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# Imagery-Enhanced Cognitive Behavioural Group Therapy for Social Anxiety Disorder: A Pilot Study

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Abstract

Cognitive behavioural group therapy (CBGT) for social anxiety disorder (SAD) is efficacious and effective, however a substantial proportion of patients remain in the clinical range so treatment innovations are required. Research suggests that working within the imagery mode may be more emotionally potent than traditional verbal-linguistic strategies. This study piloted an imagery-enhanced CBGT (IE-CBGT) protocol for SAD. It was hypothesised that IE-CBGT would be acceptable to patients, demonstrate large effect sizes, and compare favourably to historical controls who completed CBGT without the imagery-enhancements. Patients (N = 19) were consecutive referrals to a community clinic specialising in anxiety and mood disorders. Primary outcomes were self-reported performance and social interaction anxiety. IE-CBGT was highly acceptable to patients with high attendance and completion rates. Effect sizes were large by mid-treatment and very large at post-treatment and follow-up. A high proportion of patients achieved reliable change. Outcomes compared favourably to published group and individual treatments for SAD but larger randomised controlled trials are now required.

*Key Words*: imagery; cognitive behaviour therapy; social anxiety disorder; effectiveness; benchmarking

## Introduction

Social anxiety disorder (SAD) is characterised by significant and persistent fear or anxiety in situations where an individual is exposed to possible scrutiny by others, such as interacting socially, being observed, or performing in front of others (American Psychiatric Association, APA, 2013). SAD is common, chronic, debilitating, and is one of the earliest onset anxiety disorders (Andrews, Henderson, & Hall, 2001; McEvoy, Grove, & Slade, 2011). Cognitive behavioural therapy for SAD has demonstrated efficacy within randomised controlled trials (RCTs, Rapee, Gaston, & Abbott, 2009) and effectiveness within real world community clinics (Lincoln et al., 2003; McEvoy, Nathan, Rapee, & Campbell, 2012). However, a substantial proportion of patients completing gold-standard treatments remain symptomatic so treatment innovations are required.

Cognitive theories suggest that negative images are important maintaining factors of emotional disorders in general (Holmes & Mathews, 2010) and SAD in particular (Rapee & Heimberg, 1997). According to Clark and Wells' (1995) model of SAD, self-focused attention results in the construction of negative self-images viewed from the perspective of others. Rather than being an accurate impression, these negative images reflect the individual's feared outcome (Hackmann et al., 2000) and are imbued with a threatening meaning, such as "I look like an idiot and will be rejected" (Chiupka et al., 2012). Consistent with these theories, studies of SAD (e.g., Hackmann, Clark, & McManus, 2000) and high social anxiety (Chiupka, Moscovitch, & Bielak, 2012) have demonstrated that between 90% and 100% of individuals report experiencing negative social images. Experimental studies have also found that holding a negative image in mind is associated with greater anxiety, higher self-ratings of anxiety visibility, more negative self-cognitions and performance appraisals, increased safety behaviours, poorer performance ratings by conversational partners, increased self-focus, and more negative post-event processing (e.g.,

Hirsch, Meynen, & Clark, 2004). Contemporary CBT protocols incorporate video-feedback to correct distorted self-images and associated meanings (e.g., Rapee et al., 2009).

Hackmann et al. (2000) found that recurrent intrusive images in their SAD sample were often associated with early traumatic social experiences occurring around the time of disorder onset. Imagery rescripting (IR) targeting past traumatic events has been incorporated in comprehensive manuals or as a stand-alone treatment for a range of clinical problems, including post-traumatic stress disorder (Grunert, Smucker, Weis, & Rusch, 2003), depression (Brewin et al., 2009), and more recently in SAD (Wild, Hackmann, & Clark, 2008). One CBT trial for SAD found that a protocol including IR was superior to in vivo exposure with applied relaxation (Clark et al., 2006). Subsequent small clinical trials have found that IR in SAD is associated with significant improvements in negative social beliefs, the vividness and distress of negative images and early memories, fear of negative evaluation, and social anxiety symptoms (Frets, Kevenaar, & van der Heiden, 2014; Lee & Kwon, 2013; Nilsson, Lundh, & Viborg, 2012; Wild et al., 2007, 2008). These studies provide proof of concept and suggest that IR may be a powerful technique for treating SAD. However, to date IR has only been conducted individually, so it is unknown whether it could potentiate greater improvements within cognitive behavioural group therapy (CBGT).

Imagery is characterised as sensory-perceptual representations that may have visual, somatic, auditory, olfactory, and/or gustatory elements, and which have particularly strong links to both positive and negative emotions (Holmes & Mathews, 2010). For instance, one study found that compared to verbal processing instructions, cognitive bias modification training involving imagery was more powerful at changing emotion and interpretations (Holmes, Lang, & Shah, 2009). Compared to verbal thoughts, images are more potent in triggering emotional responses because they share similar neural mechanisms as the perceptual experiences one obtains from *direct* sensory experiences (Brewin, Gregory, Lipton, & Burgess, 2010). These findings have been replicated and extended to naturalistic

settings (e.g., Holmes, Mathews, Dalgleish, & Mackintosh, 2006). A review by Holmes and Mathews (2010) concluded that "…images appear to act as 'emotional amplifiers' for both positive and negative information" (p. 353), and speculated that cognitive restructuring using imagery, rather than verbal representations, would have greater impacts on therapeutic outcomes. It may be that integrating imagery-based techniques into all treatment components (e.g., behavioural experiments, attention retraining) could enhance emotional change, and there is evidence that imagery facilitates access to negative core beliefs (Pratt, Cooper, and Hackmann, 2004).

The main aim of this study was to pilot a new, imagery-enhanced CBGT protocol (IE-CBGT) for SAD. In addition to including video-feedback and IR, the IE-CBGT protocol exploits the strong relationship between imagery and emotion by using imagery-based techniques in all components of the program. The first hypothesis was that IE-CBGT would be acceptable to patients and thus attrition would be low. The second hypothesis was that effect sizes on symptoms of social interaction and performance anxiety would be large. The third hypothesis was that the IE-CBGT would compare favourably to historical controls, who completed a gold standard CBGT protocol, in terms of attrition, effect sizes, and reliable and clinically significant change.

## Method

### *Participants*

Participants comprised 19 consecutive referrals by health professionals (General Medical Practitioners, Psychiatrists, Psychologists) with a diagnosis of SAD to a specialist community mental health clinic. Mean age was 29.7 (SD = 11.6), 10 (53%) were women, and most were born in Australia or New Zealand (n=14), with the remainder from Britain (n=2), Asia (n = 2), and North America (n = 1). Inclusion criteria were (a) a Diagnostic and Statistical Manual of Mental Disorders (DSM-IV; APA, 1994) SAD diagnosis, (b) not currently actively suicidal, self-harming, or experiencing psychosis, and (c) a level of

substance use judged by the assessing clinician as unlikely to significantly interfere with engagement in treatment. The Mini International Neuropsychiatric Interview (MINI PLUS 5.0; Sheehan et al., 2001) was administered by masters- or doctorate-level clinical psychologists to establish Axis I disorders. The MINI has good validity and converges with other structured interviews (e.g., Sheehan et al., 1997). The most common comorbid disorders were major depression and/or dysthymia (n = 10) and generalized anxiety disorder (n = 6). Patients and assessing clinicians made a collaborative decision to attend IE-CBGT if SAD was considered to be the most debilitating problem. Written informed consent was provided for de-identified data to be used for evaluation purposes.

*Outcome Measures*

*Social Phobia Scale (SPS) & Social Interaction Anxiety Scale (SIAS; Mattick & Clarke, 1998).* The SPS and SIAS are widely used, 20-item measures of performance and interaction anxiety, respectively. The SPS describes situations in which the person is the focus of attention and observed by others, such as eating, drinking, and writing. The SIAS contains items reflecting cognitive, affective, and behavioural reactions to interaction situations, such as nervousness when speaking to authority figures or mixing with people. The 5-point response scale for both scales is *Not at all*, *Slightly*, *Moderately*, *Very*, or *Extremely* characteristic of me. Internal reliabilities for the SPS ($\alpha = .89$) and SIAS ($\alpha = .93$) are high within clinical samples and these scales have been shown to be sensitive to change (Cox, Ross, Swinson, & Direnfeld, 1998; Mattick, Peters, & Clarke, 1989). Twelve-week test-retest reliabilities are high for both the SPS ($r = .93$) and SIAS ($r = .92$, Mattick & Clarke, 1998).

*Procedure & Treatment*

IE-CBGT comprised 12 weekly, 2-hour sessions plus a one-month follow-up. Questionnaires were completed prior to the initial assessment (T0) and at treatment sessions 1 (T1), 4 (T4), 8 (T8), 12 (T12), and the one-month follow-up (T13). Treatment integrity

was encouraged by the use of a 187-page treatment manual with detailed therapist instructions, patient handouts, and worksheets (McEvoy & Saulsman, 2013). The co-authors facilitated the first group ($n$ = 8) and the first author co-facilitated the second group with another clinical psychologist ($n$ = 11). The IE-CBGT protocol was modified from a manual demonstrated to be efficacious (Rapee et al., 2009) and effective (McEvoy et al., 2012). The same treatment model and principles were followed in the IE-CBGT protocol with the modifications detailed below. Table 1 summarises some of the key differences between the IE-CBGT and historical control treatments (see Rapee et al., 2009, and McEvoy et al., 2012, for more detail about the historical control treatment). Many imagery-based strategies in the IE-CBGT manual were modified for a group setting from those described in Hackmann, Bennet-Levy, and Holmes (2011).

Session 1 involved socialising patients to identifying and working with negative past, present, and future social *images*. Patients were instructed to transform negative thoughts into images with the rationale that (a) imagery often encourages more specificity than verbal descriptions, which allows for more targeted cognitive modification, and (b) research suggests that imagery has stronger associations with emotions than thoughts. Patients monitored thoughts and images and their multisensory qualities between sessions 1 and 2.

Session 2 involved imagery challenging, including a description of negative social *imagery*, rating associated Subjective Units of Distress (SUDS), standard cognitive challenging techniques, description of the most realistic *image* followed by *visualisation* of the most realistic *image* for two minutes, and SUDS re-rating. Session 3 included the rationale for reducing avoidance, introduction to behavioural experiments, and coping (metaphorical) imagery. Behavioural experiments used imagery to elicit predictions, and these images were then updated (with eyes closed) based on the results and conclusions of the experiment. A coping image was developed to increase anxiety tolerance during behavioural experiments. Session 4 involved within-session behavioural experiments plus

development of individual behavioural experiment hierarchies. Session 5 included psychoeducation about how safety behaviours maintain social anxiety, followed by patients' manipulating their use of safety behaviours first in imagery and then during an in vivo behavioural experiment.

Session 6 involved video feedback of a speech task. Self-imagery was used to elicit predictions, and this image was then updated by 'constructing a new internal video' following their first and fourth viewings of the recording. Session 7 involved within-session group behavioural experiments. In Rapee et al.'s (2009) manual this session also contains individual behavioural experiments, but these were conducted in session 10 in the IE-CBGT protocol (the same number of behavioural experiments was conducted in both protocols). Session 8 involved attention training and focusing. Imagery was used to enhance this session by patients imaginally rehearsing being task-focused prior to a behavioural experiment. Session 9 included IR modified from Arntz and Weertman (2009) and Wild and Clark (2011) for use within a group context (see Discussion). Session 10 involved within-session individual behavioural experiments. New core beliefs were generated and generalised using positive imagery in Session 11, and these formed the basis for developing future action plans. Session 12 involved a review of treatment components, relapse prevention, and a future imagery exercise. The structure of all sessions involved a homework review, new content including in-session skills practice, summary of three take home messages, and homework for the following week.

*Data analysis*

The completion rate is reported as the proportion attending eight or more sessions. One patient discontinued after session two due to scheduling difficulties with new employment, so he completed the program individually and his scores substantially reduced from pre-treatment to post-treatment and further improved to follow-up (SIAS = 63, 32, and 29, SPS = 32, 24, 10, respectively). This patient is included in the benchmarking sample

comparisons (see below) but is excluded from group outcome analyses. There was no other missing data between T1 and T12, but three patients did not provide data at T13 so iterative robust model based imputation (Templ, Kowarik, & Filzmoser, 2011) using the statistical software *R* version 3.0.2 (R Core Team, 2013) was used to impute the missing data. All analyses were intention to treat. Repeated-measures Analysis of Variance (ANOVA) was used to test change on the outcome measures (SIAS, SPS), with Time (T0, T1, T4, T8, T12, T13) as the within-subjects factor, and partial eta-squared ($\eta^2$) indexed effect sizes. For significant main effects of Time, paired-samples t-tests between each active treatment session (T1 to T13) were conducted with Bonferroni-type adjustments to control for Type I error (.05/5 = .01). Paired-samples t-tests were also used to examine symptom stability prior to treatment (T0 to T1) and between post-treatment and follow-up (T12 to T13). For a more stringent test of symptom stability between T0 and T1, and because only a small effect was anticipated over the one-month follow-up, Bonferonni corrections were not made for these analyses. T0 was on average 16.5 days prior to T1. Cohen's *d* indexed effect sizes between two time-points using the formula: (pre-treatment mean minus post-treatment mean)/pooled standard deviation.

IE-CBGT outcomes were benchmarked to historical controls from the same service using the same recruitment and inclusion procedures (N = 94, McEvoy et al., 2012). The comparison treatment was identical in length and clinical contact. The two groups were compared on demographic and clinical variables without Bonferroni corrections because corrections would have favoured the hypothesis that the two samples were similar, potentially obscuring important differences. Repeated-measures ANOVAs were conducted for the SPS and SIAS, with Time (pre- vs. post-treatment) as a within-subjects factor and Treatment Group (IE-CBGT vs. historical controls) as a between-subjects factor, to identify significant Time by Treatment Group interactions. Missing data were imputed for the historical controls. The criteria for reliable change (RC) and clinically significant change

(CSC) were identical to those reported in McEvoy et al. (2012), which were based on Jacobson and Truax's (1991) method. Specifically, the magnitude of change required to achieve RC on the SIAS and SPS was 8.84 and 10.66, respectively. The corresponding CSC cutoff scores were 25.41 and 24.94, respectively. At pre-treatment all patients scored above the SIAS CSC cutoff, but 15 historical controls scored below the SPS CSC cutoff so these patients were excluded from the CSC comparisons (CSC required RC plus a shift from the clinical to non-clinical range). Independent-samples t-tests and chi-square analyses were used to compare the IE-CBGT sample to the historical controls on demographic and clinical variables, RC and CSC.

## Results

### *Attrition*

Most (18/19, 95%) IE-CBGT participants completed eight or more sessions, with an average of 10.68 (SD = 2.29). Eight patients (42.1%) attended all 12 sessions, six (31.6%) attended 11 sessions, 3 (15.8%) attended 10 sessions, and 1 (5.3%) attended 9 sessions.

### *Symptom change*

Repeated-measures ANOVAs demonstrated significant main effects of Time for the SIAS, $F(5, 85) = 27.39$, $p < .001$, Partial $\eta^2 = .62$, and SPS, $F(5, 85) = 19.94$, $p < .001$, Partial $\eta^2 = .54$. Paired-samples t-tests were not significant between T0 and T1 for the SIAS or SPS (Table 2). Follow-up paired-sample t-tests with Bonferonni corrections (.05/5 = .01) demonstrated large and significant effects between T1 and T8, T12, and T13 for both the SIAS and SPS. Paired-samples t-tests demonstrated that SIAS, but not SPS, scores significantly improved between T12 and T13.

### *Benchmarking comparisons*

The IE-CBGT (N = 19) and historical control groups did not significantly differ on pre-treatment SPS or SIAS, number of disorders, age, gender, proportion with comorbid

major depressive disorder/dysthymia, or psychotropic medication use (Table 3). On average IE-CBGT patients attended 1.5 more sessions, but this difference was not significant. A significantly higher proportion of IE-CBGT patients attended at least 8 sessions.

The Time by Treatment Group interaction was significant for the SIAS, $F(2, 220) = 10.37$, $p < .001$, Partial $\eta^2 = .09$, but not for the SPS, $F(2, 220) = .58$, $p = .56$, Partial $\eta^2 = .005$. Follow-up independent-samples t-tests found that the treatment groups did not significantly differ on the SIAS at pre-treatment, $t(110) = -.57$, $p = .57$, $d = -.15$, but the historical controls scored significantly higher at post-treatment, $t(110) = 1.99$, $p < .05$, $d = .51$, and follow-up, $t(110) = 3.81$, $p < .001$, $d = .93$.

Chi-square analyses failed to find a significant difference between the two samples on the proportion achieving RC (yes vs. no) on the SPS at post-treatment, $\chi^2(1) = 2.28$, $p = .63$, or follow-up, $\chi^2(1) = .01$, $p = .94$ (see Table 4). In contrast, a significantly higher proportion achieved RC in the IE-CBGT sample on the SIAS at post-treatment, $\chi^2(1) = 5.65$, $p = .02$, and follow-up, $\chi^2(1) = 6.01$, $p = .01$. The treatment groups did not significantly differ on the proportion achieving CSC on the SPS at post-treatment, $\chi^2(1) < .01$, $p = .96$, or follow-up, $\chi^2(1) < .23$, $p = .64$, or on the SIAS at post-treatment, $\chi^2(1) = 1.44$, $p = .23$. However, a significantly higher proportion of IE-CBGT patients achieved CSC on the SIAS at follow-up, $\chi^2(1) = 15.56$, $p < .001$.

## Discussion

CBGT for SAD is efficacious in research settings and effective within real world clinics, however a substantial proportion of patients remain in the clinical range. The aim of this study was to pilot an imagery-enhanced CBGT protocol. It was hypothesised that IE-CBGT would be acceptable to patients as shown by low attrition, that effect sizes for social interaction and performance anxiety would be large, and that outcomes would compare favorably to historical CBGT controls in terms of attrition, effect sizes, reliable and clinically significant change. These hypotheses were all supported.

Most (95%) of patients completed the IE-CBGT protocol, suggesting that IE-CBGT was highly acceptable. One patient completed the protocol individually due to scheduling difficulties, rather than dissatisfaction with the group format. Social interaction and performance anxiety were stable prior to treatment but steadily reduced during treatment, and social interaction anxiety improved further to follow-up. Effect sizes were large and statistically significant by session eight, and doubled for social interaction anxiety between sessions eight and twelve.

Benchmarking comparisons between the IE-CBGT program and the historical controls were encouraging. Although the historical protocol included video-feedback, the remainder of the program used strategies within the verbal mode (McEvoy et al., 2012; Rapee et al., 2009). The IE-CBGT protocol was an attempt to exploit the properties of imagery across all components of the program to see whether outcomes could be improved. Social interaction anxiety effect sizes between the comparison groups were small and non-significant at pre-treatment, moderate and significant at post-treatment, and large at follow-up, although changes in performance anxiety were similar across the treatments. These findings suggest that compared to the historical controls IE-CBGT was substantially more effective for social interaction anxiety, and was highly effective but not superior for performance anxiety. IE-CBGT effect sizes compared favourably to gold-standard individual CBT (Clark et al., 2006).

A significantly and substantially higher proportion of completers achieved reliable improvement in the IE-CBGT group compared to the historical controls on social interaction anxiety (60% vs. 89%). Importantly, a significantly higher proportion of IE-CBGT patients also fell within the normative range of social interaction anxiety at follow-up. Given the severity of the sample the criteria for achieving CSC were highly stringent, requiring on average a two (SPS) or three (SIAS) standard deviation reduction. As a consequence, although a higher proportion of IE-CBGT patients achieved CSC on the SIAS at post-

treatment the rates were relatively low and not significantly different across the groups. However, if the almost two- (12% vs. 22%) and six-fold (6% vs. 39%) increases in the proportion of patients achieving CSC and post-treatment and follow-up, respectively, can be maintained within larger samples, this represents a substantial improvement in social interaction anxiety outcomes.

This is the first study to use IR within a group context. Although the unique contribution of IR to outcomes cannot be determined from this study, our experiences within these sessions and patients' feedback suggest that IR can be successfully implemented within a group context with four important modifications. First, prior to IR each patient was required to nominate a self-soothing strategy in case they found the procedure overwhelming (e.g., focus on their senses in the here and now within the room, coping image, positive image), which was noted by the therapists so that patients could be prompted to use it if required. No patients reported using their nominated strategy, but this preparation provided a safer context within which to explore distressing past negative images. Second, the IR process was guided by a handout with structured self-reflection after each rescripting stage regarding the nature and intensity of emotions and bodily sensations experienced. A brief group discussion followed the self-reflections to normalise and validate experiences, and to assess willingness to continue. Third, patients were asked to briefly raise their hands as they reached each stage in the rescripting instructions, to reduce intrusiveness from the therapist and ensure that no group member was stuck in a previous stage or aspect of their past image. Fourth, patients were explicitly instructed to select a past negative *social* experience so that other trauma types (e.g., sexual abuse) were not rescripted within the group context.

These early findings are promising but need to be replicated in larger samples. This study is limited by the absence of a control group and must be considered only as preliminary evidence for the effectiveness of IE-CBGT. Although the historical control

group did not significantly differ on any of the comparison sociodemographic or clinical variables, there may nonetheless have been important differences that could have influenced the results. Definitive conclusions about the efficacy of IE-CBGT relative to other treatments can only be made within RCTs, and the contribution of each imagery-enhancement needs to be assessed within dismantling studies. Future evaluations would benefit from using multi-method behavioural (e.g., length of contributions to speech or interaction tasks), cognitive (e.g., attention bias), and psychophysiological (e.g., heart rate) assessments, rather than relying on self-report. Future research should also involve longer-term follow-up and assess potential mediators of change. For instance, Borkovec, Alcaine, and Behar's (2004) avoidance theory suggests that excessive verbal-linguistic activity (e.g., worry) occurs as a consequence of imagery suppression. One mechanism through which IE-CBGT may work is by reducing imagery suppression, enabling broader and more intense activation and modification of the fear network and, thus, superior emotional processing (Foa, Huppert, & Cahill, 2006).

This study provides preliminary evidence that enhancing CBGT techniques with imagery-based strategies is effective for severe samples with SAD. Attrition was low, effect sizes were large, and a high proportion achieved reliable change. Further research with larger samples and within the context of RCTs is warranted to evaluate if these outcomes can be replicated and to identify mechanisms of change.

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Table 1. Some key differences between Imagery-Enhanced Cognitive Behavioural Group Therapy (IE-CBGT) and CBGT completed by the historical controls.

| IE-GCT | | | Historical Controls | | |
|---|---|---|---|---|---|
| Session | Main Topic | Content | Session | Main Topic | Content |
| 1 (T1) | Socialise to the model | Focus on multi-sensory negative social *images* as key maintaining factor, multi-sensory *imagery* monitoring. | 1 | Socialise to the model | Focus on negative *verbal thoughts* as key maintaining factor. |
| 2 | Cognition: identify and challenge | Identify/challenge negative thoughts and *imagery*, Actively elicit balanced *image.* | 2 | Cognition: identify | Introduction to realistic *thinking*, *thought* monitoring. |
| 3 | Avoidance/ behavioural experiments | *Imagery* guides predictions, *visualise* experiment, *update imagery* by incorporating new information into new *images, d*evelop *coping imagery* to manage anxiety. | 3 | Cognition: challenge | *Thought* challenging via verbal mode, *verbal* conclusions. |
| 4 (T2) | Behavioural experiments[a] 1 | In vivo group behavioural experiment using *imagery* to generate predictions, *update imagery* afterwards by incorporating new information, plan individualised hierarchies. | 4 | Avoidance/ behavioural experiments | Introduction to behavioural experiments, anxiety surfing. |
| 5 | Safety | *Imagery* exercise (visualise using/not using safety | 5 | Behavioural | In vivo group behavioural experiment, no reference |

| | | | | | |
|---|---|---|---|---|---|
| | behaviours | behaviours within social situations) before in vivo experiment. | | experiments[a] 1 | to imagery, plan individualised hierarchies. |
| 6 | Negative self-image | Video-feedback following speech task to compare *self-image* to objective image of self when anxious, actively update imagery by creating new self-image. | 6 | Safety behaviours | Safety behaviours in vivo experiment (using/not using safety behaviours). |
| 7 | Behavioural experiments[a] 2 | In vivo group behavioural experiments, review individual hierarchies. | 7 | Negative self-image | Video-feedback following speech task to compare *self-image* to objective image of self when anxious. |
| 8 (T3) | Attention training | Attention focus exercises *enhanced by visualising* task-focused attention. | 8 | Attention training | Attention focusing, no visualisation task. |
| 9 | Core beliefs 1 | Identify past negative social memories (and associated core beliefs) *within imagery*, *imagery rescripting*. | 9 | Behavioural experiments[a] 2 & 3 | In vivo group and individual behavioural experiments. |
| 10 | Behavioural experiments[a] 3 | In vivo individual behavioural experiments. | 10 | Core beliefs 1 | Identify core beliefs via downward arrowing, challenge core beliefs by monitoring evidence that they are not 100% true. |
| 11 | Core beliefs 2 | Develop new *multi-sensory* core beliefs via *positive imagery*, rehearse new core beliefs *via imagery*. Use positive *imagery* to develop action plans. | 11 | Core beliefs 2 | Discuss consequences of core beliefs across life domains, develop new action plans across life domains. Core beliefs not developed/rehearsed via |

| | | | | | |
|---|---|---|---|---|---|
| | | | | | imagery. |
| 12 (T4) | Review | Relapse prevention plans via *imagery*, visualise self applying strategies and managing setbacks in future within *imagery*. | 12 | Review | Relapse prevention plans developed without imagery. |

*Note.* All sessions for both treatments were designed to target one of the key maintaining factors in the model (negative cognitions, avoidance, safety behaviours, negative self-images, self-focused attention, and core beliefs). The table illustrates some key treatment differences but is not comprehensive. The follow-up session included a review of progress and relapse prevention plans in both treatments. IE-CBGT also included a brief future-oriented imagery exercise where clients envisaged themselves continuing to act consistently with what they had learnt in the course.

[a] Three in vivo behavioural experiment components are included in both manuals. The first component involves one group behavioural experiment, the second component involves two group behavioural experiments, and the third component involves two individual behavioural experiments. Thus, although some components were completed in different sessions both groups participated in the same total number of within-session behavioural experiments.

Table 2. *Means, standard deviations (SDs), mean change scores, intention to treat test statistics and effect sizes for the SIAS and SPS*

| | Mean (SD) | Mean Change (SD) | Test Statistics | Cohen's *d* |
|---|---|---|---|---|
| SIAS | | | | |
| T0 | 58.94 (9.97) | | | |
| T1 | 58.44 (9.21) | T0-T1: 0.50 (8.22) | $t(17) = 0.26$, $p = .80$ | .05 |
| T4 | 55.67 (11.28) | T1-T4: 2.78 (4.60) | $t(17) = 2.56$, $p = .020$ | .27 |
| T8 | 49.17 (12.57) | T1-T8: 9.28 (10.12) | $t(17) = 3.89$, $p = .001$ | **.85** |
| T12 | 37.67 (13.42) | T1-T12: 20.78 (13.99) | $t(17) = 6.30$, $p < .001$ | **1.84** |
| T13 | 32.36 (15.30) | T1-T13: 26.09 (17.80) | $t(17) = 6.22$, $p < .001$ | **2.13** |
| | | T12-T13: 5.31 (7.71) | $t(17) = 2.92$, $p = .01$ | **.37** |
| SPS | | | | |
| T0 | 44.00 (13.28) | | | |
| T1 | 45.00 (12.01) | T0-T1: -1.00 (7.88) | $t(17) = -.54$, $p = .60$ | -.08 |
| T4 | 40.33 (13.30) | T1-T4: 4.67 (7.58) | $t(17) = 2.62$, $p = .018$ | .37 |
| T8 | 31.78 (13.18) | T1-T8: 13.22 (14.74) | $t(17) = 3.81$, $p = .001$ | **1.05** |
| T12 | 24.11 (13.33) | T1-T12: 20.89 (16.48) | $t(17) = 5.38$, $p < .001$ | **1.65** |
| T13 | 22.64 (13.50) | T1-T13: 22.36 (17.22) | $t(17) = 5.51$, $p < .001$ | **1.75** |
| | | T12-T13: 1.47 (7.07) | $t(17) = 0.88$, $p = .39$ | .11 |

*Notes.* SIAS = Social Interaction Anxiety Scale, SPS = Social Phobia Scale, A = Assessment (initial), T = Treatment session. Bonferonni-corrected alpha = .01 for comparisons between T1 and subsequent sessions. Uncorrected alpha used for T0 to T1 and T12 to T13 comparisons. Significant effect sizes are bolded.

Table 3. *Benchmarking comparisons between imagery enhanced-CBGT (IE-CBGT) and historical controls*

| | IE-CBGT (N = 19) | CBGT (N = 94) | Test statistics | *Cohen's d/ % difference* |
|---|---|---|---|---|
| Pre-treatment mean (SD) | | | | |
| SPS | 44.84 (11.66) | 42.17 (16.07) | $t(111) = 0.61$, $p = .54$ | .19 |
| SIAS | 57.63 (10.13) | 56.95 (10.30) | $t(111) = 0.27$, $p = .79$ | .07 |
| Number of disorders (mean) | 2.10 (.74) | 1.93 (.74) | $t(111) = 0.97$, $p = .33$ | .23 |
| Mean number of sessions (SD) | 10.68 (2.29) | 9.14 (3.47) | $t(111) = 1.07$, $p = .29$ | .53 |
| Age (years) | 29.68 (11.59) | 32.77 (11.41) | $t(111) = -1.07$, $p = .29$ | -.27 |
| Women (%) | 53 | 40 | $\chi^2(1) = 0.33$, $p = .45$ | 13% |
| Major depression/dysthymia (%) | 53 | 57 | $\chi^2(1) = 0.15$, $p = .70$ | 4% |
| Medication (%) | 63 | 74 | $\chi^2(1) = 0.70$, $p = .55$ | 11% |
| Completers (attended 8+ sessions) | 95 | 65 | $\chi^2(1) = 6.69$, $p = .01$ | 30% |

*Notes*. CBGT = cognitive behavioural group therapy, SPS = social phobia scale, SIAS = social interaction anxiety scale.

Table 4. *Number (Proportion) of Each Sample Achieving Reliable Change (RC) and Clinically Significant Change (CSC)*

| | IE-CBGT | | CBGT | |
|---|---|---|---|---|
| | SPS | SIAS | SPS | SIAS |
| Post-treatment | | | | |
| Reliable deterioration | 0 (0%) | 0 (0%) | 3 (3%) | 5 (5%) |
| Unchanged | 4 (22%) | 2 (11%) | 23 (25%) | 33 (35%) |
| Reliable improvement | 14 (78%) | 16 (89%) | 68 (72%) | 56 (60%) |
| % achieving CSC | 9/18 (50%) | 4/18 (22%) | 39/79[a] (50%) | 11/94 (12%) |
| Follow-up | | | | |
| Reliable deterioration | 0 (0%) | 0 (0%) | 3 (3%) | 5 (5%) |
| Unchanged | 5 (28%) | 2 (11%) | 24 (25%) | 34 (36%) |
| Reliable improvement | 13 (72%) | 16 (89%) | 67 (72%) | 55 (59%) |
| % achieving CSC | 8/18 (44%) | 7/18 (39%) | 40/79 [a] (51%) | 6/94 (6%) |

*Note.* IE-CBGT = Imagery enhanced cognitive behavioural group therapy, CBGT = cognitive behavioural group therapy completed by historical controls, SPS = social phobia scale, SIAS = social interaction anxiety scale, CSC = clinically significant change.

[a] 15 historical controls scored below the SPS CSC cutoff at pre-treatment so were excluded from CSC calculations