting DSM-5

criteria for a primary diagnosis of SAD at a clinical severity rating (CSR) of 4 or more (on a scale from 0-8) according to the ADIS-C/P. Comorbidity with other anxiety disorders, depression and externalising disorders was permissible if the CSR was lower than that of the SAD diagnosis. Exclusion criteria included diagnosis of a pervasive developmental disorder, presence of an intellectual or learning disability, diagnosis of dysthymia or depression at a CSR of 5 or higher, other acute psychiatric disorders (such as psychosis or suicide ideation), and receipt of other current treatment for anxiety. Information about baseline levels of social anxiety, global functioning and comorbidity is provided in Table 1.

1.2.   Procedure

Ethical approval was granted from the Griffith University Human Research Ethics Committee. Participants were self-referred and recruited across Australia via schools, parent groups, mental health professionals, guidance officers, the media and Facebook. Those meeting telephone screening criteria were directed to an online site to obtain additional information and provide informed consent to participate. The child and participating parent/caregiver then completed a structured diagnostic interview by telephone and online questionnaires (see below for details). Once pre-treatment assessments were completed and inclusion criteria confirmed, children were randomly assigned to condition using a computerized random number generation, to one of three conditions: generic CBT (CBT-GEN), SAD-specific CBT (CBT-SAD) or a waitlist control (WLC). There were two versions of both CBT-GEN and CBT-SAD, one for children aged 8-12 years, and one for teenagers aged 13-17 years. The program content of the different age versions was identical but the language and examples were designed to be age appropriate.

The CONSORT statement for participants at each stage of the study is presented in Figure 1. As is evident from Figure 1, of the 48 participants allocated to the CBT-SAD condition, 31 were allocated to the child version of the program (8-12 years*)*, and 16 to the

teen version (13-17 years). Of the 47 youth allocated to the CBT-GEN condition, 30 were

allocated to the child version and 18 to the teen version. Of the 30 youth allocated to the WLC

condition there were 18 categorized as children and 12 as teens. After the 12-week

assessment, participants in the WLC group were offered CBT-SAD and no longer formed part

of the study.

1.3.   Measures

1.3.1.   Primary outcome measures - diagnostic status, clinical severity and global

functioning.

  Diagnostic status and the Clinican Severity Rating (CSR) - were derived from the

Anxiety Disorders Interview Schedule for Children (ADIC C/P Albano & Silverman, 1996).

The ADIS C/P was administered by telephone at all time-points by trained psychologists, with

provisional registration, who were blind to experimental condition. Prior to determining

diagnoses, clinicians compared the ADIS C/P interview information against DSM-5 criteria,

and therefore all diagnoses given in this study align with DSM-5 criteria. Diagnoses and

CSRs were based on a composite of parent and child interviews as specified by Albano and

Silverman (1996). Where children met criteria for a diagnosis, a CSR was allocated from 4 to

8, with 0 being the CSR for those who did not meet diagnostic criteria. Inter-assessor

agreement was assessed in the present study for 20% of interviews. High inter-rater

agreement was found for the ADIS-C/P composite primary diagnosis with a kappa = .84, with

an inter-rater reliability Cronbach alpha of .98 and intra-class correlation of .96 for the CSR.

  Global functioning was assessed by clinicians using the Children's Global Assessment

Scale (CGAS; Shaffer et al., 1983) informed by the ADIS C/P interviews. Scores on the

CGAS can range from 1-100, with higher scores indicating better overall functioning. Scores

of 81-100 indicate healthy functioning, scores of 61-80 indicate slight impairment, scores of

41-60 suggest moderate impairment, and scores of 1-41 indicate a seriously disabling

functional impairment. The CGAS has been found to be a valid and reliable instrument, with an inter-rater reliability of .84 and a six-month test-retest reliability of .85 (Shaffer et al., 1983). Inter-rater reliability was determined using the same procedure as for the ADIS, revealing a Cronbach alpha of .90 and intra-class correlation of .80 for CGAS between independent raters.

1.3.2. Secondary outcome measures

Clinical improvement –was assessed with the Clinical Global Impression: Improvement Scale (CGI-IS; Guy, 1976). Scores range from 1 ("very much improved since the initiation of treatment") to 7 ("very much worse since the initiation of treatment"). The CGI-IS correlates well with other treatment efficacy scales for disorders affecting adults, including SAD (Bandelow et al., 2006), and has been shown to be sensitive to treatment effects in children and adolescents with SAD (Compton et al., 2001).

Social anxiety symptoms – were measured with child and parent report on the 10-item version of the Social Phobia and Anxiety Inventory for Children (SPAI-C: Beidel, Turner, & Morris, 1995- Personal communication, 2012). The SPAI-C-10 consists of 10 items relating to cognitive, somatic and behavioral aspects of social anxiety, eight of which require subsidiary ratings. In total, there are 29 ratings each made on a 3-point scale from 0 ("Never or hardly ever") to 2 (Most of the time or always") producing scores ranging from 0-58, with higher scores indicating greater social anxiety. Cronbach alphas for the SPAI-C-10 at baseline in the current study were .91 for the child version and .92 for the parent version.

Anxiety symptoms – were assessed with the parent and child versions of the Spence Child Anxiety Scale (SCAS; Spence, 1998). The SCAS-C is a 44-item scale in which young people rate the frequency of symptoms on a 4-point Likert scale ranging from 0 ("never") to 3 ("always"). Total scores range from 0-114, with higher scores indicating greater anxiety symptoms. It has demonstrated good internal consistency for the total score, ranging from .89-

.92 (Spence, 1998; Spence, Barrett, & Turner, 2003). The 38-item SCAS-P for parents (Nauta et al., 2004) also has scores ranging from 0 – 114, and demonstrates good psychometric properties. The internal consistency in this sample for the SCAS-C was .88 and for the SCAS-P was .90.

1.3.3. *Treatment satisfaction.*

Satisfaction with the program was measured at 12-week assessment using a Treatment Satisfaction Questionnaire with 6-items for children and 8-items for parents adapted from March et al. (2009). Participants rated their satisfaction on a 5-point scale from 1 ("not at all true) to ("extremely true"), with scores being totaled and divided by the number of items, to produce a mean score ranging from 1 to 5. The Cronbach alphas in the current study were .94 for the child scale and 0.92 for the parent scale.

1.3.4. *Cognitive and behavioral measures*

Social skills – were assessed with the 30-item Social Skills Questionnaire – Child and Parent Versions (Spence, 1995). Participants were required to rate how true each item is on a 3-point scale from 0 ("not true") to 2 ("mostly true"). Scores range from 0-60 with higher scores indicating better social skills. Examples of items from the child report version include "I ask other kids if I can join in their activities", "I look people in the eye when we are talking" "I tell a parent or teacher if I have a problem or need help", and "I stand up for myself if other kids behave badly towards me without losing my temper". The psychometric properties of the SSQ are sound, with coefficient alphas of .85 and .92 for the parent and child versions respectively (Spence, 1995). In the present study, Cronbach alphas were .85 for the SSQ-C and .91 for the SSQ-P at baseline. The scale has been shown to be sensitive to treatment outcome effects (Beaumont et al., 2015; Spence et al., 2000) and socially anxious youth have been shown to exhibit weaker social skills on this measure compared to non-anxious controls on both parent and youth report (Spence, Donovan, & Brechman-Toussaint,

1999).

Post-event processing - was assessed using the 8-item Post Event Processing Questionnaire Revised (PEPQ-R; McEvoy & Kingsep, 2006). Respondents were asked to think of a time in the past few months where they felt uncomfortable in a social situation and to rate the degree to which they engaged in each of 8 PEP activities (e.g., "After the event was over, did you find yourself thinking about it a lot?"). A visual analogue scale was used, ranging from 0 (not at all) to 100 (totally agree). Higher total scores indicate higher levels of repetitive thinking. Cronbach's alpha for the PEPQ-R in the present study was .87.

1.4.   Treatment

1.4.1.   Generic CBT.

The CBT-GEN intervention (BRAVE-ONLINE) was previously developed and evaluated by Spence and colleagues (March et al., 2009; Spence et al., 2011) and was adapted from a clinic-delivered program that is highly consistent with other generic CBT programs for youth anxiety (Barrett et al., 2000; Kendall & Hedtke, 2006; Rapee et al., 2006; Rapee et al., 2000; Silverman et al., 1999; Waters et al., 2009). It consists of 10 weekly, 60-minute sessions for children or youth, followed by two booster sessions at 1- and 3- months after completion of the program. There is a version for children aged 8-12 years and one for teens from 13-17 years, with identical therapy content but using age-appropriate wording, graphics and examples. Session content includes psycho-education about anxiety and its different types, anxiety management strategies such as recognizing body signs of anxiety, relaxation (deep breathing, progressive muscle relaxation, guided imagery), cognitive strategies including coping self-talk and cognitive restructuring, graded exposure, problem solving techniques, and self-reinforcement of "approach" behavior. There are also six parent sessions for parents of child participants, and five sessions for parents of teens, with parent booster sessions at 1- and 3- months post treatment. The CBT-GEN program includes information,

illustrations and exercises relating to a broad range of anxiety provoking situations, relevant to social, separation, and generalized anxiety and specific phobias.

All sessions are interactive, with quizzes, puzzles and tasks. Prior to treatment, each family is assigned a therapist (BRAVE Trainer) who monitors their progress through the program and provides brief email feedback (taking approximately 5-10 mins each) following each session. Feedback is based on client responses to session and homework activities that are stored in an administrator section of the program that is accessible to the therapist. In addition, personalised, automated computer-generated emails are sent on behalf of the online therapist to congratulate participants for completing sessions, to provide feedback on quiz tasks and to send reminders when they are able to log on to complete the next session. The brief therapist support also included a single, 15 min telephone call mid-way through the program to assist with development of the exposure hierarchy. For further information about the program see March et al. (2009), Spence et al. (2006), and Spence et al. (2011).

1.4.2. SAD-specific CBT.

The CBT-SAD intervention mirrored CBT-GEN in terms of the number and duration of sessions, the number of web pages and activities, amount of time spent by youth and parents on the program, and the level of therapist support. Like CBT-GEN, CBT-SAD included psychoeducation, problem solving, relaxation training, graded exposure, and self-reward. However, in CBT-SAD these elements specifically focused on social anxiety, whereas the CBT-GEN included examples and activities relating to a range of anxiety problems. CBT-SAD also included elements to tackle specific factors associated with the development and maintenance of SAD outlined above. Firstly, it included social skills training using instructions and explanations about the nature and importance of social skills, videotaped illustrations, and behavioral rehearsal tasks between sessions. Training covered basic social skills (such as eye contact, voice volume, facial expression) and more complex social skills

(such as starting conversations, making requests, joining in, offering invitations, and assertive responding e.g. dealing with unreasonable requests). Secondly, the intervention included more intensive cognitive elements relevant to social phobia than the cognitive components of CBT-GEN, in line with Melfsen, Kuhnemund, et al. (2011), and based on the Clark and Wells (1995) model. Specifically these strategies included a) a stronger focus on the child's own symptoms, thoughts (before/during/after a social task), attentional strategies, and avoidance behaviors related to social anxiety, b) to illustrate the maladaptive effects of self-focussed attention, with experiential exercises to reduce self-focused attention and increase attention externally to the social task, and c) exposure tasks emphasing externally focused attention, reducing self-focused attention and use of social skills, in addition to cognitive challenging and use of coping skills.

1.4.3.   *Therapists and supervision.*

All therapists were psychologists who had received a minimum of two days training with the BRAVE-ONLINE materials. In addition, therapists were provided with weekly supervision from an experienced clinical psychologist. During supervision, the therapist's online responses were reviewed in order to maintain a high standard of integrity and to ensure that each therapist was adhering to all guidelines for participant contact (e.g., length and content of session responses, adhering to templates).

1.4.4. *Treatment compliance.*

Compliance with treatment was assessed from the mean number of sessions completed by participants in each condition. Participants were not able to commence a subsequent session unless they had completed all material and tasks from the previous session.

1.5.   *Statistical analyses*

Continuous outcome variables and percent diagnosis free were analysed using orthogonal

planned contrasts; (i) treatment versus WLC and (ii) CBT-SAD vs CBT-GEN), with linear mixed models containing random effects for subject and fixed effects for condition and time (with time as a repeated effect), using maximum likelihood estimates. This approach uses all available data with no imputation of missing values, which are assumed to be missing at random. Little's MCAR test confirmed that the data fulfilled the requirements for this analysis, being missing completely at random. Thus, in these analyses, all participants allocated to conditions were included, irrespective of completer status, reflecting an intent-to-treat (ITT) approach. For the data set for pre-treatment to 12-weeks, 8.92% of data points were missing across the three experimental groups (CBT-GEN, CBT-SAD and WLC), but this increased to 16.29% for the pre-treatment to 6-months analyses between CBT-GEN and CBT-SAD. Effect sizes were calculated as the estimated fixed effect divided by the square root of the sum of the two variance components. Interaction effects with age and gender were also examined in subsidiary analyses but were not statistically significant and thus are not reported here. The proportion of participants who no longer met criteria for the principal diagnosis and any diagnosis was determined using Chi Square tests. This analysis was conducted separately for the ITT sample and then for the retained sample. For the ITT sample, participants without assessment data at a given time point were assumed to possess the diagnoses that were allocated at the prior assessment point. For the "retained" sample, the analysis was limited to those for whom diagnostic data was available at the 12-week assessment and for whom the child or parents had completed at least 3 sessions.

It was not possible to conduct tests of longitudinal mediation due to the absence of the WLC at follow-up, and in order to infer causal mediation time should elapse between a putative cause and its hypothesized effect (Preacher, 2015). Thus, we limited the analyses to cross-sectional mediation tests from baseline to 12-weeks with youth who completed (or their parent/caregiver completed) at least 3 intervention sessions and who provided 12-week assessment data to determine whether reductions in anxiety were associated with changes in

PEP or social skills. These analyses used the PROCESS macro for SPSS (Hayes, 2013) to determine whether changes in social skills or PEP (M) mediated changes in anxiety (Y) in response to treatment (X, CBT-SAD vs CBT-GEN). This approach used a non-parametric, accelerated bootstrapping method (1000 random samples of the available data) to determine the cross-products of the coefficients of the paths from treatment to mediator (X->M; "a") and mediator to change in anxiety (M-> Y, "b") thereby overcoming issues relating to non-normal distributions and small sample sizes. Bias-corrected and accelerated bootstrapped confidence intervals of indirect effects are produced. Statistical significance of the indirect effect is concluded when the confidence interval of the indirect effect does not include 0. Residual change scores were used as indicators of change over time for clinical outcomes and potential mediators because they adjust for pre-treatment variance and control for the correlation between pre- and 12-week scores (Manning & Du Bois, 1962).

2.   Results

2.1.   Pre-treatment differences

There we no pre-treatment differences between any of the three experimental groups on any of the demographic variables (see Table 1 for a summary). There were no significant differences between groups at pre-treatment for diagnostic data or measures of SAD symptom severity on the CSR, CGAS, number of comorbid diagnoses, SPAI-C or SPAI-P, anxiety severity on SCAS-C and SCAS-P, social skills on SSQ-C and SSQ-P, or PEPQ-R.

2.2.   Attrition.

The Consort statement (Figure 1) shows the retention of participants during the study. At the 12-week assessment there was 21% (*N*=10) attrition from CBT-SAD (including 3 allocated but failed to commence treatment); 29% (*N*=14) from CBT-GEN and 10% (*N*=3) from the WLC. Attrition figures included those who were randomly allocated to a condition

but who failed to provide data at an assessment point and/or for those in a treatment condition for whom the parent and child both failed to complete at least 3 intervention sessions. A comparison of those retained versus those not retained at 12-week assessment revealed no significant differences in terms of age, gender, or other demographic variable, CSR, CGAS, number of diagnoses, or other clinical measure. At 6-month follow-up there was 38% (N=18) attrition from CBT-SAD and 31% (N=13) from CBT-GEN.

2.3. *Primary outcome measures at 12-week assessment and 6-month follow-up*

The estimated means and standard errors for the CSR and other continuous variables for each group at each occasion are shown in Tables 2 - 4, with details regarding effect sizes and confidence intervals presented in Tables 3 - 7.

2.3.1. *Clinician Severity Rating.*

Linear mixed model analysis for the ITT sample from pre- to 12-week assessment indicated a significant difference in change in CSR between those receiving treatment (CBT-SAD or CBT-GEN) vs WLC, F = 14.22 (118.97), p <.001, with no significant overall group effect, but a significant effect for time, F = 4.17 (127.49), p =.043. The comparison between CBT-SAD and CBT-GEN revealed no significant difference in change in CSR over time, and no overall effect for condition, but a significant reduction in CSRs for treatment in general, F = 112.75 (92.22), p <.001. Comparison of CBT-SAD vs CBT-GEN from baseline to 6-month follow-up indicated a significant decrease in CSR for treatment in general, F = 209.54 (94.04), p <.001 but no significant difference in change in CSR between treatments.

2.3.2. *Diagnosis.*

For the ITT sample, there was no significant difference between conditions in terms of percent free of their primary diagnosis, χ^2 (2) = 2.35, p = .28 at the 12-week assessment (CBT-SAD=6/47 (12.8%); CBT-GEN=7/48 (14.6%) and WLC=1/30 (3.3%)). The ITT analysis for 6-month follow-up data showed 14/47 (29.8%) and 17/48 (35.4%) of the CBT-

SAD and CBT-GEN conditions respectively to be free of their primary SAD diagnosis, with no significant difference between treatments.

For the retained sample, the combined treatments showed a significantly higher percent free of their primary anxiety diagnosis compared to WLC, at 12-weeks, $\chi^2 (1) = 3.89$, $p = .05$, but no significant difference between treatments (CBT-SAD=6/35 (17.1%); CBT-GEN=7/34 (20.6%) and WLC=1 (3.7%)). At follow-up 14/27 (51.9%) and 16/34 (47.1%) for those in CBT-SAD and CBT-GEN conditions respectively were free of their primary SAD diagnosis, with no significant difference between conditions. Figures for percent free of any diagnosis are also shown in Table 2.

2.3.3. *Global functioning.*

For the CGAS, from pre- to 12-weeks, significantly greater improvement was found for those receiving treatment compared to the WLC, $F = 12.51$ (115.61), $p = .001$, with a significant effect for time, $F = 81.74$ (115.61), $p < .001$. Comparison between CBT-SAD and CBT-GEN from baseline to 12-weeks showed no significant differences between treatments in change over time, but a significant overall improvement for treatment in general, $F = 149.95$ (88.54), $p < .001$. From baseline to 6-month follow-up there was a significant time effect indicative of improvements in global functioning for those who received treatment, $F = 224.27$ (86.88), $p < .001$, but no significant differences between CBT-SAD and CBT-GEN over time.

2.4. *Secondary outcome measures*

From pre- to 12-weeks, significantly greater improvements were found for those receiving treatment compared to the WLC on the SPAI-C, $F = 4.54$ (99.47), $p = .036$, SPAI-P, $F = 8.50$ (102.61), $p = .004$, SCAS-C, $F = 8.60$ (98.35), $p = .004$, and SCAS-P, $F = 12.18$ (100.48), $p = .001$.

Significant overall effects for time were evident on the SPAI-C, $F = 21.56$ (99.47), p <.001, SPAI-P, $F = 26.66$ (102.67), p <.001, SCAS-C, $F = 25.64$ (98.35), p <.001, and SCAS-P, $F = 41.53$ (100.48), p <.001. Overall group effects were significant for the SPAI-P, $F = 5.17$ (102.67), $p = .025$, and SCAS-P, $F = 4.24$ (121.60), $p = .041$.

When CBT-SAD and CBT-GEN treatments were compared from baseline to 12-weeks, significant overall improvements were evident for treatment in general on the SPAI-C, $F = 38.50$ (76.19), p <.001, SPAI-P, $F = 55.87$ (79.42), p <.001, SCAS-C, $F = 60.45$ (76.96), p <.001, and SCAS-P, $F = 90.47$ (76.43), p <.001. However, there was no significant difference between CBT-SAD and CBT-GEN in terms of change over time on any measure.

When CBT-SAD and CBT-GEN were compared from baseline to 6-month follow-up, again there were substantial time effects indicative of significant improvements for those who received treatment on the SPAI-C, $F = 60.12$ (62.78), p <.001, SPAI-P, $F = 85.32$ (76.69), p <.001, and SCAS-C, $F = 74.19$ (66.44), p <.001, SCAS-P, $F = 126.91$ (63.88), p <.001, but no significant difference between CBT-SAD and CBT-GEN over time on any clinical outcome measure.

In terms of clinical improvement on the Clinical Global Impression – Improvement Scale, at 12-weeks, those receiving treatment showed significantly greater levels of improvement than the WLC, χ^2 (4) = 11.66, p = .02, with no significant difference between CBT-SAD and CBT-GEN. Of the 94 participants who received either CBT-SAD or CBT-GEN treatment, 5 (5.3%) were assessed as very much improved, 26 (27.9%) as much improved, 37 (39.4%) as improved but minimally, 26 (27.9%) as not changed, and 1 (1.1%) as minimally worse at 12-weeks. Of the 30 WLC participants, 1 (3.3%) was very much improved, 3 (10%) were much improved, 8 (26%) were minimally improved, 16 (53.3%) were not changed, and 2 (6.7%) were minimally worse at 12-weeks. From baseline to 6-month follow-up, there was no significant difference between CBT-SAD and CBT-GEN in terms of clinical improvement on the CGI-IS. Of the 61 participants who received either

CBT-SAD or CBT-GEN treatment and completed the 6-month ADIS-C/P interview, 21 (34.4%) were assessed as very much improved, 21 (34.4%) as much improved, 15 (24.6) as improved but minimally (39.4%), 3 (4.9%) as not changed, and 1 (1.6%) as minimally worse.

2.5. *Cognitive and behavioral measures*

In terms of post-event processing, from baseline to 12-weeks, those receiving treatment showed significantly greater reductions in PEP than the WLC, $F = 3.92$ (99.44), $p =.05$, with an overall effect for time, $F = 5.32$ (99.47), $p =.023$, and condition (treatment vs WLC), $F = 4.94$ (119.94), $p =.028$. For social skills, there was an overall effect for time on the SSQ-C, $F = 10.47$, (106.57), $p =.001$ and SSQ-P, $F = 34.06$ (106.03), $p <.001$, but no significant treatment or treatment by time effects suggesting a tendency for participants in general to improve their social skills over time, irrespective of whether they received treatment.

From baseline to 6-month follow-up there were significant overall effects for time, indicative of improvements for those who received treatment, on measures of PEP, $F = 36.74$ (61.17), $p <.001$, and social skills, SSQ-C, $F = 25.35$ (78.01), $p =.001$; SSQ-P, $F = 69.04$ (64.99), $p <.001$. However, there were no significant differences between CBT-GEN and CBT-SAD in change over time for SSQ-C or PEPQ-R, although for the SSQ-P this effect approached significance, $F = 3.90$ (64.99), $p =.05$, with CBT-SAD showing greater improvement in social skills than CBT-GEN.

2.6. *Association between changes social skills, PEP, and reductions in anxiety*

It was initially predicted that CBT-SAD would show significantly greater improvements in PEP and social skills than CBT-GEN and that improvements in these factors would mediate reductions in anxiety from baseline to 12-weeks. Given that the two treatments did not differ significantly from each other on PEP, and yet showed significantly greater

improvements on this measure than the WLC, we combined data from the two treatments in order to examine this potential mechanism of change. Separate analyses were conducted to determine the indirect effects upon residual change on the CSR, SPAI-P, SPAI-C, SCAS-P and SCAS-C.

In terms of correlations, reductions in PEPQ-R from baseline to 12-weeks correlated significantly with reductions on the SCAS-C ($r = .43$, p<.001), SCAS-P ($r = .24$, p=.04), and SPAI-C ($r = .53$, p<.001) but not on the SPAI-P or CSR. There were also significant correlations between changes in social skills and changes in some outcome variables, with improvements on the SSQ-P being significantly associated with reductions in CSR ($r = -.25$, p=.015), SCAS-P ($r = .44$, p<.001), and SPAI-P ($r = -.53$, p<.001). Improvements in child rated social skills on the SSQ-C were significantly associated with reductions on SPAI-C ($r = -.27$, p=.015) and CSR ($r = .-.38$, p<.001).

The tests of cross-sectional mediation revealed that for the SPAI-C, the effect of treatment on change in PEPQ-R (path *a*) was statistically significant ($B = -.44$, $SE = .19$, $t = -2.30$, $p = .024$) and the effect of change in PEPQ-R upon change in SPAI-C (path *b*) was also significant ($B = .47$, $SE = .08$, $t = 5.59$, $p < .001$). The indirect effect of treatment upon change in SPAI-C via change in PEP (*ab*) was statistically significant (Coeff = -.21, SE = .11, 95% CI -.46: -.03). The proportion of variance in intra-individual change in social anxiety on the SPAI-C explained by the indirect effect through PEP was 61%. This result is consistent with cross-sectional mediation in which treatment has its effect upon SPAI-C through its influence on PEP.

Similar results were found for youth reported anxiety on the SCAS-C. A significant association was found between treatment and changes in PEPQ-R (*a* path: $B = -.57$, $SE = .20$, $t = -2.91$, $p < .001$) and between changes in PEPQ-R and changes on SCAS-C (*b* path: $B = 5.02$, $SE = 1.35$, $t = 3.73$, $p < .001$). There was also a significant indirect effect (*ab*) in explaining the effect of treatment upon reductions in anxiety on the SCAS-C, (Coeff = -2.86,

SE = 1.30, 95% CI -6.40: -.87). The indirect effect explained 53% of the total effect of treatment upon changes in anxiety on the SCAS-C. This finding is consistent with the view that treatment has its effect upon anxiety symptoms through its impact on PEP. There was no evidence that pre- to 12-week changes in PEPQ-R mediated changes on the CSR, SPAI-P or SCAS-P over this period. There were no significant mediation effects for changes in parent or youth reported social skills and any of the outcome variables.

Given that the mediational analyses were cross-sectional, it was important to determine whether the signficant mediational effects could simply reflect correlations between PEP and anxiety symptoms. Thus, the analyses were reversed to examine changes in anxiety as a mediator of PEP in response to treatment. A similar pattern of results was evident, when the analyses were reversed, with significant indirect effects of changes in anxiety (both SCAS-C and SPAI-C) on the association between treatment and changes in PEP. The implications of this finding are discussed below.

2.7.   Completion of therapy sessions

The number of therapy sessions completed was compared between child and adolescent participants (and their parents), as well as between participants receiving CBT-GEN and those allocated to CBT-SAD. Program compliance was conceptualized as the proportion of program sessions completed, given that the adolescent parent program contains fewer therapy sessions (five) than the child parent program (six sessions).

The average number of sessions completed by child participants at 12-weeks was 4.75 out of 10 sessions (47.46%), and 4.32 out of 6 (72.03%) for their parents. Adolescent participants completed on average 4.0 out of 10 sessions (40%) while their parents completed on average 3.18 out of 5 sessions (63.64%). Participants continued to complete sessions after the 12-week assessment, such that by 6-month follow–up, children had completed an average of 6.57 (65.74%) of core sessions, and adolescents had completed an average of 4.88 (48.8%)

of core sessions. By 6-month follow-up, parents of children had completed an average of 4.77

(79.51%) of core sessions, and parents of teens had completed an average of 3.50 (70%) of

core sessions. There were no significant differences between the completion of therapy

sessions by children or parents in the CBT-GEN versus CBT-SAD conditions. Only 21% of

young people and 26% of parents completed at least one booster session.

2.8.   Association between completion of therapy sessions and outcome

We examined whether the proportion of core therapy sessions completed by young

people was associated with treatment outcome at 6-month follow-up, using linear regression

analyses, controlling for baseline level of the measure, gender, type of treatment (CBT-SAD

or CBT-GEN) and age level or program (Child or Teen). Analyses indicated that a greater

number of completed therapy sessions by 6-months (but not by 12-weeks) was significantly

associated with greater clinical improvement as measured by the CSR, (B= -.04, p=.01),

SPAI-C (B= -.20, p=.05) and CGAS (B= .14, p=.03), but not for the SCAS-C, SCAS-P or

SPAI-P. Further investigation indicated significant effects for the interaction between session

completion and age level (child or teen) in the prediction of changes in CSR, SPAI-C and

CGAS. Posthoc analyses showed that greater session completion was associated with stronger

reductions in anxiety and improvements in functioning for children but not adolescents.

2.9.   Treatment Satisfaction Questionnaire – Child and Parent Version.

There were no significant differences between CBT-SAD and CBT-GEN in terms of

treatment satisfaction ratings at 12-weeks, for either parents or youth. Youth ratings showed a

mean of 3.28 (SD=1.05) and 3.02 (SD=.87) for CBT-SAD and CBT-GEN respectively, with

mean parent ratings of 3.24 (SD=.73) and 3.21 (SD = .72). These ratings are indicative of

moderate satisfaction with the programs.

3.   Discussion

3.1.   *Overall impact of intervention and comparison between treatments*

The results of the present study did not support the proposition that an intervention that included social skills training, components to reduce self-focused attention, and more in-depth restructuring of maladaptive cognitions related to social interactions, would be produce significantly better outcomes than traditional CBT in the treatment of SAD in children and adolescents. No significant difference in outcome was evident between the two interventions after 12-weeks. Nevertheless, CBT intervention in general was associated with significantly greater clinical improvements compared to the WLC on youth and parent report questionnaires and independent clinician ratings of severity, improvement and global functioning at 12-weeks. These improvements were sustained or further enhanced for the two treatment conditions during the 6-month follow-up period for those who received treatment, but again with no significant difference in outcome between treatments.

Despite substantial reductions in social anxiety symptoms and improvements in functioning at 12-weeks, with continued improvements by 6-month follow-up, the impact on the clinical diagnosis of SAD was weak. Only 12.8% of CBT-SAD and 14.6% of CBT-GEN participants in the ITT sample were free of their SAD diagnosis at 12-weeks, and 29.8% and 35.4% respectively at 6-month follow-up. This finding is consistent with the results of Hudson, Rapee, et al. (2015), in which 22.3% and 30.7% of those with a primary diagnosis of SAD were free of this diagnosis after treatment and at follow-up respectively following traditional, clinic-based CBT for anxiety disorders. In the present study, the results were more positive for those cases in which the child or parent had completed at least 3 core treatment sessions and provided evaluation data, with 51.9% of CBT-SAD and 47.1% of CBT-GEN being free of their SAD diagnosis at 6-month follow-up.

It is important to examine possible explanations for the failure to find significantly better outcomes from the tailored CBT-SAD intervention compared to the generic approach, and

also to explain the weak impact of both treatments upon clinical diagnoses despite significant reductions in SAD severity and improvements in functioning.

3.2.   Possible explanations for low impact of treatment upon diagnosis despite improvements in symptoms and global functioning

In terms of explanations for the weak impact of both treatments upon the clinical diagnosis of SAD, we note that the sample showed extremely high levels of social anxiety upon admission to the study. Indeed, the mean CSR value was around 7 on the 8-point scale (indicative of extremely high severity and impairment). This CSR is higher than most other studies examining the treatment of youth SAD, where mean baseline CSRs have typically been between 5 and 6 (e.g. Beidel et al., 2000; Garcia-Lopez et al., 2014; Spence et al., 2000). There was also a very high degree of comorbidity, with participants having on average 2.86 diagnoses and 79.9% of participants showing at least one further anxiety disorder, and 14 participants meeting criteria for Selective Mutism. Mean baseline CGAS ratings approximating 45 at baseline also suggested a moderate to severe level of functional impairment. Thus, the failure to eliminate diagnoses despite marked and significant improvements in social anxiety and global functioning could partly reflect the extremely high initial severity. To reach an end state in which there is no clinical diagnosis may require a treatment that is longer in terms of number of sessions.

Kerns et al. (2013) reached a similar conclusion in relation to clinic-based treatment of youth SAD and proposed that longer and more intensive treatments may be needed. These authors found that anxious young people with elevated SAD symptoms or a SAD diagnosis in their profile were significantly less likely to be free of their primary clinical diagnosis after treatment compared to youth without a SAD diagnosis following clinic-based CBT. They concluded that, despite equivalent decreases in anxiety severity during treatment, a lower proportion of youth with social anxiety symptoms or diagnoses fell below diagnostic criteria

after treatment because their initial presentation was more severe. They also noted that youth with SAD symptoms were more likely to show a resurgence of anxiety during long-term follow-up. Hudson, Rapee, et al. (2015), in discussion of clinic-based CBT for youth with SAD also proposed the need for longer intervention given the long-standing issues of behavioral inhibition that may youth with SAD have experienced. They suggest that this long-standing trait may make SAD more resistant to change. In particular, they proposed the need for more sessions that include intensive, invivo exposure and practice of cognitive and behavioral skills, and strategies to ensure reduction in the use of safety behaviors.

It is also possible that outcomes would be stronger, resulting in a greater level of change and loss of a clinical diagnosis of SAD, if the intervention involved face-to-face treatment rather than internet-completed sessions. Although our prior research has demonstrated equivalent outcomes for internet-delivered CBT with minimal therapist assistance compared to the same program delivered using the internet (Spence et al., 2011), that study was conducted with varying types of anxiety disorder, and baseline indicators of severity were less severe, with CSR (Mean = 6) and CGAS (Mean = 50). With severe cases of SAD, clinic-based delivery may have advantages such as having greater control over the rate of completion of sessions, the ability to tackle treatment and non-treatment related difficulties that could trigger drop-out from therapy, and greater opportunities to engage in exposure tasks invivo in a group-therapy context.

In the present study, participants tended to work their way more slowly through the sessions than may be the case with clinic-delivery. At the 12-week point many participants had not completed their sessions, with youth in both CBT-GEN and CBT-SAD having completed on average only 4 of the 10 sessions at 12-weeks. However, they continued to complete sessions during the follow-up period, so that by 6-month follow-up they had completed an average of 6.6 of the 10 core sessions. While all core treatment strategies were covered in the first 6 sessions, very few participants progressed to complete the final two

sessions in which all the previously learned material is brought together and instructions are provided for further practice. Thus, the slow rate of session completion and failure of some participants to complete all 10 sessions may have limited the strength of treatment outcomes. Clinic-delivered treatments tend to have more control over the rate of session completion and may also have a greater influence over session completion. We note, however, that in a study involving a range of types of anxiety disorders, Spence et al. (2011) did not find a difference in the number of sessions completed between clinic and internet program delivery, although youth in the internet delivery condition completed a higher number of sessions at 12-weeks (Mean=7.5 out of 10) than was found in the present study.

Another possible limitation of the internet-delivery modality in the present study is that, despite detailed computer-based information, interactive tasks and online therapist guidance, socially anxious children and adolescents may find it particularly difficult to complete the practice sessions outside the sessions. Without strong face-to-face therapist guidance and support, they may avoid practicing the skills they have learned in the sessions, and may avoid implementing their fear hierarchy. This proposition is consist with the finding that, for the younger age group at least, greater session compliance by follow-up was associated with better treatment outcomes for both treatments. While online therapy may seem appealing to young people with SAD because it can be completed without requiring feared face-to-face interactions within treatment sessions, they are missing out on potentially important exposure experiences that they would have during face-to-face sessions, particularly in a group context. Future online interventions for SAD in young people need to identify ways of increasing opportunities for practicing skills outside sessions, and increasing program engagement and session compliance.

3.3.   Possible explanations for the lack of difference between treatments

It is also important to discuss possible reasons for why the CBT-SAD intervention did not enhance outcomes over and above CBT-GEN in line with hypotheses. Authors such as Hudson, Rapee, et al. (2015) and Spence and Rapee (2016) have made a strong case for the inclusion of social skills training, and techniques to reduce self-focused attention, and maladaptive cognitive processes before, during and after feared social interactions. In terms of social skills, all three conditions, including the WLC showed equivalent improvements in social skills by 12-weeks. At 6-month follow-up, there was a trend for CBT-SAD to show greater improvements in social skills according to parent (p=.05), but not youth, report. Thus, although there was a trend, we cannot say conclusively that the CBT-SAD intervention was effective in enhancing social skills. Again, it is possible that internet treatment delivery may not be the best method for social skills training in socially anxious youth. Although the content included videotaped exemplars and interactive online exercises to teach social skills, with home tasks to practice the use of social skills outside the session, the internet mode of delivery did not provide the opportunity to practice skills with other young people within the therapy sessions and to receive feedback about performance, as is the case with group-based clinic therapy. Potentially, a combination of face-to-face, group-based intervention, supplemented with online examples could produce better results. The Beidel et al. (2000) clinic-based program described above, for the treatment of SAD in youth, provides extensive opportunity for skills practice within and between sessions and has shown positive outcomes with 67% of participants no longer meeting diagnostic criteria for social phobia at post-treatment. Although this result is encouraging, there is still room for improvement. The Beidel et al. program does not include an intensive focus on changing the maladaptive cognitive processes associated with SAD, and in the present paper we suggested that outcomes for the treatment of youth SAD would be greater if the intervention included both social skills training and cognitive change strategies.

The results of the present study also did not find that CBT-SAD was more effective in changing maladaptive cognitive processing (at least as measured by PEP) than CBT-GEN. Both interventions were associated with significantly greater reductions in PEP than the WLC at 12-weeks, but with no significant difference between treatments. It appears therefore that the cognitive change strategies included in CBT-GEN were sufficient to produce significant reductions in PEP despite a more detailed and intensive focus in CBT-SAD on changing maladaptive cognitions associated with feared social situations. The generic approach may be sufficient for bringing about reductions in PEP, and it is feasible that participants in CBT-GEN were able to generalize sufficiently from the generic content to their own situation.

However, the data were consistent with the view that changes in PEP may be an important mechanism through which reductions in social anxiety occur, with changes in PEP being associated with changes in social anxiety in response to treatment. We acknowledge that, while the cross-sectional findings were consistent with mediation by PEP, we are unable to draw firm conclusions about causality given that we could not test longitudinal mediation. As the analysis was cross-sectional, we cannot exclude the possibility that PEP is purely a reflection of SAD rather than being a mediating variable, or that there may be a reciprocal relationship between changes in social anxiety and changes in PEP. Nevertheless, the finding that changes in PEP are associated with reductions in social anxiety in response to treatment is consistent with research in the adult literature (McEvoy et al., 2009)(Hedman et al., 2013).

The CBT-SAD intervention also included a significant emphasis on reducing self-focused attention, in keeping with the recommendations of Hudson et al., (2015). However, we did not include a measure of this construct in order to determine whether it did indeed change in response to CBT-SAD. Future studies should include the monitoring of self-focused attention to ensure that changes are occurring and to determine its potential role as a mediator of treatment outcome.

Although the CBT-SAD intervention included elements to address the cognitive distortions and biases associated with SAD, it is possible that these efforts need to be even more intensive. Hudson, Rapee, et al. (2015) noted that it may be harder to achieve disconfirmation of fear expectancies in social situations, compared to other types of feared situations. They suggest that, after social interactions, it can be ambiguous to the young person as to whether the outcome is positive or negative, and thus negative interpretation biases may persist. Thus, treatment may need to include strategies that specifically aim to disconfirm maladaptive social beliefs and interpretations.

There may also be other ways to strengthen the content of CBT-SAD. For example, the current intervention did not include a focus on imagery in relation to changing PEP. Given that post-event imagery has been shown to be a significant predictor of social anxiety in youth, (Ranta et al., 2014), it may be possible to use techniques such as imagery rescripting to reduce the frequency of distressing imagery associated with prior social experiences in young people (Norton & Abbott, 2016).

3.4. Limitations and future directions

Although the present study has many strengths, there are several methodological limitations that need to be noted. For example, there was a relatively high drop-out rate in terms of participants who failed to complete outcome interviews and questionnaires. Given that the analyses were conducted on an intent-to-treat basis, the findings may provide a conservative estimate of treatment effectiveness. Furthermore, the relatively slow rate of session completion meant that, at the 12-week assessment point, many families had not completed the majority of sessions. Thus, comparison with the WLC at this point may not have provided a valid indicator of the strength of the treatment. Indeed, for those who had completed at least 3 core treatment sessions (parent or child) and who completed the

evaluations, the percent free of their SAD diagnosis at 6-months was similar to results reported from clinic-based studies.

The sample size of 125, while providing sufficient power to detect differences between active intervention and WLC, was weak when it came to detecting potential differences between the two active clinical conditions. The initial intent was for a much larger sample size (300) but we had difficulty recruiting a sufficient number of participants who met all inclusion criteria within the timeframe of the study which had been delayed by longer than anticipated time to develop the CBT-SAD online program. We note, however, that there were no clear trends for superiority of either treatment approach.

A further limitation in the present study was the lack of data from the WLC at follow-up, which restricted our ability to examine mediating variables. Future research should include more frequent assessment of both outcome and potential mediating variables to enable examination of longitudinal mediation.

Finally, as noted above, the current study did not provide convincing evidence that CBT-SAD produced significantly greater reductions in PEP and improvements in social skills than CBT-GEN. This means that we cannot draw firm conclusions as to whether an intervention that changes underlying cognitive and behavioral factors associated with SAD is more effective than a generic approach. A true test requires demonstration that a) CBT-SAD is more effective than CBT-GEN in changing these cognitive and behavioral factors, b) CBT-SAD is more effective than CBT-GEN in reducing social anxiety, and c) changes in the targeted cognitive and behavioral variables mediate changes in social anxiety.

A key challenge in future research will be to identify ways of increasing treatment compliance among young people who complete intervention, particularly if this is delivered using the internet. Furthermore, when delivered through the clinic or the internet there remains a significant need to identify ways of increasing treatment outcomes for young people with SAD. For example, methods such as virtual reality could be used to provide realistic

opportunities to practice social skills and exposure tasks, with therapists being able to provide live feedback. This may also be a method through which young people could learn to challenge some of the biased cognitions and beliefs before, during and after feared social interactions. Future research should also examine the impact of comorbidity upon the treatment of SAD in order to identify treatments that are most likely to be beneficial with children with different profiles of comorbidity. For example, a CBT-GEN approach may be more appropriate for young people with a high level of comorbid symptoms in addition to SAD, whereas this may not be the case for youth with only SAD. It would also be valuable to examine whether the presence of poor social skills, or specific cognitive factors such as PEP or self-focused attention, influence treatment outcome and whether treatments can be tailored to the needs of particular clients in order to optimize treatment outcomes.

4.   Conclusion

Both CBT-SAD and CBT-GEN were associated with significant reductions in social anxiety symptoms and improvements in global function over time for children and adolescents with SAD. These improvements were significantly greater than any changes evident for the WLC at 12-weeks, and were maintained at 6-month follow-up. Contrary to hypotheses, there were no significant differences in outcome between CBT-SAD and CBT-GEN. Furthermore, CBT-SAD did not result in significantly greater changes in PEP than CBT-GEN, although there was a trend for CBT-SAD to show greater improvements in parent rated social skills at follow-up. Despite substantial and significant reductions in social anxiety symptoms and improvements in global functioning, the majority of participants continued to show a diagnosis of SAD after treatment. Possible explanations for this finding are discussed, particularly the extremely high initial clinical severity of SAD in the sample. Given the considerable distress, interference and adverse consequences of SAD, its persistence if left untreated, and its relative resistance to current treatment methods, it is important that

researchers and clinicians continue to seek and evaluate methods to enhance the treatment

effectiveness for SAD in children and adolescents.

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Table 1

Sociodemographic details for participants

	Total (N = 125)	WLC (*n* = 30)	CBT-GEN (*n* = 48)	CBT-SAD (*n* = 47)
Age in Years (*SD*)	11.29 (2.67)	11.6 (2.72)	11.02 (2.57)	11.34 (2.78)
Range (years)	8–17	8-16	8-17	8-17
Female N(%)	75 (60)	16 (53.3)	26 (54.2)	33 (70.2)
Country of Birth				
Australia	104 (83.3)	26 (86.7)	41 (85.4)	37 (78.7)
USA/Canada	6 (5.6)	1	2	3
United Kingdom	5 (4.0)	1	1	3
New Zealand	3 (2.4)	1	0	2
Europe	2 (1.6)	1	0	1
Africa	2 (1.6)	0	2	0
Asia	1 (0.8)	0	0	1
Other/Missing	2	0	2	0
Indigenous Australian	3 (2.4)	0	2 (4.2)	1 (2.1)
Living Arrangements				
Both biological parents	106 (84.9)	27 (90)	39 (81.3)	40 (85.1)
SES (*n* = 119) (*SD*)				
High (> AUS$100 001)	69 (54.8)	14 (46.7)	28 (58.3)	27 (57.4)
Low+Middle (<100,000k)	50 (40.5)	16 (53.0)	18 (37.5)	17 (36.2)
Program Age Group				
Child	79	18 (60)	30 (62.5)	31 (66)
Teen	46	12 (40)	18 (37.5)	16 (34)
CSR (Primary DX:SAD)	6.85 (0.97)	6.73 (0.8)	6.77 (1.1)	7 (1.0)
CGAS	46.03 (6.83)	46.53 (6.08)	46.69 (7.47)	45.04 (6.6)
Secondary Diagnosis				
None	27 (21.6)	5 (16.7)	16 (33.3)	6 (12.8)
Selective mutism	14 (11.2)	3 (10.0)	6 (12.5)	5 (10.6)
GAD	44 (28.9)	8 (26.7)	14 (29.2)	22 (46.8)
Separation Disorder	10 (6.6)	2 (6.7)	4 (8.3)	4 (8.5)
Specific Phobia	21 (13.8)	8 (26.7)	8 (16.8)	5 (10.6)
Dysthymia	6 (3.9)	3 (10.0)	0	3 (6.4)
Other Enur/pan/agor/ODD/OCD	3 (2.0)	1 (3.3)	0	2 (2.2)
Tertiary Diagnosis				
None	54	12 (40)	23 (47.9)	19 (40.4)
GAD	26	8 (26.7)	4 (8.3)	14 (29.8)
Separation Disorder	13	7 (23.3)	1 (2.1)	5 (10.6)
Specific Phobia	22	2 (6.6)	15 (31.3)	5 (10.6)
Dysthymia	3	1 (3.3)	0	2 (4.3)
Other Enur/pan/agor/ODD/OCD	7	0	5 (10.5)	2 (4.2)
Number of anxiety DXs	2.86 (1.56)	2.73 (1.14)	2.90 (1.98)	2.89 (1.32)
Total number of DXs	3.03 (1.70)	2.93 (1.39)	3.00 (2.07)	3.13 (1.48)

Note: Values represent number of participants (percentages) or means ± SD, as appropriate. CSR = Clinician Severity Rating; CGAS = Children's Global Assessment Scale; DX = diagnosis; GAD = Generalized Anxiety Disorder; Enur = Enuresis; Pan = Panic Disorder; Agor = agoraphobia; ODD = Oppositional Defiant Disorder; OCD = Obsessive Compulsive Disorder.

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Table 2.

Diagnostic Outcome Measures at Each Assessment Point

	CBT-SAD	CBT-GEN	WLC
Percent free of primary anxiety diagnosis			
12-week assessment			
ITT sample	6/47 (12.8%)	7/48 (14.6%)	1/30 (3.3%)
Retained sample	6/35 (17.1%)	7/34 (20.6%)	1/27 (3.7%)
6-month follow-up			
ITT sample	14/47 (29.8%)	17/48 (35.4%)	
Retained sample	14/27 (51.9%)	16/34 (47.1%)	
Percent free of *any* anxiety diagnosis			
12-week assessment			
ITT sample	2/47 (4.3%)	7/48 (14.6%)	0/30 (0%)
Retained sample	2/35 (5.7%)	7/34 (20.6%)	0/27 (0%)
6-month follow-up			
ITT sample	10/47 (21.3%)	16/48 (33.3%)	
Retained sample	10/27 (37.0%)	15/34 (44.1%)	

Note. Retained sample included participants with data available at the 12-week assessment time point.

Table 3

Estimated Marginal Means and Standard Errors for Continuous Variables from Baseline to

12-week Assessment

Condition		CBT-SAD		CBT-GEN		WLC	
Measure	Time	*M*	*SE*	*M*	*SE*	*M*	*SE*
CSR	Baseline	7.00	0.24	6.77	0.23	6.73	0.30
	12-wks	4.72	0.26	4.53	0.25	5.95	0.31
CGAS	Baseline	45.04	1.18	46.69	1.17	46.53	1.48
	12-wks	55.83	1.29	58.12	1.24	51.41	1.54
SPAI-C	Baseline	29.02	1.78	27.92	1.79	26.64	2.23
	12-wks	21.81	1.97	19.19	1.94	23.68	2.39
SPAI-P	Baseline	37.79	1.56	34.89	1.57	37.56	1.98
	12-wks	29.47	1.78	24.10	1.78	34.90	2.06
SCAS-C	Baseline	42.18	2.40	33.50	2.39	35.75	3.10
	12-wks	29.51	2.59	22.87	2.56	32.62	3.10
SCAS-P	Baseline	34.87	1.93	29.23	1.87	32.62	2.33
	12-wks	21.14	2.07	17.16	1.99	28.81	2.51
SSQ-C	Baseline	41.84	1.12	44.33	1.11	42.67	1.38
	12-wks	46.57	1.24	46.26	1.30	45.33	1.49
SSQ-P	Baseline	35.75	1.58	40.77	1.56	34.90	1.97
	12-wks	43.53	1.76	45.72	1.69	41.45	2.04
PEPQ-R	Baseline	383.04	32.41	351.63	31.81	408.45	40.92
	12-wks	287.87	36.17	216.40	37.98	399.13	44.87

Note. CSR = Clinician Severity Rating; CGAS = Children's Global Assessment Scale; SPAI-C/P = Social Phobia and Anxiety Inventory - Child/Parent ; SCAS-C/P = Spence Children's Anxiety Scale - Child/Parent; SSQ-C/P= Social Skills Questionnaire- Child/Parent; PEPQ-R = Post Event Processing Questionnaire- Revised

Table 4

Estimated Marginal Means and Standard Errors from Baseline to 12-week Assessment and 6- Follow-up for CBT-SAD and CBT-GEN

Condition		CBT-SAD		CBT-GEN	
Measure	Time	*M*	*SE*	*M*	*SE*
CSR	Baseline	7.00	0.30	6.77	0.30
	12-wks	4.72	0.33	4.54	0.32
	6-mth fup	2.99	0.37	2.87	0.33
CGAS	Baseline	45.04	1.39	46.69	1.38
	12-wks	55.74	1.52	58.07	1.46
	6-mth fup	62.62	1.67	65.34	1.49
SPAI-C	Baseline	29.02	1.70	27.89	1.71
	12-wks	21.80	1.90	19.29	1.87
	6-mth fup	16.25	2.22	16.36	2.08
SPAI-P	Baseline	37.79	1.60	34.81	1.62
	12-wks	29.06	1.84	24.10	1.83
	6-mth fup	24.24	2.15	20.04	1.83
SCAS-C	Baseline	42.17	2.10	33.48	2.09
	12-wks	29.09	2.31	23.27	2.28
	6-mth fup	22.95	2.66	20.03	2.44
SCAS-P	Baseline	34.75	1.82	29.20	1.76
	12-wks	21.23	1.95	17.23	1.87
	6-mth fup	17.74	2.22	13.54	1.95
SSQ-C	Baseline	41.87	1.14	44.12	1.13
	12-wks	46.56	1.27	46.01	1.33
	6-mth fup	48.70	1.58	48.67	1.43
SSQ-P	Baseline	35.75	1.45	40.77	1.43
	12-wks	43.58	1.59	45.62	1.53
	6-mth fup	46.87	1.78	47.93	1.60
PEPQ-R	Baseline	383.47	30.12	351.63	29.54
	12-wks	288.83	34.04	213.85	35.84
	6-mth fup	178.70	44.53	159.84	40.85

Note. CSR = Clinician Severity Rating; CGAS = Children's Global Assessment Scale; SPAI-C/P = Social Phobia and Anxiety Inventory for Children- Child/Parent ; SCAS-C/P = Spence Children's Anxiety Scale - Child/Parent; SSQ-C/P= Social Skills Questionnaire- Child/Parent; PEPQ-R = Post Event Processing Questionnaire- Revised

Table 5

Mixed Model Effects Comparing (i) Treatment vs WLC and (ii) CBT-SAD vs CBT-GEN From Baseline to 12-week Assessment for CSR, CGAS and SPAI-C/P for ITT Analysis

	CSR			CGAS			SPAI-C			SPAI-P		
	B (SE)	*t* (CIs)	*d*	*B* (SE)	*t* (CIs)	*d*	*B* (SE)	*t* (CIs)	*d*	*B* (SE)	*t* (CIs)	*d*
(i) Treatment vs WLC												
Intercept at Pre-												
WLC	6.73 (.30)	22.72*** (6.15 - 7.32)		46.53 (1.48)	31.34*** (43.60 – 49.46)		26.63 (2.24)	11.90 (22.21–31.05)		37.55 (2.00)	18.77*** (33.61- 41.50)	
WLC vs Treatment	0.15 (.34)	.44 (-.52 - .82)		-.66 (1.70)	-.39 (-4.01 – 2.70)		1.82 (2.57)	.71 (.71 - .48)		-1.22 (2.29)	-.53 (-5.74- 3.30)	
Slope Pre- to 12 wks												
WLC	-.78 (.34)	-2.30 (-1.45 - -.11)	.48	4.88 (1.53)	3.18** (1.84 - 7.91)	.60	-2.96 (2.02)	-1.46 (-6.98 – 1.06)	.24	-2.66 (2.01)	-1.32 (-6.65 – 1.34)	.24
WLC vs Treatment	-1.48 (.39)	-3.77*** (-2.26 - -.70)	.91	6.27 (1.77)	3.54*** (2.76 – 9.78)	.77	-5.01 (2.35)	-2.13* (-9.68 - -.34)	.41	-6.89 (2.36)	-2.92** (-11.58 - -2.20)	.64
Random Effects												
Residual variance	1.61			32.46			50.96			53.11		
Intercept variance	1.02			33.69			99.35			64.09		
	B (SE)	*t* (CIs)	*d*	*B* (SE)	*t* (CIs)	*d*	*B* (SE)	*t* (CIs)	*d*	*B* (SE)	*t* (CIs)	*d*
(ii) CBT-GEN vs CBT-SAD												
Intercept at Pre-												
CBT-GEN	6.77 (.25)	27.19 *** (6.27 -7.26)		46.69 (1.18)	39.43*** (44.35 – 49.03)		27.93 (1.67)	16.66*** (24.61-31.25)		34.91 (1.55)	22.52*** (31.84-37.97)	
CBT-GEN vs CBT-SAD	.23 (.35)	.65 (-2.8 - -1.65)		-1.64 (1.68)	-.98 (-4.97 – 1.68)		1.09 (2.37)	.46 (-3.59 – 5.77)		2.87 (2.18)	1.32 (-1.43 – 7.19)	
Slope Pre to 12 wks												
CBT-GEN	-2.24 (.29)	-7.60*** (-2.83- -1.66)	1.30	11.44 (1.26)	9.11*** (8.94 – 13.93)	1.39	-8.80 (1.83)	-4.80*** (-12.44 - -5.15)	.77	-10.87 (1.83)	-5.93*** (-14.52 - -7.22)	1.03
CBT-GEN vs CBT-SAD	-.04 (.42)	-.08 (-.88 - .81)	.02	-.65 (1.81)	-.36 (-4.25 – 2.96)	.08	1.55 (2.58)	.60 (-3.59 – 6.71)	.13	2.45 (2.58)	.95 (-2.69 – 7.59)	.09
Random Effects												
Residual variance	1.87			33.55			60.35			59.21		
Intercept variance	1.10			33.74			70.57			51.86		

Note. *p* < .05, **p <.01, ***p <.001. CSR = Clinician Severity Rating; CGAS = Children's Global Assessment Scale; SPAI-C/P = Social Phobia and Anxiety Inventory for Children- Child/Parent. Effect sizes "d" were calculated as the estimated fixed effect divided by the square root of the sum of the two variance components.

Table 6

Mixed Model Effects for Treatment## vs WLC and CBT-SAD vs CBT-GEN Comparing Baseline and 12-week Assessment for Anxiety, Social Skills and Post-Event Processing for ITT Analysis

	SCAS-C B (SE)	SCAS-C t (CIs)	d	SCAS-P B (SE)	SCAS-P t (CIs)	d	SSQ-C B (SE)	SSQ-C t (CIs)	d	SSQ-P B (SE)	SSQ-P t (CIs)	d	PEPQ-R B (SE)	PEPQ-R t (CIs)	d
Treatment## vs WLC															
Intercept at Pre-															
WLC	35.73 (3.16)	11.31*** (29.49-41.96)		32.62 (2.36)	13.78*** (27.95-37.30)		43.10 (0.80)	54.01*** (41.52-44.67)		34.90 (2.00)	17.47*** (30.95-38-84)		408.45 (41.15)	9.93*** (327-489)	
WLC vs Treatment	2.08 (3.60)	.58 (=5.02 – 9.91)		-.76 (2.73)	-.25 (-6.06 – 4.72)		-.43 (1.62)	-.27 (-3.62 – 2.75)		3.38 (2.29)	1.48 (-1.13 – 7.90)		-41.29 (47.06)	-.88 (-134.15- 51.56)	
Slope Pre to 12 wks															
WLC	-3.11 (2.52)	2.53* (-8.12 – 1.90)	.19	-3.82 (2.23)	-1.71 (-8.25 - .61)	.26	3.35 (0.96)	3.51*** (1.46 – 5.25)	.43	6.55 (1.89)	3.46** (2.80 – 10.29)	.60	-9.38 (45.93)	-.20 (-100-81.77)	
WLC vs Treatment	-8.55 (2.92)	-2.93** (-14.34 - -2.76)	.51	-9.03 (2.59)	-3.50*** (-14.16- -3.89)	.70	-.69 (1.86)	-.37 (-4.37 – 3.00)	.09	-.21 (2.21)	-.10 (-4.59 – 4.16)	.02	-104.01 (53.21)	-1.96# (-209.59-1.56)	
Random Effects															
Residual variance	73.52			62.19			33.42			49.22			25649.6		
Intercept variance	205.75			105.89			25.91			70.45			23454.9		
CBT-GEN vs CBT-SAD															
Intercept at Pre-															
CBT-GEN	33.54 (2.09)	16.02*** (29.41–37.69)		29.23 (1.84)	15.81*** (25.58 – 32.89)		44.33 (1.10)	40.29*** (42.15-46.50)		40.77 (1.42)	28.67*** (37.96-43.58)		351.62 (30.67)	11.47*** (291.02-412.23)	
CBT-GEN vs CBT-SAD	8.66 (2.97)	2.92** (2.79-14.53)		5.65 (2.66)	2.12* (.39 – 10.91)		-2.49 (1.56)	-1.60 (-.87 – 4.72)		-5.03 (2.02)	-2.49* (-9.03- -1.02)		32.40 (43.82)	.74 (-54.18 – 118.98)	
Slope Pre to 12 wks															
CBT-GEN	10.66 (2.13)	-4.99*** (-14.91- -6.41)	.74	-12.14 (1.89)	-6.41*** (-15.91 - -8.37)	96	1.92 (1.41)	1.37 (-.87 – 4.72)	.25	4.94 (1.40)	3.53** (2.15-7.73)	.50	-135.90 (42.04)	-3.23** (-219.55- -52.26)	.64
CBT-GEN vs CBT-SAD	-2.20 (3.02)	-.73 (-8.22 – 3.82)	.15	-1.74 (2.74)	.53 (-7.19 – 3.72)	14	2.77 (1.95)	1.42 (-1.10 – 6.66)	.37	2.85 (2.02)	1.40 (-1.19- 6.89)	.29	41.04 (58.45)	.70 (-75.29 – 157.37)	.19
Random Effects															
Residual variance	80.98			68.84			35.09			38.83			31221.1		
Intercept variance	123.87			90.52			21.80			58.22			13924.2		

Note. #=.05, *p < .05, **p <.01, ***p <.001. CSR = Clinician Severity Rating; CGAS = Children's Global Assessment Scale; SPAI-C/P = Social Phobia and Anxiety Inventory for Children- Child/Parent ; SCAS-C/P = Spence Children's Anxiety Scale - Child/Parent; SSQ-C/P= Social Skills Questionnaire- Child/Parent; PEPQ-R = Post Event Processing Questionnaire- Revised

Note ## : "Treatment" refers to receipt of CBT-GEN or CBT-SAD

Table 7

Mixed Model Effects for CBT-SAD vs CBT-GEN Comparing Baseline and 6-month Follow-up for Anxiety, Social Skills and Post-Event Processing for ITT Analysis

	CSR			CGAS			SPAI-C			SPAI-P		
	B (SE)	*t* (CIs)	*d*	*B* (SE)	*t* (CIs)	*d*	*B* (SE)	*t* (CIs)	*d*	*B* (SE)	*t* (CIs)	*d*
Intercept at Pre-												
CBT-GEN	6.77 (.28)	23.98*** (6.21-7.32)		46.69 (1.40)	33.40*** (43.92-49.45)		27.87 (1.15)	16.32*** (24.49-31.25)		34.86 (1.65)	21.17*** (31.60-38.11)	
CBT-GEN vs CBT-SAD	.23 (.40)	.57 (-.56 –1.02)		-1.65 (1.99)	-.83 (-5.57-2.28)		1.15 (2.24)	.48 (-3.61-5.91)		2.93 (2.32)	1.26 (-1.65-7.51)	
Slope Pre to 6-mth Fup												
CBT-GEN	-3.94 (.37)	10.62*** (-4.67- -3.20)	2.02	18.76 (1.62)	11.57*** (15.53-21.98)	2.47	-12.01 (2.22)	-5.40*** (-16.46- -7.56)	1.03	-14.94 (2.06)	-7.25*** (-19.04- -10.83)	1.34
CBT-GEN vs CBT-SAD	-.17 (.56)	-.32 (-1.28 - .92)	.09	-.88 (2.45)	-.36 (-5.74-3.98)	.12	-1.20 (3.25)	.71 (-7.70-5.30)	.10	.64 (3.16)	.20 (-5.65-6.95)	.06
Random Effects												
Residual variance	2.83			53.04			68.88			75.71		
Intercept variance	.99			4.77			65.90			49.37		

	SCAS-C			SCAS-P			SSQ-C			SSQ-P			PEPQ-R		
	B (SE)	*t* (CIs)	*d*	*B* (SE)	*t* (CIs)	*d*	*B* (SE)	*t* (CIs)	*d*	*B* (SE)	*t* (CIs)	*d*	*B* (SE)	*t* (CIs)	*d*
Intercept at Pre-															
CBT-GEN	33.61 (2.17)	15.44*** (29.91-37.91)		29.20 (1.88)	15.56*** (25.49- 32.92)		44.18 (1.14)	38.60*** (41.91-46.44)		40.77 (1.45)	27.98*** (-37.88- 43.65)		351.62 (39.67)	12.67*** (296.7- 406.5)	
CBT-GEN vs CBT-SAD	8.62 (3.07)	2.80** (2.53-14.72)		5.56 (2.70)	2.06* (.22- 10.91)		-2.37 (1.63)	-1.46 (-5.59- .84)		-5.03 (2.07)	-2.43* (-9.13- -.92)		33.69 (39.67)	.40 (-44.79- 112.17)	
Slope Pre to 6-mth Fup															
CBT-GEN	-13.91 (2.64)	-5.27*** (-19.18- -8.63)	.94	-16.05 (1.95)	-8.22*** (-19.96- -12.15)	1.25	4.62 (1.66)	2.78** (1.31- 7.93)	.59	7.24 (1.49)	4.86*** (4.25-10.22)	.72	-181.54 (45.07)	-4.03*** (-217.8- -91.29)	.94
CBT-GEN vs CBT-SAD	-6.17 (3.95)	-1.56 (-14.05- 1.70)	.42	-1.96 (3.02)	-.65 (-8.00- 4.08)	15	3.24 (2.48)	1.31 (-1.69- 8.17)	.41	4.51 (2.28)	1.97# (-.05 -9.08)	.45	-40.12 (66.52)	-.60 (-173.12- 93.88)	.21
Random Effects															
Residual variance	106.16			64.32			43.42			38.04			29471.40		
Intercept variance	113.01			100.29			18.26			63.85			7515.52		

Note. #=.05,**p* < .05, ***p* <.01, ****p* <.001. CSR = Clinician Severity Rating; CGAS = Children's Global Assessment Scale; SPAI-C/P = Social Phobia and Anxiety Inventory for Children-Child/Parent ; SCAS-C/P = Spence Children's Anxiety Scale - Child/Parent; SSQ-C/P= Social Skills Questionnaire- Child/Parent; PEPQ-R = Post Event Processing Questionnaire- Revised
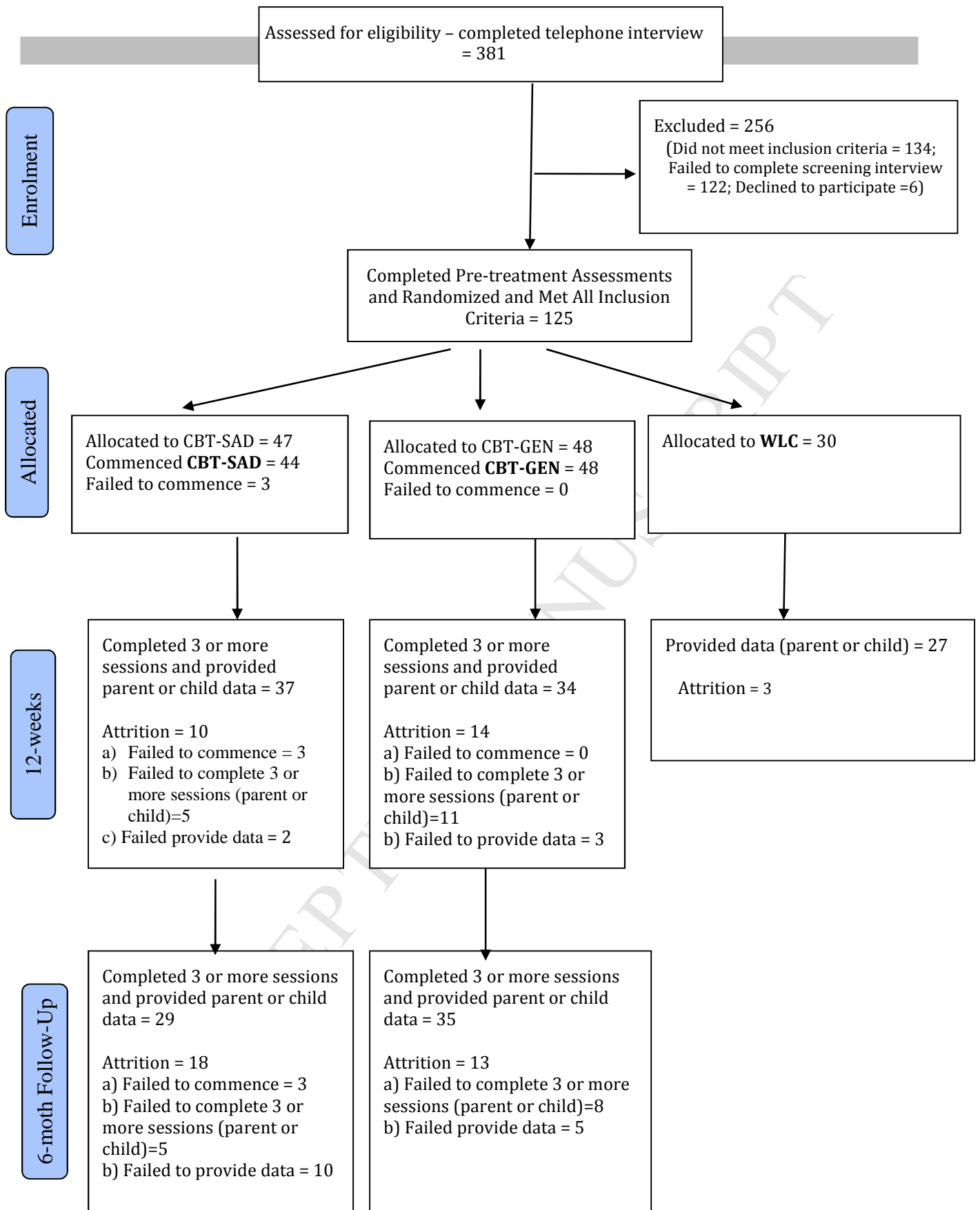
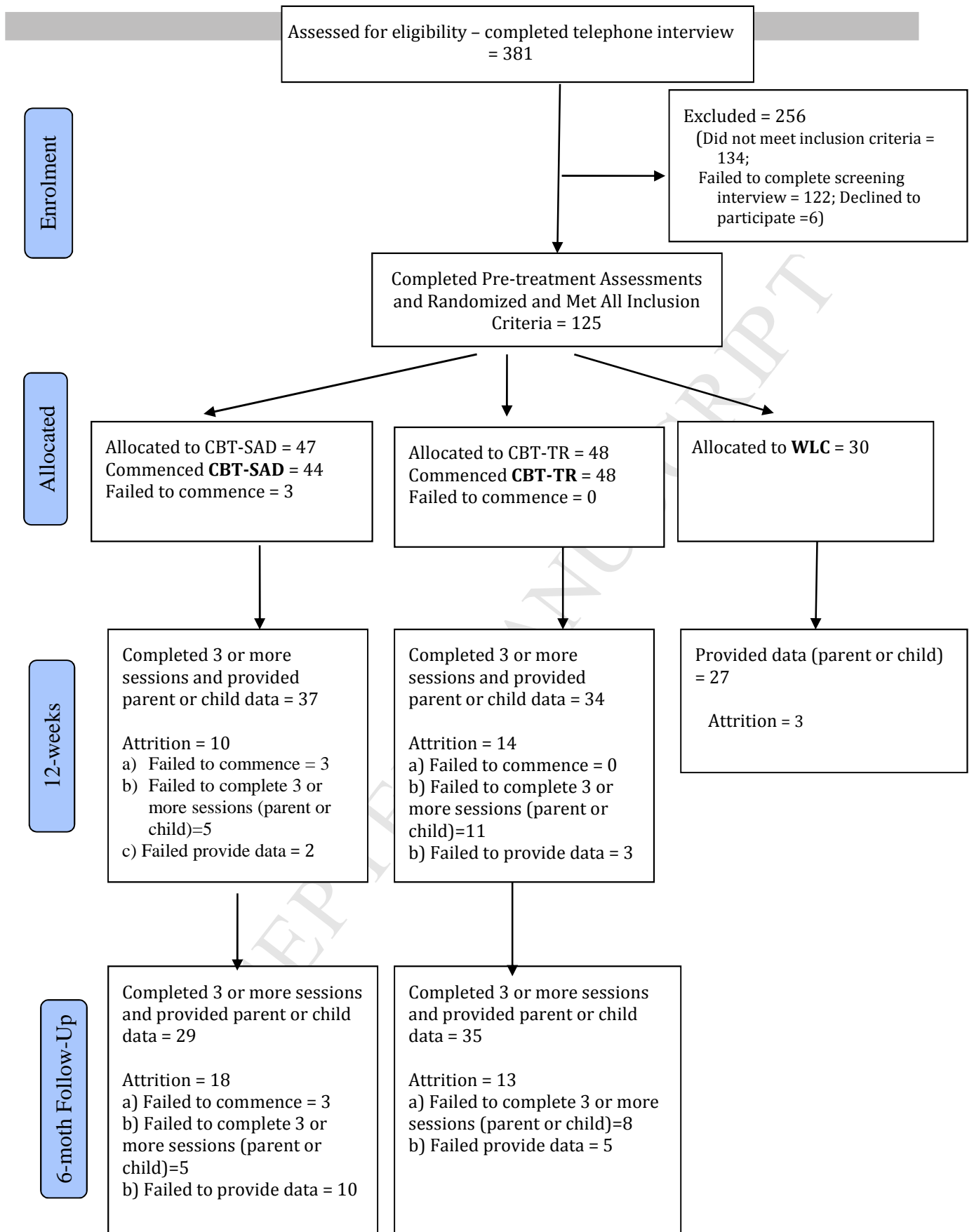*Figure 1.* Flow diagram showing the progression of participants through the study.

Figure 1. Flow diagram showing the progression of participants through the study.

Highlights

1. There was no significant difference in outcome between generic and disorder-specific CBT for SAD in youth. Both treatments, using internet delivery with brief therapist assistance, showed significantly greater reductions in social anxiety than a wait list control.

2. Post-event processing mediated reductions in social anxiety for both generic and disorder-specific CBT supporting the importance of this construct as an underlying mechanism of therapeutic change in the treatment of SAD.

3. Despite significant reductions in social anxiety and improvements in social functioning following CBT, the majority of youth in both conditions continued to meet criteria for a clinical diagnosis of SAD. This indicates the challenges in treating SAD in young people, and reflected the high initial severity of social anxiety symptoms and poor adaptive functioning of the sample in this study.