Face-to-face and Internet-based Cognitive Therapy for Social Anxiety Disorder: Mechanisms of Change and Treatment Dissemination



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Abstract

While effective psychological interventions for common mental health difficulties exist, our understanding of how they work, and our ability to disseminate them at scale, is limited. This thesis aimed to 1) examine the mechanisms underlying clinical improvement in one such intervention, Cognitive Therapy for Social Anxiety Disorder (CT-SAD), and 2) disseminate and evaluate an internet-based version (iCT-SAD) in a new culture (Hong Kong).

Following an introduction and literature review (Chapters 1 and 2), eight studies are presented. Studies 1, 2a, and 2b (Chapters 3 and 4) investigated three candidate mediators (negative social cognitions, self-focused attention, and depressed mood) of the relationship between time in therapy and social anxiety symptoms. Results indicated that cognitions consistently mediated subsequent clinical improvement, with weaker and less consistent effects for self-focused attention and depressed mood.

Studies 3a, 3b, and 3c (Chapter 5) examined 'sudden gains': large and stable symptom reductions between consecutive therapy sessions, in CT-SAD and iCT-SAD. Sudden gains were common in both treatments, occurring with similar frequency and magnitude. They were associated with better overall therapy outcome. There was some evidence of reductions in negative cognitions and self-focused attention prior to, and concurrently with, gains. Clients in CT made more statements indicating 'generalised' learning in 'pre-gain', relative to control, sessions.

Study 4 (Chapter 6) implemented a new iCT-SAD therapist training programme with three therapists from Hong Kong, who delivered the treatment in a pilot case series. Study 5 (Chapter 7) then evaluated the efficacy of iCT-SAD in Hong Kong compared to waitlist controls in a randomized controlled trial. Results indicated the training was effective at developing iCT skills and competence, and that iCT-SAD was superior to waitlist, showing large effect sizes comparable to UK studies. Implications for theory, research, and practice are discussed (Chapter 8).

Overall, the findings indicate that negative social cognitions play an important role in determining clinical improvement in CT-SAD and iCT-SAD, that the therapy mechanisms of change investigated appear to be similar between these treatment formats, and that iCT-SAD was successfully disseminated to another culture without losing efficacy.

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List of Abbreviations

ABM	Attention Bias Modification
ACT	Acceptance and Commitment Therapy
ADIS-5	Anxiety and Related Disorders Interview Schedule for DSM-5
AIC	Akaike Information Criterion
ANOVA	Analysis of Variance
BAI	Beck Anxiety Inventory
BDI	Beck Depression Inventory
BFNE	Brief version of the Fear of Negative Evaluation Scale
BIC	Bayesian Information Criterion
CBGT	Cognitive-behavioural group therapy
CBT	Cognitive Behaviour Therapy
cCBT	Computerised Cognitive Behavioural Therapy
CFI	Comparative Fit Index
CR-SE	Cognitive Reappraisal Self-Efficacy
CT	Cognitive Therapy
CTCS-SP	Cognitive Therapy Competence Scale for Social Phobia
CTS-R	Cognitive Therapy Scale - Revised
DASS-21	Depression, Anxiety, and Stress Scale 21-item version
DSM-5	Diagnostic and Statistical Manual of Mental Disorders, 5th Edition
EBPT	Evidence Based Psychological Treatment
EGT	Exposure Group Therapy
FNE	Fear of Negative Evaluation Scale
FPSQ	Fear of Public Speaking Questionnaire
GAD	Generalised Anxiety Disorder
GAD-7	Generalised Anxiety Disorder Questionnaire
GLQ	Generalised Learning Questionnaire
HKSAR	Hong Kong Special Administrative Region
IAPT	Improving Access to Psychological Therapies
ICBT	Internet Cognitive Behavioural Therapy
iCT	Internet Cognitive Therapy
IPT	Interpersonal Therapy
ISRCTN	International Standard Registered Clinical/Social Study Number
LL	Loglikelihood
LSAS	Liebowitz Social Anxiety Scale
NICE	National Institute for Health and Care Excellence
PDSS	Panic Disorder Severity Scale
PHQ-9	Patient Health Questionnaire
PRCS	Personal Report on Confidence as a Speaker
PTSD	Posttraumatic Stress Disorder

RCI	Reliable Change Index
RCT	Randomised Controlled Trial
RMSEA	Root Mean Square Error of Approximation
SAD	Social Anxiety Disorder
SADS	Social Avoidance and Distress Scale
SAQ	Social Attitudes Questionnaire
SBQ	Social Behaviour Questionnaire
SCID-5	Structured Clinical Interview for DSM-5
SCQ	Social Cognitions Questionnaire
SEM	Structural Equation Modelling
SIAS	Social Interaction Anxiety Scale
SPAI	Social Phobia and Anxiety Inventory
SPIN	Social Phobia Inventory
SPS	Social Phobia Scale
SPSQ	Social Phobia Screening Questionnaire
SPWSS	Social Phobia Weekly Summary Scale
SSPS-N	Self-Statements During Public Speaking – Negative Self-Statements
SSRI	Selective Serotonin Reuptake Inhibitor
TLI	Tucker-Lewis Index
VRE	Virtual Reality Exposure Therapy
WSAS	Work and Social Adjustment Scale

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1

Introduction and Overview

Over the last few decades, substantial progress has been made in developing effective psychological treatments for mental health problems. Landmark early studies, such as Joseph Wolpe's (1958) systematic desensitisation procedure for anxiety, and its evaluation (Paul & Shannon, 1966), and Aaron Beck's (1976) cognitive therapy approach to treating common mental health problems, again coupled with systematic evaluation in a randomised controlled trial (Rush, Beck, Kovacs, & Hollon, 1977), have paved the way for the development of a range of cognitive behavioural therapies (CBT) and other approaches, and the evaluation of their efficacy. It is now the case that many empirically-supported treatments exist for a range of common mental health problems, with efficacy and effectiveness data suggesting that on average 50% of those receiving them recover (Clark, 2018; Layard, Clark, Knapp, & Mayraz, 2007). These treatments also generally lead to lower rates of relapse when compared to other forms of treatment such as medication (Cuijpers et al., 2013; Hollon, Stewart, & Strunk, 2006). In the UK, this progress in treatment development and evaluation has led to CBT approaches being advocated by the National Institute for Health and Care Excellence (NICE) as primary treatment recommendations for depression and all the anxiety disorders (e.g. NICE, 2009, 2013b).

Whilst it is of course beneficial that such treatments exist, maximising their impact requires two key issues to be addressed: First, we know little about how and why these treatments work, that is, the mechanisms through which clinical improvement happens. A better understanding of this has the potential to further improve the efficacy and efficiency of treatments by allowing the key therapeutic processes to be targeted. Second, there is a significant problem with availability and access to such treatments, meaning that although they exist, many people are unable to benefit from them. It is these two issues that form the focus of this thesis.

1.1 Understanding Mechanisms of Change to Improve Treatment Efficacy

The first issue relates to the efficacy of current evidence-based psychological treatments (EBPTs). While a 50% recovery rate is good, there is clear room for improvement, and one way to achieve this is by gaining a better understanding of how and why treatments are having their clinical effects. If we can determine which factors and mechanisms might be involved in producing clinical improvement, it may be possible to adapt therapies to place more emphasis on these, and/or to implement techniques that target these factors earlier in therapy, so as to increase the efficacy and efficiency of the intervention.

Research into the mechanisms of treatment change typically examine mediation (how treatments have their effects), moderation (for whom, and under what circumstances treatments are effective), or individual patient trajectories, which examine the variability between people, and explore the timecourse and/or

patterns of change among those who benefit most or least from treatment. Such studies have received much less research attention in comparison to treatment efficacy studies, and have been emphasised as a significant need to advance the field (Emmelkamp et al., 2014; Holmes et al., 2018; Kazdin, 2007).

Two methods to examine mechanisms of change are employed in this thesis: firstly, a series of mediation studies is presented, aiming to understand whether changes in hypothesised mediators drive subsequent clinical improvement; and secondly, an analysis of 'sudden gains' (Tang & DeRubeis, 1999), where people make a significant improvement from one session to the next. This work explores the frequency and clinical significance of such gains, aiming to understand why they occur and what this might imply for enhancing treatment.

1.2 Increasing the Availability of Evidence-Based Treatments

Following the development and empirical evaluation of psychological treatments, the next step is to make them available to those that need them (Clark, 2013; Fritz, 2016; Layard & Clark, 2014). This involves the translation of research findings into routine clinical practice to ensure that patients can benefit from the most efficacious treatments.

Unfortunately, in many fields of healthcare but particularly in mental health, the evidence suggests that most people are unable to access EBPTs as these are not reaching routine clinical practice sufficiently (Harvey & Gumport, 2015; Kazdin, 2017; Layard & Clark, 2014; McManus, Bebbington, Jenkins, & Brugha, 2016;

Powers & Deacon, 2013; Shafran et al., 2009). This 'dissemination gap' between research and practice is a significant problem, and some researchers cite evidence that access to EBPTs in the USA and UK is diminishing (Harvey & Gumport, 2015). Kazdin (2017) highlighted that it is currently the case that globally, the majority of people experiencing psychological problems receive no treatment at all. There is also evidence to suggest that where treatments are provided, they may not be the type that patients prefer; McHugh and colleagues (2013) conducted a metaanalysis of 34 studies, which found that when given the choice, adults were three times more likely to prefer psychological over pharmacological treatments. However, in the 2014 English Adult National Comorbidity Survey (McManus et al., 2016), while 13.1% of respondents reported currently receiving treatment for a common mental health problem, only 3.0% of respondents reported receiving counseling or psychological therapy, and 11.6% reported receiving medication.

Therefore it appears that the availability of evidence-based psychological interventions is generally poor, and may even be worsening, despite a general patient preference for psychological treatments. The availability issue is perhaps principally a result of there being too few therapists trained in their delivery, and this could be for a number of reasons: first, many therapists working today may have completed their professional training prior to some of these treatments becoming available. While some may seek out further training, this is not consistent. Although UK practitioner psychologists are required to undertake continuing professional development (CPD) activities (Health and Care Professions Council, 2017) there are currently no professional requirements to

undergo further training in new EBPTs as they become available. Second, professional training programmes such as UK doctoral courses in clinical psychology are not required to provide training in all EBPTs, or assess competence in their delivery. Lastly and perhaps most significantly, it may be that the current number of trained therapists is simply dwarfed by the number of people who could benefit from treatment.

Addressing this problem requires a large increase in training efforts, for which the financial implications need to be considered. One successful example of this has been the Improving Access to Psychological Therapies programme in England (IAPT), where lobbying the UK government to consider the economic benefits of increased provision of EBPTs has led to a significant increase in therapist training over the last ten years (Clark, 2018; Layard & Clark, 2014). Figures from 2017 indicate that over 7000 new therapists have been trained since IAPT started in 2006, with around 960,000 people per year accessing IAPT services and 560,000 receiving a course of treatment (Clark, 2018). A key component of this training was establishing national curricula for training in specific EBPT protocols, and assessing the delivery of these using a standardised competence framework (Roth & Pilling, 2007).

While this training increase has significantly improved the number of trained therapists, and the number of people accessing evidence-based psychological therapies, services are still currently reaching only 16% of people experiencing anxiety or depression in the community (Clark, 2018). The ability to 'scale up' the provision of EBPTs is therefore a priority, both in the UK and internationally.

The further expansion of training programmes and service provision is possible, though would require vast increases in funding. An alternative is to consider how EBPTs might be delivered in more efficient and accessible ways. The current level of therapist input per patient in most EBPTs limits their scalability due to the time, money, and expertise required to deliver them. It has therefore been suggested that successful large-scale dissemination will require the development of EBPTs involving reduced therapist input, or removing the therapist altogether, for example through internet or mobile platforms (Andrews & Williams, 2015; Fairburn & Patel, 2014, 2017; Fairburn & Wilson, 2013; Teachman, 2014).

The accessibility of internet interventions is also a possible advantage; those in rural or remote areas, or in places with limited service provision are more likely to be able to receive treatment if delivered online. Similarly, the global reach of internet interventions is potentially a significant benefit (Fairburn & Patel, 2017), in that these treatments can be more easily translated and delivered in other languages compared to face-to-face therapies.

This thesis explores the implementation of a UK-developed internet-based EBPT in Hong Kong. The aims were to describe and evaluate a programme of therapist training in the delivery of the treatment, to assess the efficacy of the intervention in a randomised controlled trial, and to consider the extent of cultural adaptation required for implementing the intervention in this context.

1.3 Cognitive Therapy for Social Anxiety Disorder

Individual Cognitive Therapy for Social Anxiety Disorder (CT-SAD) based on the model of Clark and Wells (1995) is an established EBPT, recommended in the UK as a first-line treatment for social anxiety by NICE (2013b). It constitutes an excellent candidate for the investigation of the two key issues described above, for a number of reasons: first, it shows clear treatment effects that have been shown to be superior to a range of other psychological and pharmacological treatments (Mayo-Wilson et al., 2014), suggesting these are specific to the therapy content. Second, social anxiety is the most common of the anxiety disorders, meaning there is a large demand for treatment both in the UK and globally. Third, there is a good body of evidence that online cognitive-behavioural interventions for social anxiety are effective (see Kampmann, Emmelkamp, & Morina, 2016), including one trial of an online version of the CT-SAD protocol (Clark, Wild, et al., in preparation). Lastly, there are some important gaps in our understanding of the mechanisms of change and dissemination of therapies for social anxiety, such as whether online interventions operate through the same mechanisms as their face-to-face equivalents, and whether such treatments can be effectively disseminated to other cultures where social anxiety may present differently.

Chapter 2 describes these treatment protocols in more detail, and reviews the relevant literature in relation to the topics outlined above.

2

Background and Literature Review

This chapter provides background information and reviews of existing literature relevant to the topics covered in this thesis, and consists of four elements. Firstly, it begins with an overview of social anxiety disorder, and a description of the Cognitive Therapy treatment protocol that was developed from Clark and Wells' (1995) psychological model of the maintenance of the disorder, before discussing the delivery of psychological interventions via the internet, and outlining the internet Cognitive Therapy programme used in the present studies. Secondly, the methodology and current literature relating to mediation of clinical improvement, and sudden gains are described and discussed. Thirdly, issues in the dissemination of evidence-based psychological interventions are reviewed. Finally, the aims and research questions in relation to each study are described.

2.1 Social Anxiety Disorder

Social Anxiety Disorder (SAD; also known as Social Phobia), a persistent fear of social situations and interactions, is a common mental health problem, with lifetime prevalence estimates of up to 13%, making it the most common anxiety disorder and the third most common psychiatric problem after major depression and alcohol dependence (Kessler et al., 2005; Kessler, Petukhova, Sampson,

Zaslavsky, & Wittchen, 2012; Stein et al., 2017). People with SAD report significant concerns about saying or doing something in a social situation that will be embarrassing or humiliating, or that will lead to others rejecting them. These commonly include showing signs of anxiety that might be noticeable to others, such as sweating, shaking, or blushing, concerns about saying something boring, stupid, or offensive to others, running out of things to say, or being perceived negatively, for example as weird, unlikeable or disinterested (see Clark, 2005; Veale, 2003). In addition to this, the DSM-5 diagnostic criteria for SAD (American Psychiatric Association, 2013) stipulate that the fear must be persistent in relation to one or more social situations, these situations must almost always provoke anxiety, that feared situations are avoided or endured with intense distress, that the fear is out of proportion to the situation, and that the problem has been present for at least six months, causing significant distress or impairment (American Psychiatric Association, 2013).

The impairment and impact on people's lives caused by SAD can be significant; studies have reported impaired educational attainment, with children and young people more likely to leave school early and obtain fewer qualifications (van Ameringen, Mancini, & Farvolden, 2003), along with reduced functioning in work, social, and family life (Aderka, Hofmann, et al., 2012; McManus, Peerbhoy, Larkin, & Clark, 2010; Veale, 2003). On average, people with SAD earn less compared to nonanxious controls (Katzelnick & Greist, 2001), and have lower rates of marriage, higher rates of divorce, and are less likely to have children (Wittchen, Fuetsch, Sonntag, Müller, & Liebowitz, 2000). The condition typically starts in childhood or adolescence, and in the absence of treatment, recovery is

rare, so many people find the whole of their lives blighted by the condition (Bruce et al., 2005). Unfortunately this chronic experience of SAD is common; the average time between onset and seeking help is 10-15 years (Grant et al., 2005), which may be due to limited awareness of the condition and available treatments, or avoidance of the social demands of seeking help. It is perhaps unsurprising therefore that SAD is associated with an increased risk of depression, other anxiety disorders, substance use, and suicide (Katzelnick & Greist, 2001; Magee, Eaton, Wittchen, McGonagle, & Kessler, 1996).

Fortunately, it is the case that a number of evidence-based interventions for SAD exist, and are recommended in the UK by the National Institute for Health and Care Excellence (NICE, 2013a). The NICE guidelines for SAD include both psychological and pharmacological interventions with the first line recommendation for adults being individual cognitive therapy (CT) based on Clark and Wells' (1995) theoretical model. This therapy has been shown to be the most effective and cost-effective of a range of interventions in a recent network meta-analysis (Mayo-Wilson et al., 2014) and economic analysis (Mavranezouli et al., 2015). The network meta-analysis included 101 trials and over 13000 participants, and involved 41 different treatments, including psychological therapies, a range of medication types, and combination treatments. The analysis allows the efficacy of different treatments to be compared both within and between individual trials. Other evidence-based treatments recommended by NICE include individual CT based on the model by Hope, Heimberg and Turk (2006) and secondary recommendations, where efficacy has been shown empirically but is less strong, include group-based CBT,

CBT-based supported self-help, medication such as a selective serotonin reuptake inhibitor (SSRI), and short-term psychodynamic psychotherapy specifically developed for SAD.

2.2 Cognitive Therapy for Social Anxiety Disorder (CT-SAD)

The CT treatment protocol for SAD studied in this thesis is based on a cognitive model of the key factors involved in maintaining the problem (Clark & Wells, 1995)(see Figure 1). The model suggests that in a social situation, people with SAD experience a range of negative automatic thoughts linked to assumptions about how they should behave or come across. These thoughts include those about how they look to others (e.g. “I am looking shaky”), concerns about something bad happening (e.g. “I will say something boring”, “people will stare at me”), and thoughts about themselves more generally (e.g. “I am useless”). These thoughts influence three other components in the model: emotions, self-focus, and safety behaviours.

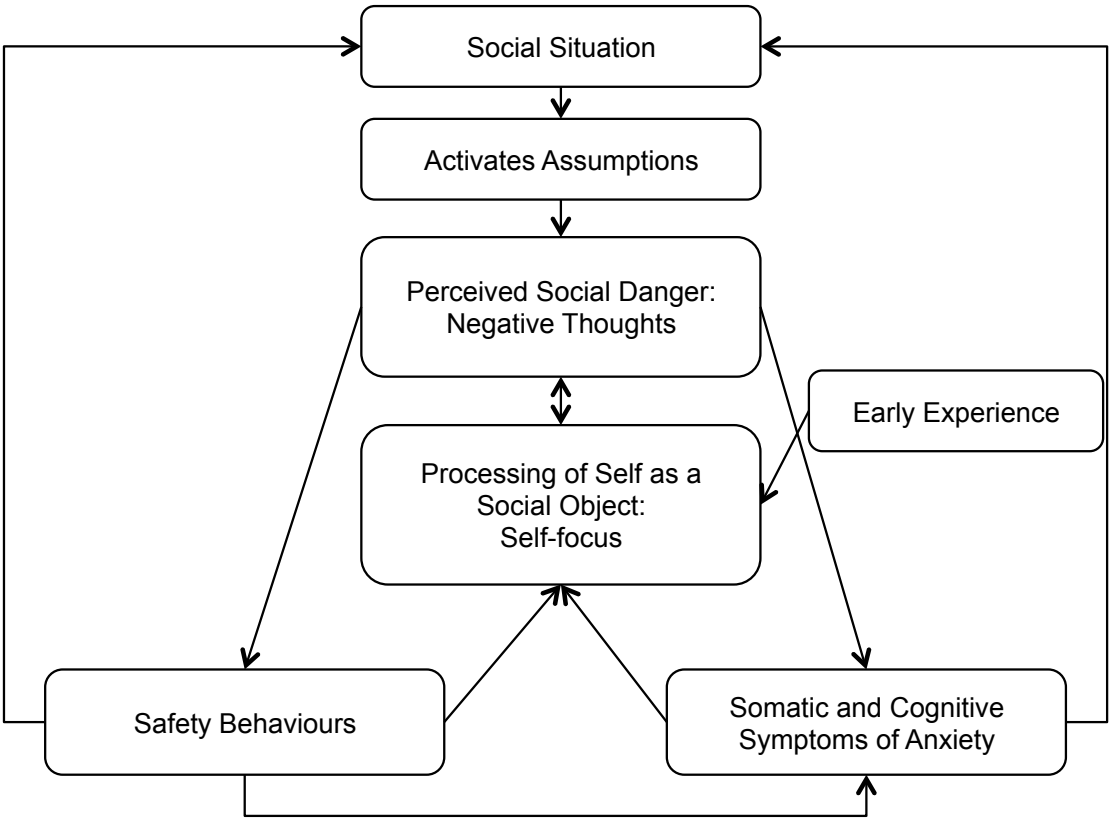


Figure 1

The Clark and Wells cognitive model of social anxiety (developed from Clark & Wells, 1995).

Given the sense of threat generated by the negative automatic thoughts, the principal emotional consequence is anxiety, accompanied by its physiological consequences such as feeling hot, a racing heart, or nausea. Self-focus refers to a heightened sense of self-awareness and self-consciousness. The person's focus of attention is drawn inwards in order to monitor how they are coming across, and this process can often be accompanied by a negative image or felt impression of the self (e.g. looking beetroot red, big beads of sweat rolling down my face, a 'gibbering wreck'). These images or impressions may be influenced by previous socially traumatic experiences.

The term safety behaviour refers to an action undertaken in response to a negative cognition, which is designed to prevent or minimise a feared outcome, and therefore promote a sense of safety from the perceived threat. Hirsch, Meynen and Clark (2004) suggested they can be divided into the two categories below, and factor analytic studies of the Social Behaviours Questionnaire (SBQ; Clark, 1995), which lists a range of safety behaviours common to SAD, have supported this categorisation (Gray & Clark, submitted; Plasencia, Alden, & Taylor, 2011):

1. Avoidance: As well as avoiding difficult social situations entirely, people may use many other avoidance-based behaviours, such as not sharing their opinions or disagreeing with others, avoiding eye contact, or positioning themselves at the edge of groups so as not to be noticed.
2. Impression management: People may engage in behaviours with the aim of giving a 'normal' or favourable impression to others. These can include rehearsing or replaying sentences in their mind before and after they speak to check they are saying appropriate things, or making special efforts to get their words right, speak fluently, or check they are coming across well. People may also ask lots of questions, talk more, or try to act 'normally', to try to give the impression of someone who is relaxed and confident.

While safety behaviours are a logical and understandable response to negative thoughts about social situations, they are problematic for a number of reasons. Firstly, as they are used so frequently, people can feel that the only reason they coped in a social situation was because of these. They therefore do not get the

opportunity to discover that some of their fears may be unrealistic, being much less likely to happen, or much less significant if they do, even without safety behaviours. Secondly, safety behaviours can make people more self-conscious, increasing the inward focus of attention, and consequently increasing anxiety. Third, some safety behaviours can look unusual or are more noticeable to others, meaning they can attract attention in their own right. For example, speaking quietly may be intended to avoid being noticed, but may cause others to lean towards you, look at you more, and focus more on what you are saying. Fourth, these behaviours can mean people come across to others in ways that are not intended. For example, someone who is avoiding talking about themselves, not looking directly at others, and monitoring carefully what they say may be perceived as guarded, distracted, or uninterested in others; this may be the complete opposite to the impression they wished to convey. Lastly there are some safety behaviours that can directly bring about the feared social outcome. For example someone concerned about shaking may grip so tightly onto a glass that it starts to shake, or wearing extra layers of clothing to conceal sweating may mean people sweat more.

Whilst the individual components of the model are important, its key explanatory power comes from outlining how the components interact to establish cyclical patterns that maintain the anxiety. As described above, safety behaviours occur in response to negative thoughts, but they can serve to increase self-focus, which in turn strengthens belief in the negative thoughts. Similarly, the symptoms of anxiety experienced in relation to these thoughts can also increase self-focus, and therefore belief in the negative thoughts. At its core,

the model therefore suggests two 'vicious cycles' that maintain anxiety. As outlined in Figure 1, it is also possible for safety behaviours to directly influence how the social situation proceeds, and to generate symptoms of anxiety, as described above. Finally, the arrow from anxiety symptoms to the social situation highlights the potential for attention to become biased towards external stimuli that may be interpreted in a negative or threatening manner.

The model was developed following interviews with a number of people experiencing social anxiety, along with existing literature and clinical experience, which led to hypotheses regarding possible maintenance factors that were then tested experimentally. These studies demonstrated that people with social anxiety show a greater bias toward focusing their attention internally rather than on the outside world (Mansell, Clark, & Ehlers, 2003), that holding a negative self-image in mind during a social interaction leads to greater anxiety, and lower perceived social performance (Hirsch et al., 2004), and that the use of safety behaviours during social interactions prevents disconfirmation of anxious beliefs, thus maintaining anxiety (Wells et al., 1995). A further review of the empirical tests of the cognitive model is described in Clark (2005).

These empirical demonstrations of anxiety-maintaining factors, and the cognitive model that presents a framework for how they interact, have guided the development of the therapeutic interventions that form the CT-SAD protocol. Some of these clinical techniques (such as the Self-focused Attention and Safety Behaviours Experiment described below) draw directly on methodologies and procedures used to research and test the cognitive model. This approach to

developing treatments has also been used successfully for other anxiety disorders such as panic disorder and posttraumatic stress disorder (see Clark, 2004, 2013).

The standard Clark and Wells CT for SAD protocol involves up to 14 weekly sessions with a therapist, each lasting up to 90 minutes. Whilst the therapy content is individualised to the needs of each person, there are a number of key components, which are discussed below:

2.2.1 Deriving a Model

Following detailed assessment of the problem, an individualised version of the cognitive model is developed collaboratively with the client (see Figure 2). They are asked to describe a recent difficult social event that they stayed in for a while. Once a suitable example has been identified, the therapist and client elicit the key cognitions, emotions, and safety behaviours that were present, along with any images or impressions of the self associated with feeling self-conscious. The arrows between components of the model are discussed and added to the model, which is developed directly onto a whiteboard. This allows both client and therapist to see the developing formulation, along with providing an inanimate focus for the discussion, which can reduce the conversational and social demands of the situation.

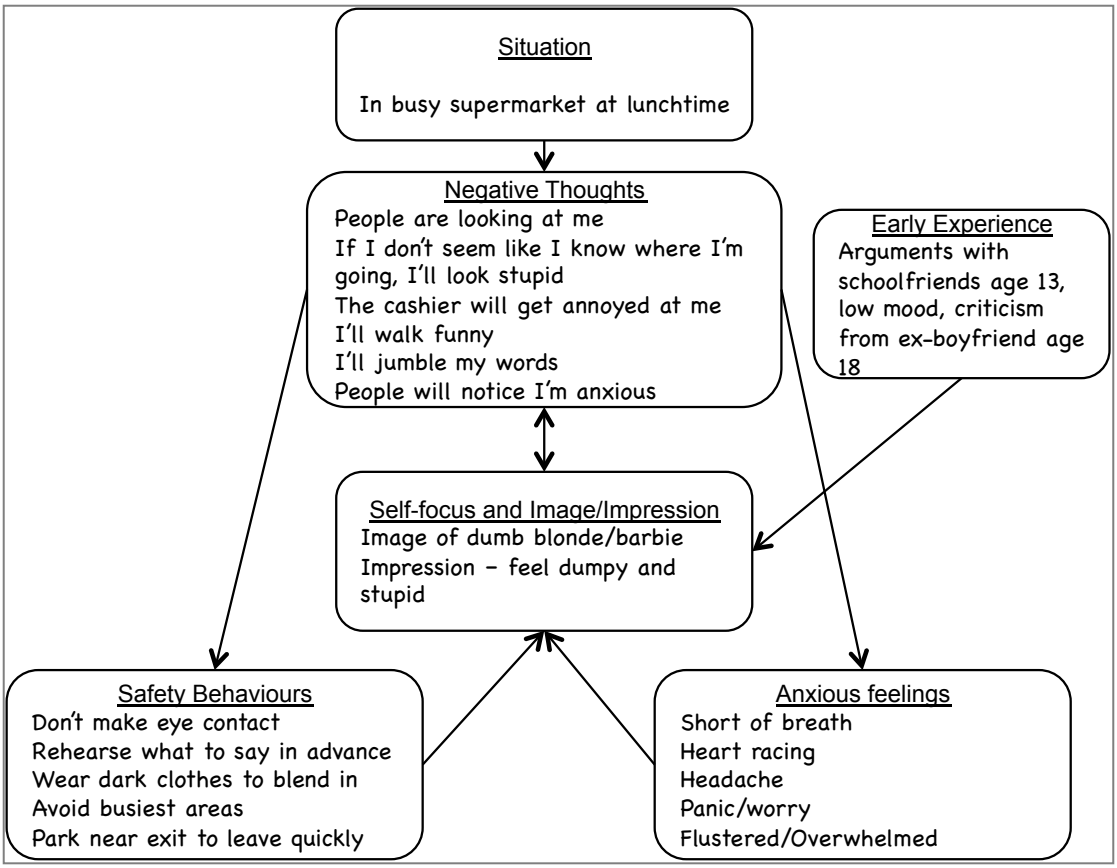


Figure 2

A completed example of an individualised cognitive model.

2.2.2 Self-focused Attention and Safety Behaviours Experiment

In order for clients to experience for themselves whether self-focused attention and safety behaviours are helpful in social situations, an experiment is conducted early on in therapy, involving two brief conversations with a stranger. In the first, clients are instructed to do their safety behaviours as much as possible, such as avoiding talking about themselves, not making eye contact, preparing what to say in advance, or any other key behaviours they do to feel safer in social situations, or to prevent their feared social outcomes from happening. In addition they are instructed to closely monitor how they are coming across. In the second they are instructed to not do their safety behaviours, not to monitor

how they are coming across, and to just focus on and get lost in the conversation. This is obviously difficult and unfamiliar for clients, so a brief role-play prior to the second conversation can be used to practise this approach.

Predictions of performance, anxiety, and the likelihood of the client's feared social outcomes (e.g. I'll blush, I'll say something stupid) are taken prior to each conversation, along with ratings of these after each conversation. Through comparison of the two conversations, clients can discover that safety behaviours and self-focused attention are generally associated with more anxiety and poorer conversational outcomes. The aim of the experiment is to start to elicit doubts about the strategies currently being used to manage social situations, which can provide a basis for behavioural experiments and attention training in later sessions. Feedback from the conversational partner is also obtained in relation to their overall experience of each conversation, and the client's specific concerns.

The self-focused attention and safety behaviours experiment is derived from Wells and colleagues' (1995) experimental study, and as a standalone technique, has been shown to help patients understand that these factors serve to maintain anxiety, to reduce symptoms of social anxiety, and to increase a sense of self-authenticity (McManus et al., 2009; Plasencia, Taylor, & Alden, 2016; Wells et al., 1995).

2.2.3 Video and Photo Feedback

Therapy sessions are routinely video recorded with the client's consent. A video record can be particularly helpful in SAD treatment, as social experiments such

as the one described above can subsequently be reviewed and discussed. The aim is to consider the objective evidence of how the client comes across in social situations, and to correct biased self-perceptions around things that clients assume to be occurring and noticeable to others. The client is asked to make predictions about what they will see when they watch themselves on video. They then are asked to view the video as if watching a stranger on television, which aims to help in taking a more objective viewpoint. Ratings of what was observed on video are then taken and compared to the earlier predictions. It has been demonstrated that after viewing the video of their performance, 94-98% of clients rate themselves as coming across better than they predicted, with significant reductions in social anxiety symptoms observed in the next session (McManus et al., 2009; Warnock-Parkes et al., 2016), indicating this can be a powerful therapeutic tool, and a meaningful experience for clients. The systematic approach to preparing and watching videos described above has been shown to be a particularly important part of this procedure (Harvey, Clark, Ehlers, & Rapee, 2000; Warnock-Parkes et al., 2016).

In order to distil key messages from video feedback, still images can be taken from significant points during an experiment (such as a particular moment where the client felt they were shaking, or felt they said something boring). By comparing the image of this moment with another during the conversation where they felt more comfortable, or by capturing how others in the conversation looked at the time, clients can discover key messages of therapy; that feelings are private, and that how they look to others remains essentially the same whether they feel uncomfortable or not. These still photos are often used

with a brief caption to outline the key learning, and are taken home by clients to refer back to as required.

2.2.4 Attention Training

The cognitive model suggests that an important maintenance factor in social anxiety is the tendency to focus one's attention internally during social interactions, rather than on the conversation or situation itself. To break this anxiety-maintaining pattern, a series of attention training exercises are used in therapy to help clients practise shifting their attention externally. Although this can be difficult because it is unfamiliar, greater external focusing of attention can be obtained through practice, and clients are able to discover that this is associated with reduced anxiety, and greater enjoyment of the interaction.

Clients are invited to close their eyes and spend a few minutes focusing their attention on all the sounds they can hear both inside and outside the therapy office. The therapist does the same and helps guide the client to focus on the details of the sounds they hear. Clients are asked to reflect on the experience of focusing fully on the external world. Once this has been achieved, the idea of shifting between an internal and external focus is introduced, and practised across a range of modalities, such as focusing on colours or light and shadow in the room, music, or a story being read by the therapist. During each, clients are instructed to shift between the two attentional foci, and this is prompted by the therapist as required. Subsequently, clients compare their experiences of the two conditions, which generally reveals that self-focused attention is more difficult,

leads to feeling more uncomfortable, and being less able to concentrate on the task they were doing.

2.2.5 Behavioural Experiments

The term behavioural experiment covers a range of activities that are planned and undertaken by clients, both with their therapist in sessions, and independently. They fall into two general categories: 1) those that demonstrate the adverse effects of factors in the cognitive model that maintain anxiety, such as the self-focused attention and safety behaviours experiment described above, and 2) those that test out specific predictions about social situations, such as the 'staring experiment', where the prediction that others are looking at you is tested by standing in a busy area looking down, predicting what proportion of people are looking at you, then looking up and around to see whether the prediction was correct.

While experiments will sometimes therefore involve exposure to social situations that would otherwise have been avoided, the rationale is not simply to habituate to social situations, but to understand why anxiety is being maintained, and to test specific concerns or predictions about what might happen in order to generate new learning. Given that negative thoughts and beliefs about social situations are central to the cognitive model, experiments form a fundamental part of therapy.

Experiments are conducted both 'in the office', such as the self-focused attention and safety behaviours experiment described above, along with ones in public

places, for example cafeterias, shops, or busy streets. A record sheet is used for each experiment in order to clearly define the situation and what clients are planning to do, and their predictions. After the experiment, the outcome is recorded, along with any wider learning that has been obtained (see Figure 3). Over therapy, clients are encouraged to integrate experiments into everyday life, making the most of 'golden opportunities' as they arise in the course of a normal day.

Date	**Situation**	**Prediction** **What do you think will happen?** **How much do you believe it will, 0-100%?** **How would you know if it had?** E.g. How would you predict other people would react?	**Experiment** **What can you do to test the prediction?** Remember to focus on what actually happens rather than your feelings and let go of Safety Behaviours	**Outcome** **Where was your attention focused?** **What actually happened?** **Was the prediction correct?**	**Learning** **What I learned in general about myself in social situations.** **How can I build on this?**
9/6	Busy places in public – feeling stared at	About half of the people around are staring at me – 70% belief	Went into busy pub, where I concentrated on myself, and then switched the focus to external and looked at what was actually happening.	The prediction wasn't correct, and in fact only 0–10% (max) were looking.	I used feelings to determine how I was coming across, and they are not reliable. Instead I should concentrate externally as the reality isn't as bad.

Figure 3
A completed example of a behavioural experiment record sheet.

Understandably, clients can often find behavioural experiments difficult and anxiety provoking, particularly in the early stages of therapy. The therapist thus has a key role in conveying the importance of doing experiments in overcoming anxiety, but finding ways to make this manageable and not overwhelming. Therapists will often model doing an experiment themselves prior to the client undertaking it, or therapist and client can together consider different ways to

test a particular belief and choose the most feasible. As clients become more comfortable with experiments and the rationale for doing them, more challenging experiments can be included. These are referred to as 'decatastrophising' experiments, and involve the client intentionally enacting one of their main concerns to find out how people respond. For example, someone who is worried about their voice shaking when they talk might intentionally do this in a range of social situations, to test their predictions about whether people will notice and how they will respond. These experiments generally show that most clients' worst fears are not noticeable to others, or not something that receives a negative response from others.

2.2.6 Surveys

There are some situations where clients may have doubts about the result of a behavioural experiment, in that negative reactions by others were not observed, but there is a concern that other people may be thinking negatively towards them. For example, following an experiment where the client deliberately stumbles over their words, and then observes how others respond, a concern might be "they might not have said anything about it, but they'll have been thinking I'm weird/stupid/inadequate". Surveys can be a helpful tool in this context to find out more information about what people think when they notice someone stumble over their words. Survey questions are planned collaboratively, usually starting with more general questions about the particular concern (e.g. 'Do you ever stumble over your words?', 'Do you ever notice others doing this?'), moving onto the more specific concerns of the client (e.g. 'If someone stumbled over their words when talking to you, would you think

they were inadequate?'). The client and therapist then discuss who should be asked to complete the survey so that the results are credible and relevant. Once this has been established, a plan can be made as to whether the client, therapist, or both will distribute the surveys.

Responses to each question are subsequently reviewed together, to look for patterns in how people respond and what they are thinking in the relevant social situation. Results generally indicate that negative judgements from others do not occur in relation to clients' feared concerns, or occur with much less frequency or consistency than was assumed.

2.2.7 Working with Early Memories

It is commonly the case that clients' present social anxiety is associated with a recurrent negative image or felt impression of the self (Hackmann, Clark, & McManus, 2000; Hackmann, Surawy, & Clark, 1998). Through discussion in therapy, it is often possible to draw links from these experiences back to particular socially traumatic memories from the past. This is sometimes described in therapy as 'still being haunted by a ghost from the past', meaning the therapeutic goal is to break this link between the past and the present.

Where this is the case, therapy makes use of two techniques derived from cognitive therapy for posttraumatic stress disorder (PTSD) designed to help process the difficult memory, and leave it in the past. In the first of these, discrimination training, clients work with their therapist to produce a 'Then versus now' list, which outlines the context of the traumatic memory and what

was happening at the time, and compares this with how life is different now. When anxious, the recall of these, and attention to other discriminations between 'then and now' can be an effective technique to reduce the unhelpful impact of the outdated memory.

For some memories, discrimination training may need to be supplemented by a second technique. Memory rescripting involves the client reliving the memory in a therapy session, describing it in detail in the first person and present tense. A process of cognitive restructuring is then used to explore the meaning and beliefs associated with this memory, and to introduce alternative perspectives by reviewing the evidence for and against a particular belief. The client is then asked to repeat the reliving exercise, but from the viewpoint of their current self observing the events happening to their younger self. They are invited to imagine how they might intervene with the events that are being observed, for example by confronting others, or by introducing new perspectives to their younger self. Finally, the story is relived once more, this time back in the perspective of the younger self, but with the current self also present, doing the interventions that were planned previously. The procedure for this technique is described and discussed more fully by Wild and colleagues (Wild & Clark, 2011; Wild, Hackmann, & Clark, 2007, 2008). These studies have shown that one session of rescripting was associated with reductions in negative beliefs, image and memory vividness, and related distress, along with reduced negative social cognitions and social anxiety symptoms.

2.2.8 Anticipatory and Post-event Processing

People with SAD can spend a lot of time thinking about social situations both beforehand and afterwards. This usually takes the form of anticipatory worry about things that might go wrong in an upcoming social situation, or post-event rumination or dwelling, where people may analyse what happened or what they did in great detail. While it is common and understandable that this occurs given how difficult social situations can feel, it is problematic in that it increases self-focus, increases anxiety and fear of future social situations, may promote avoidance or the use of further safety behaviours, and can increase feelings of depressed mood or shame.

Specific techniques can be used to work on anticipatory and/or post-event processing if they do not show improvement with the standard components of treatment. The client is helped to generate a list of the advantages and disadvantages, which can often highlight particular beliefs or predictions about worry or rumination that can then be tested in a behavioural experiment, for example not preparing things to say or do in advance of the situation. Equally the list can serve to emphasise potential disadvantages that might not be immediately obvious. The client may be asked to keep a diary of when they notice themselves doing these kinds of thinking, and to try to bring the disadvantages to mind in these situations. By increasing awareness of when the worry or rumination is happening, and the negative impact they can have, clients may be more able to choose to disengage with these processes, and approach future social situations differently.

2.2.9 Therapy Blueprint

In the later stages of therapy, the client is asked to develop a therapy blueprint: a document summarising the key messages they have gained from therapy, the progress they have made, and plans for taking this forward once sessions come to an end. This aims to assist with moving towards a positive ending to therapy, along with helping to prevent relapse (see Butler, Fennell, & Hackmann, 2010). The blueprint can be in written or electronic form, and is organised into sections ('How did the problem develop?', 'What kept it going?', 'What were my main negative thoughts, and what answers did I develop to these?', 'What did I learn in therapy that was useful?', 'How should I deal with social situations in future, including any setbacks?', and 'How can I build on what I have learned?') with further prompting information and questions as required. As such the process of developing this helps to recall, clarify and consolidate key learning, and the resulting document is retained by the client for them to refer back to in future.

2.2.10 Homework

Between therapy sessions, clients are encouraged to complete activities that serve to practise and consolidate new learning from therapy, and continue to test out their feared social concerns. These activities are often referred to as 'homework', or 'action plans', and might consist of repeating or extending behavioural experiments from sessions, reducing social avoidance, attention training practice, diary recording, practising discrimination and imagery techniques, completing a blank cognitive model, working on a therapy blueprint, listening back to a recording of the previous session, or other activities linked to session content. These exercises can provide rehearsal and repetition of key

therapy points, which are important for overall learning and memory of content (Harvey et al., 2014). Additionally, they convey the message that working to overcome social anxiety is not something that should be confined to therapy sessions, or that is dependent on the presence of the therapist. Homework activities are discussed and planned every session, and reviewed at the start of the following session.

2.2.11 Monitoring of Progress and Outcomes

Throughout therapy, progress is monitored through the use of standardised measures, which also serve to highlight particular beliefs, concerns, or feared situations that may need to be addressed in sessions. Clients are asked to complete a brief set of questionnaires prior to each therapy session, which includes measures of social anxiety (Liebowitz Social Anxiety Scale - Self-report, LSAS-SR, Baker, Heinrichs, Kim, & Hofmann, 2002; Social Cognitions Questionnaire, SCQ, and Social Summary Rating Scale, SSRS, Clark, 1995), depression (PHQ-9; Kroencke, Spitzer, & Williams, 2001), generalised anxiety (GAD-7; Spitzer, Kroenke, Williams, & Löwe, 2006), and the impact of the problem on functioning (Work and Social Adjustment Scale; Mundt, Marks, Shear, & Greist, 2002). At the start, midpoint, and end of therapy, additional measures of social anxiety can be used, including the Social Behaviours Questionnaire and Social Attitudes Questionnaire (Clark, 1995), and others such as the Social Phobia Inventory (SPIN; Connor et al., 2000) These measures are described in more detail in subsequent chapters.

Recent research has shown the importance of collecting outcome data on a session-by-session basis; due to missing data from clients who do not complete therapy, outcomes across services can be significantly overestimated when measurement only occurs before and after therapy (Clark et al., 2009). While this does mean frequent completion of questionnaires, there is evidence to suggest that clients find the use of measures helpful when they are integrated well into sessions by the therapist (Thew, Fountain, & Salkovskis, 2015).

2.2.12 Empirical Support

To date, six randomised controlled trials (RCTs) have demonstrated the greater efficacy of the above CT protocol compared to both waitlist controls and a range of alternative active treatments, including exposure therapy, interpersonal psychotherapy, brief psychodynamic therapy, medication-based treatment-as-usual, pill placebo, and selective-serotonin reuptake inhibitors (Clark et al., 2006; Clark et al., 2003; Leichsenring et al., 2014; Mörtberg, Clark, Sundin, & Åberg Wistedt, 2007; Stangier, Heidenreich, Peitz, Lauterbach, & Clark, 2003; Stangier, Schramm, Heidenreich, Berger, & Clark, 2011). However, the limited availability of therapists in the NHS and the high prevalence of SAD mean that most people with SAD are unable to access this treatment even in metropolitan areas with good mental health provision, and the situation is even worse for people living remotely or in areas with limited service provision. Addressing this problem requires treatments to be developed in more accessible formats that require considerably less therapist time per person.

Other formats for delivering CT more efficiently have been investigated. These include group therapy, which has been shown to be effective, though less effective than individual sessions (Stangier et al., 2003). More intensive formats have also been trialled, for example where therapy is delivered in 16 group sessions over the course of three weeks, though again while this was effective, individual CT showed better outcomes (Mörtberg et al., 2007). More promising results have been obtained from a guided self-study approach, where clients work through booklets of psychoeducational and therapeutic resources between face-to-face therapy sessions, which then aim to consolidate and extend this independent work, resulting in an average of seven sessions overall compared to the fourteen in standard treatment. A randomised controlled trial of this treatment showed that it was as effective as the standard protocol (Clark, Wild, et al., in preparation). Further information and resources about the CT-SAD protocol, including video demonstrations of key techniques, are available online (Oxford Centre for Anxiety Disorders and Trauma, 2018).

2.3 Internet-based Psychological Interventions

The use of the internet and other technologies to support the delivery of psychological interventions may have the potential to deliver treatments more efficiently, and have received a significant rise in research attention over recent years (Teachman, 2014). Online psychological interventions use technology to deliver the information, exercises, and techniques that are used in face-to-face therapy (Teachman, 2014), and may or may not involve guidance from a therapist. A number of potential benefits to delivering treatment in this way have

been identified, including easier distribution and dissemination to rural and remote areas, increased adherence to the underpinning theoretical approach, flexibility on what and how content is delivered, less therapist time per patient and consequently lower costs, the ability to proceed at your own pace, and greater convenience and privacy for patients (Andersson, 2010; Andrews, Cuijpers, Craske, McEvoy, & Titov, 2010; Andrews & Williams, 2015; Chorpita, Daleiden, & Burns, 2004).

Research into the efficacy of online interventions has focused principally on CBT interventions for depression and anxiety disorders, and there is a growing body of evidence suggesting these interventions are associated with substantial reductions in clinical symptomatology compared to waitlist controls (see reviews by Andrews et al., 2010; Cuijpers et al., 2009; Mayo-Wilson & Montgomery, 2013). Further, a meta-analysis of 20 studies comparing online with face-to-face treatments found that the two formats did not differ in efficacy (Carlbring, Andersson, Cuijpers, Riper, & Hedman-Lagerlöf, 2018), though within individual clinical conditions the extent of research was limited (see also Andersson, Cuijpers, Carlbring, Riper, & Hedman, 2014; Andrews et al., 2010; Cuijpers, Donker, van Straten, Li, & Andersson, 2010).

One of the main questions arising in the literature has been whether direct guidance from a therapist is required, or whether sufficiently large reductions in clinical symptoms can be obtained when service users work through a program independently. A number of studies have begun to address this question, with results demonstrating larger clinical improvements when the intervention

involved therapist guidance compared to those without (see reviews by Andersson & Cuijpers, 2009; Baumeister, Reichler, Munzinger, & Lin, 2014; Spek et al., 2007). Two studies have demonstrated a positive relationship between the amount of therapist input within an online intervention and improved clinical outcomes (Cuijpers et al., 2009; Palmqvist, Carlbring, & Andersson, 2007), though two studies comparing more subtle variations in contact, such as one versus three therapist emails per week (Klein et al., 2009), or fixed weekly versus flexible email guidance (Berger et al., 2011) did not find a significant difference in therapy outcomes. In depression, a recent randomised controlled trial found that unguided access to a computerised CBT (cCBT) website did not serve as an effective adjunct to usual GP care (Gilbody et al., 2015).

Although there is evidence to suggest these interventions can be effective at addressing clinical symptoms, there remain some important issues in the literature at present. Firstly it is noted that given the theoretical global reach of online interventions (Fairburn & Cooper, 2011; Rakovshik et al., 2013), there is a need for research into their effectiveness following translation into other languages and implementation in countries and cultures outside of where they were developed. Secondly, there is currently a limited understanding of why and how online treatments might be effective, with few studies moving beyond overall patient outcomes to consider the mechanisms of change across therapy and compare these against theoretical models. This may allow the most active components of therapies to be identified and therapy protocols to be modified accordingly (Kazdin, 2007; Rakovshik & McManus, 2010). This issue is not unique to online treatments, but the technology involved may offer an important

opportunity to capture more nuanced process data and investigate the factors that drive clinical improvement in more detail. Equally there is the related question of whether online and face-to-face versions of the same therapy have their effects in similar ways, but studies comparing these formats, particularly for therapy protocols with the strongest evidence of efficacy, have yet to be reported in the literature.

Lastly, it should also be mentioned that the consistency of the terminology used to describe these interventions is poor, with the following terms all being found in the literature, and in some cases being defined in different ways: computer-administered; computer-aided; computer-assisted; computer-based; computerised; computer therapy; e-health; e-mental health; etherapy; interapy; internet therapy; internet-administered; internet-assisted; internet-based; internet-delivered; media-delivered; online therapy; telecare; telehealth; telemedicine; web-based. Greater consensus on how these interventions are described is likely to be beneficial for research and treatment dissemination.

Further issues in relation to the dissemination of internet-based interventions will be discussed in section 2.8.

2.4 Internet Interventions for Social Anxiety Disorder

A systematic search strategy was used to identify randomised controlled trials of internet-based psychological interventions for SAD, searching PsycINFO, EMBASE and Medline databases, with additional searches in Google Scholar and

reference lists of relevant papers. The following search terms were used: ("randomised controlled trial" OR "randomized controlled trial") AND ("social anxiety" OR "social phobia") AND (internet OR online) AND (treatment OR therapy). Included studies were required to be peer reviewed, English-language papers reporting a randomised controlled trial of a psychological therapy for adults with SAD delivered via the internet. No date limits were set. Studies describing cognitive bias modification paradigms were not included. Searches were conducted and updated between January 2016 and August 2018.

These searches resulted in 33 studies, which are summarised in Table 1. Many of these studies were included in a 2016 metaanalysis which reported that ICBT showed large and consistent effects on SAD symptoms when compared to waitlist control conditions, and a small advantage over active non-CBT controls i.e. other therapeutic interventions (Kampmann et al., 2016). The mean within-group pre-post effect size (Hedges *g*) was 0.96, indicating a large effect. Other reviews have drawn similar conclusions (Boettcher, Carlbring, Renneberg, & Berger, 2013).

Table 1 highlights the extent of research into internet interventions for SAD, and the promising results these treatments have generated. Most have examined CBT-based interventions, though ACT and psychodynamic interventions have also been studied. 'Treatment versus waitlist' designs were common, with internet therapies consistently superior to waitlist. Studies using active control groups were also common. This included comparisons with face-to-face therapy, where no between-format differences were observed (Andrews, Davies, & Titov,

2011; Botella et al., 2010; Hedman, Andersson, et al., 2011). Other comparisons have shown that online CBT interventions were superior to online interpersonal therapy (IPT)(Dagöö et al., 2014), and an online discussion forum (Andersson, Carlbring, Furmark, & SOFIE Research Group, 2012), but where the content of the control condition was more similar, such as transdiagnostic CBT (Dear et al., 2016) or bibliotherapy (Furmark et al., 2009), differences between treatments have not been observed. Other studies have examined the effect of adding an extra treatment component (e.g. further psychoeducation, attentional bias modification, face-to-face exposure sessions, reminders, strategies to enhance motivation). While one study found that extra reminders did improve outcomes (Titov, Andrews, Choi, Schwencke, & Johnston, 2009), all other studies found that the additional components of treatment tested did not enhance efficacy (Boettcher, Berger, & Renneberg, 2012; Boettcher, Hasselrot, Sund, Andersson, & Carlbring, 2014; Nordmo et al., 2015; Tillfors et al., 2008; Titov, Andrews, Schwencke, et al., 2010; Titov, Andrews, Schwencke, et al., 2009).

The level of therapist guidance varied across studies, from fully unguided interventions (e.g. Boettcher et al., 2012; Gallego, Emmelkamp, van der Kooij, & Mees, 2011) to those including weekly phonecalls with additional messaging via email or SMS (e.g. Carlbring et al., 2007; Gershkovich, Herbert, Forman, Schumacher, & Fischer, 2017; Nordmo et al., 2015). Of the five studies comparing guided with unguided versions of the same intervention, only one (Titov, Andrews, Choi, Schwencke, & Mahoney, 2008) showed significantly better outcomes for the guided condition, while the others found no difference (Berger et al., 2011; Dear et al., 2016; Gershkovich et al., 2017; Ivanova et al., 2016).

However, the extent of therapist guidance in these studies was variable, and relatively modest in some cases, and not all interventions were supported by experienced therapists, which could have limited the potential benefits of guidance. Inspection of the effect size estimates for the Dear et al (2016), Gershkovich et al (2017), and Ivanova et al (2016) studies does suggest a trend for better outcomes for guided conditions, in line with the broader review of internet interventions discussed earlier. Taking the lower estimates of the stated ranges for different measures, the within-group pre-post d_{Cohen} values range from 0.28 to 1.39 for unguided interventions (arithmetic mean 0.86), and from 0.43 to 1.84 for guided interventions (arithmetic mean 1.02), which suggests a benefit of therapist guidance may be observed if examined meta-analytically. It is also notable from these studies that unguided interventions can be associated with higher rates of participant dropout, of up to 50% (Botella et al., 2010; Gallego et al., 2011; Gershkovich et al., 2017; McCall, Richardson, Helgadottir, & Chen, 2018; Titov, Andrews, Choi, et al., 2008). Nevertheless, it is clear that unguided interventions can achieve promising results.

Table 1

Randomised Controlled Trials of Internet-based Psychological Therapy for Social Anxiety Disorder

Trial	Design	Therapist Input	Total N	Primary Outcome Measure(s)	Results Summary	Online Treatment Effect Size (Within-group pre-post d_{Cohen})
Andersson et al. (2006)	Online self help CBT (plus two group exposure sessions face-to-face) vs. waitlist	Minimal contact via email (weekly)	64	LSAS; SPS; SIAS; SPSQ; PRCS	Treatment superior to waitlist, gains maintained at 1-year follow-up.	0.58 - 1.21
Andersson et al. (2012)	ICBT vs. moderated online discussion forum	Email contact (approx. weekly) from MSc students or qualified therapists	204	LSAS; SPS; SIAS; SPSQ	ICBT superior to control at posttreatment and 1-year follow-up. ICBT group also showed increase in SAD knowledge. No effect of therapist experience observed.	1.03 – 1.22*
Andrews et al. (2011)	ICBT vs. face-to-face group CBT	Weekly phone or email contact (ICBT)	37	SPS; SIAS	Improvements observed in both groups, though no between-group differences. Study unlikely to be sufficiently powered.	0.58 – 0.74*
Berger et al. (2009)	ICBT vs. waitlist	Minimal contact via email (weekly)	52	LSAS; SPS; SIAS	ICBT superior to control at posttreatment. Gains maintained at 6-month follow-up (Berger, Hohl, & Caspar, 2010)	0.82
Berger et al. (2011)	Online CBT-based self help: Unguided vs. weekly therapist emails vs. flexible therapist guidance	Determined by treatment arm	81	LSAS; SPS; SIAS	Significant improvement in all groups pre- to posttreatment. No additional improvement between posttreatment and 6-month follow-up. No between-group differences.	1.38 – 1.64 (Unguided); 1.43 – 1.53 (guided); 1.40 – 1.44 (flexible)

Trial	Design	Therapist Input	Total N	Primary Outcome Measure(s)	Results Summary	Online Treatment Effect Size (Within-group pre-post d_{Cohen})
Boettcher et al. (2012)	ICBT with vs. without a pretreatment diagnostic interview	Unguided intervention	109	LSAS; SPS; SIAS	Both conditions showed significant improvement in SAD symptoms. Interview group showed greater change on secondary measures of depression and distress, but not primary outcomes.	1.39 – 1.63 (Interview); 1.00 – 1.28 (No Interview)
Boettcher et al. (2014)	ICBT plus ABM vs. ICBT plus control training task	Minimal contact via email (weekly)	133	LSAS; SPS; SIAS	Both groups showed significant improvement in social anxiety pre- to posttreatment. No between-group differences. No pre-post change in attention processes, thus adding ABM did not enhance outcomes.	1.39-1.41
Botella et al. (2010)	CBT protocol for public speaking anxiety delivered online vs. face-to-face vs. waitlist	No therapist guidance for online intervention. Therapist delivered full face-to-face treatment	127	No primary measure designated; used BFNE, SADS, FPSQ, SSPS	Both active treatments superior to waitlist at posttreatment and 1-year follow-up. No differences between the two treatment formats. 50% dropout from online group.	0.29 – 0.91*
Carlbring et al. (2007)	ICBT vs. waitlist	Email contact and weekly phonecalls	57	LSAS; SPS; SIAS; SPSQ	Treatment superior to waitlist regarding social anxiety outcomes, and secondary outcomes (avoidance, depression). 93% completion rate. Benefits maintained at 1-year, and 30-month follow-up (Carlbring, Nordgren, Furmark, & Andersson, 2009)	0.95
Dagöö et al. (2014)	Online/mobile CBT vs. Online/mobile IPT	Minimal contact via email (weekly)	52	LSAS	Both treatments improved social anxiety, but mCBT performed better than mIPT	0.99 (mCBT); 0.43 (mIPT)

Trial	Design	Therapist Input	Total N	Primary Outcome Measure(s)	Results Summary	Online Treatment Effect Size (Within-group pre-post d_{Cohen})
Dear et al. (2016)	Transdiagnostic vs. SAD-specific ICBT, with or without clinician guidance.	Determined by treatment arm (weekly contact via phone or messaging if clinician-guided)	220	MINI-SPIN	Large SAD symptom reductions shown in all treatment conditions, and medium to large reductions in comorbid depression/GAD/Panic. No between-group differences.	1.25 (SAD specific); 1.11 (Transdiagnostic); 1.34 (Clinician guided); 1.01 (Self-guided)
Furmark et al. (2009)	ICBT vs. Bibliotherapy vs. waitlist	Minimal contact via email (weekly)	235	LSAS; SPS; SIAS; SPSQ	Both treatments superior to waitlist. No significant differences in outcome measures between the two active treatments. Gains maintained at 1 year, with some further improvement in ICBT. Gains also maintained at 5-year follow-up (Hedman, Furmark, et al., 2011).	0.85 - 1.29 (Trial 1); 0.81 – 1.58 (Trial 2)
Gallego et al. (2011)	ICBT (fear of public speaking) vs. waitlist	Unguided	41	No primary measure designated; used BFNE, SADS, SSPS	High dropout (45% in ICBT). Completer analysis indicated significant improvement in treatment group.	1.13 (mean d; completers only)
Gershkovich et al. (2017)	Acceptance-based ICBT with vs. without therapist support.	Determined by treatment arm (weekly webcam call and daily text messages in guided condition)	42	LSAS; SPAI	Significant symptom reduction in both groups. No between-group differences in clinical outcome though lower attrition in the therapist-guided group.	0.86 – 1.18 (guided); 0.67 – 0.96 (unguided)

Trial	Design	Therapist Input	Total N	Primary Outcome Measure(s)	Results Summary	Online Treatment Effect Size (Within-group pre-post d_{Cohen})
Hedman et al. (2011)	ICBT vs. face-to-face group CBT	Minimal contact via email (respond within 24 hours)	126	LSAS	Similar LSAS improvement across both treatments, ICBT was noninferior to group CBT. Gains maintained at 6-month follow-up, and in subsequent 4-year follow-up (Hedman, El Alaoui, et al., 2014).	1.42 (ICBT); 0.97 (group CBT)
Ivanova et al. (2016)	Online ACT-based intervention (guided vs. unguided) vs. waitlist. NB Participants with SAD and/or Panic Disorder	Determined by treatment arm (twice weekly email feedback in guided group)	152	GAD-7; LSAS; PDSS	Treatment effective for SAD subgroup but not different to control group for Panic Disorder. Guided not significantly superior to unguided treatment though insufficient power to detect small group differences. Gains maintained at 12-month follow-up.	For SAD subgroup only: 0.78 (guided); 0.68 (unguided)
Johansson et al. (2017)	Online affect-focused psychodynamic therapy vs. waitlist	Email contact (response to questions within 24 hours)	72	LSAS	Treatment superior to waitlist. Gains maintained/further decrease at 2-year follow-up.	1.45
Johnston et al. (2011)	Transdiagnostic ICBT (34.4% with principal diagnosis of SAD): Clinician support vs. coach support vs. waitlist	10 mins contact per week. Therapeutic input only from clinician.	131	GAD-7; DASS-21; SIAS and SPS (for SAD)	Pooled treatment group superior to waitlist. The two treatment groups were similar at posttreatment, though the coaching group showed significantly lower symptom scores on some measures (not SAD) at follow-up.	For pooled treatment group: 1.02 – 1.28; 0.76 for SAD measures only
McCall et al (2018)	Web-CBT vs. waitlist	None (unguided) – automated email reminders.	65	SIAS; FNE	Treatment led to significant within-group reductions, not true of wait group (analysed separately). Did not reach target sample size. 40% dropout in treatment condition.	0.72 – 0.82

Trial	Design	Therapist Input	Total N	Primary Outcome Measure(s)	Results Summary	Online Treatment Effect Size (Within-group pre-post d_{Cohen})
Nordmo et al. (2015)	ICBT with initial psychoeducation session vs. ICBT without this	Weekly phonecall (10 mins)	37	SPS; SIAS	Both treatments significantly reduced social anxiety, but no between-group difference i.e. no benefit to adding the psychoeducation session.	For pooled treatment group: 0.70 – 0.95
Schröder et al. (2017)	Transdiagnostic ICBT treatment vs. usual care NB. Included 54.8% participants with SAD	Weekly written feedback and/or automated SMS (if participant opts in to this)	179	BAI	10% and 30% of treatment group opted to receive therapist messages/SMS respectively. Intervention group superior to usual care, showing small to medium effect sizes. The type of anxiety disorder experienced did moderate treatment outcome.	0.43*
Schulz et al. (2016)	Group ICBT vs. Individual ICBT vs. waitlist	Weekly contact via messaging, plus responding to messages within 3 days.	149	SPS; SIAS	Both active conditions superior to waitlist but not different to each other. Gains maintained at 6-month follow-up.	1.08 – 1.50 (individual); 0.95 – 1.03 (group)
Stolz et al (2018)	ICBT (smartphone app) vs. ICBT (desktop) vs. waitlist	Weekly written feedback, and response to questions within 3 days	150	SPS; SIAS; LSAS	Composite outcome measure indicated both active treatments superior to waitlist, and no significant difference between active conditions.	1.25 (desktop); 1.84 (app)
Tillfors et al. (2008)	ICBT plus 5 group exposure sessions vs. ICBT alone	Minimal contact via email (weekly)	38	LSAS; SPS; SIAS; SPSQ	Both treatment groups showed significant effects on social anxiety. Adding the exposure sessions did not confer an additional benefit. Gains maintained at 1-year follow-up.	0.77 – 1.31 (ICBT + Exp); 0.81 – 1.18 (ICBT alone)
Tillfors et al. (2011)	ICBT vs. waitlist (for speech-anxious students)	Minimal contact via email (weekly)	19	LSAS; SPSQ	ICBT superior to waitlist, leading to significant reductions in social anxiety. Authors note that the average number of completed ICBT modules was low. Gains maintained at 1-year follow-up.	0.55 – 1.06

Trial	Design	Therapist Input	Total N	Primary Outcome Measure(s)	Results Summary	Online Treatment Effect Size (Within-group pre-post d_{Cohen})
Titov, Andrews, & Schwencke (2008)	ICBT vs. waitlist	Email contact (within 24 hours) and therapist-moderated discussion forum	88	SPS; SIAS	Treatment superior to waitlist.	1.14 – 1.21
Titov, Andrews, Choi et al. (2008)	cCBT with clinician assistance vs. unguided cCBT vs. waitlist	Email contact (within 24 hours) and therapist-moderated discussion forum	98	SPS; SIAS	Guided treatment superior to unguided and waitlist conditions, though some participants did still benefit from unguided. Treatment completion much higher in guided condition.	1.17 – 1.47 (guided); 0.28 – 0.38 (unguided)
Titov, Andrews, Choi et al. (2009)	Unguided cCBT vs. Unguided cCBT with weekly telephone reminders	None	163	SPS; SIAS	Both treatments showed significant reductions in social anxiety. The telephone reminders did enhance outcomes and treatment adherence.	0.73 – 0.98 (cCBT); 0.89 – 1.41 (cCBT+ phone)
Titov, Andrews, Johnston et al. (2010)	Transdiagnostic ICBT programme (including SAD) vs. waitlist	Messaging – approx. 10 minutes weekly contact time	86	GAD-7 (overall); SPSQ (for SAD)	Treatment superior to waitlist for GAD-7 and disorder-specific questionnaires apart from worry (PSWQ).	For SPSQ: 0.54; 0.67 for SAD subgroup
Titov, Andrews, Schwencke et al. (2008)	ICBT vs. waitlist	Email contact (within 24 hours) and therapist-moderated discussion forum	105	SPS; SIAS	Treatment superior to waitlist.	1.06 – 1.24
Titov, Andrews, Schwencke et al. (2009)	cCBT with technician phonecalls vs. cCBT with access to discussion forum	Weekly phonecalls from technician, or therapist-moderated discussion forum (based on condition)	82	SPS; SIAS	Both treatments showed significant reductions in social anxiety. No between-group differences.	1.15 – 1.47(cCBT+ phone); 1.51 – 1.56 (cCBT+ forum)

Trial	Design	Therapist Input	Total N	Primary Outcome Measure(s)	Results Summary	Online Treatment Effect Size (Within-group pre-post d_{Cohen})
Titov, Andrews, Schwencke et al. (2010)	ICBT vs. ICBT plus motivational enhancement strategies	None (unguided) – automated email messages.	108	SPS; SIAS	Significant reductions in social anxiety in both groups. The motivational strategies significantly increased completion rates but not clinical outcomes. Gains maintained at 3-month follow-up.	0.97 - 1.15 (ICBT); 0.88 – 1.25 (ICBT+MS)
Tulbure et al. (2015)	ICBT vs. waitlist	Weekly feedback by email, and response to questions within 48 hours	76	LSAS; SPIN	Treatment superior to waitlist. Gains maintained at 6-month follow-up.	1.50 - 1.53

Note. ABM = Attention Bias Modification; ACT = Acceptance and Commitment Therapy; BAI = Beck Anxiety Inventory; BFNE = Brief version of the Fear of Negative Evaluation Scale; cCBT = Computerised Cognitive Behavioural Therapy; DASS-21 = Depression, Anxiety, and Stress Scale 21-item version; FPSQ = Fear of Public Speaking Questionnaire; GAD-7 = Generalised Anxiety Disorder Questionnaire; ICBT = Internet Cognitive Behavioural Therapy; IPT = Interpersonal Therapy; LSAS = Liebowitz Social Anxiety Scale (Self-report); PDSS = Panic Disorder Severity Scale; PRCS = Personal Report on Confidence as a Speaker; SADS = Social Avoidance and Distress Scale; SIAS = Social Interaction Anxiety Scale; SPAI = Social Phobia and Anxiety Inventory; SPIN = Social Phobia Inventory; SPS = Social Phobia Scale; SPSQ = Social Phobia Screening Questionnaire; SSPS = Self-Statements during Public Speaking.

* d_{Cohen} calculated from data as not reported within paper (mean pre-post change divided by pooled standard deviation); all other effect sizes are as reported.

Studies implementing such interventions in routine clinical settings are less common compared to those conducted in research contexts. However, it is promising that researchers and clinicians are taking steps to disseminate online SAD interventions and considering how these can be usefully integrated into clinical practice. To date, most of these studies have shown that overall effectiveness and remission rates in routine practice are broadly comparable to those found in RCTs (Andrews et al., 2011; Aydos, Titov, & Andrews, 2009; El Alaoui et al., 2015; Nordgreen, Gjestad, Andersson, Carlbring, & Havik, 2018; Williams, O'Moore, Mason, & Andrews, 2014). However, one study found no difference between intervention and waiting list control groups in a routine practice setting regarding anxiety outcomes, though was underpowered to detect this effect (Mathiasen, Riper, Ehlers, Valentin, & Rosenberg, 2016). While further studies in routine practice are needed, the current evidence suggests the online treatment format is acceptable to patients, and allows larger numbers of people to receive an intervention simultaneously (Aydos et al., 2009; El Alaoui et al., 2015; Nordgreen et al., 2018; Williams et al., 2014).

In summary, there is an extensive body of evidence that online psychological interventions for SAD are associated with significant clinical improvement, on average showing large effect sizes of around 0.96 (Kampmann et al., 2016) and remission rates of around 40-50% (Boettcher et al., 2013). However, some studies report high levels of participant dropout, particularly in unguided interventions. Further work could usefully develop or refine treatments to enhance efficacy, retention, and remission rates, and to examine in more depth

how these interventions perform in routine clinic settings and new cultural contexts.

2.5 Internet Cognitive Therapy for SAD (iCT-SAD)

Clark and colleagues' internet-based Cognitive Therapy (iCT) for SAD aims to implement all of the key features of face-to-face Cognitive Therapy (CT) without the patient having to attend any therapy sessions in person, thereby reducing the amount of therapist time required per client. It is a therapist-guided treatment that makes use of a range of technological features to deliver the therapy content in an accessible and engaging way. An initial open-trial of 11 participants (Stott et al., 2013) found that iCT-SAD showed high efficacy, with a large effect size of 1.64 on the primary outcome measure, the self-report LSAS. Nine participants were classed as treatment responders, and seven (64%) as remitted from their SAD. Therapist guidance was provided by a clinical psychologist, averaging four hours of contact across the intervention. Compared to the average of 21 hours in face-to-face CT, this therefore represented an 80% reduction in therapist time per person. A recently completed RCT has replicated these findings in a larger sample and demonstrated that iCT-SAD was equally effective as CT-SAD, with both treatments superior to a waitlist control group (Clark, Wild, et al., in preparation). The iCT-SAD protocol is described below.

Clients obtain access to the secure site via an individual username and password. The first time they log in, an introductory welcome video is played introducing the site and how to navigate around it. The main content of the site is organised

into a series of modules that are accessed from the client's individual dashboard (homepage). At the start of therapy, four 'core' modules are available: 'Introducing the Treatment', 'Getting Started', 'Feeling Self-Conscious', and 'Safety Behaviours'. Each iCT-SAD module contains a range of written information, case examples, exercises to complete, videos, and key points, conveying the main therapeutic content related to the module topic. These introductory modules explain the nature of the therapy, help the client to develop an individualised cognitive model, and elaborate on key aspects of the model that maintain anxiety.

The treatment is delivered over the course of 14 weeks followed by up to three booster sessions over the following three months. Throughout the main body of treatment, clients are in regular contact with their named therapist, via the secure on-site asynchronous messaging system and webcam facility. They receive weekly phonecalls from their therapist, which last between 15 and 20 minutes. The therapist may also contact the client by SMS message if the client agrees to this. This regular contact is used to address clients' questions or concerns as they arise, to reinforce key therapeutic principles and messages, and to provide support and encouragement as they progress through therapy. Clients are encouraged to log in and use the site as much as possible during the therapy period; a recommendation of 45 to 60 minutes per day is given.

The first two weeks of treatment are designed to be more intensive, to help clients understand and get going with using the site. Therapist input is more frequent in this early phase, and a total of four phonecalls are arranged over this

period. One of the calls in the second week is more extended and is used to complete the self-focused attention and safety behaviours experiment. This is completed over webcam, where the therapist will invite someone to be the client's conversational partner in the two conditions of the experiment. This experiment is supported by a core module, 'My Safety Behaviour & Attention Experiment', which explains the procedure and allows the results of the experiment to be recorded. A subsequent core module, 'Watching your Conversation Videos', supports the client to complete the video feedback procedure from face-to-face CT using the webcam recordings of each conversation.

At this stage, two further core modules are released to the client. 'Behavioural Experiments' introduces this key aspect of therapy and explains the rationale and procedure for planning and implementing experiments. The site has a behavioural experiments log separate from the modules, where clients can plan and record their learning from experiments all in one location. The 'Getting out of your Head and into the World' module supports the client in undertaking attention training using a variety of methods, including video, music extracts, and narrated stories. These allow the client to practise shifting to an external focus of attention, thereby interrupting self-focus, which is thought to maintain the anxiety.

After completion of the core modules of the therapy, a range of optional modules can be released by the therapist depending on the particular concerns of the client. These may be easily identifiable by the client's questionnaire responses,

or suitable modules may be decided through discussion. The optional modules cover a range of topics: 'Updating My Key Images and Memories', 'Having Conversations', 'Blushing', 'Sweating', 'Shaking', 'Feeling Boring', 'Feeling Stupid', 'Decatastrophising', 'Feeling Responsible for Others' Enjoyment', 'Worrying in Advance', 'Going Over Social Situations After They've Happened', 'Self-Esteem', 'Managing My Mood', 'Managing My Inner Critic', and 'Giving Myself Credit'.

Towards the end of the therapy, the therapist will release the final core module, 'My Therapy Blueprint', to assist the client with summarising what they have learnt in therapy and how they plan to take things forward. Additionally, there is a short module ('Preparing for Follow-up') that is completed prior to each of the three booster phonecalls, aiming to identify progress and any difficulties that might benefit from discussion with the therapist. Clients retain access to the site during the three-month booster period, and for a one-year period following the conclusion of therapy, allowing them to access their completed modules and resources on the site.

As in face-to-face CT, clients complete weekly measures of social anxiety, mood, and general functioning. These are administered online within the iCT-SAD site, and clients are able to track their progress through therapy using graphs of their weekly scores. The website also contains a library of therapy resources, such as example surveys, worksheets and videos. As part of their behavioural experiments, clients can also record themselves giving presentations to 'virtual audiences' on the website, where they can select the size and responsiveness of the prerecorded audiences to present to over webcam.

2.6 Mediation of Clinical Improvement in Psychological Interventions for SAD

While research to develop and evaluate psychological therapies has progressed significantly over recent decades, and we have some good evidence of their efficacy in the treatment of mental health problems, our understanding of why they work, that is, the mechanisms through which they operate, is less clearly understood and is recommended as an important avenue for further research (see Holmes et al., 2018; Kazdin, 2007).

The exploration of 'mechanisms of change' across therapy commonly focuses on two processes. The first is moderation, which in psychotherapy research generally refers to variables that might influence a person's overall therapy outcomes, such as their demographic characteristics, baseline questionnaire scores, or the conditions under which therapy was provided. The second process, and the focus of Studies 1, 2a, and 2b, is mediation. This refers to the variables through which a treatment has its effects. Mediators are the middle step in a causal chain, where a predictor variable causes a change in the mediator variable, which causes a change in the outcome variable. Finding mediators of clinical change can help to move towards an explanation of why and how a treatment is effective. Most commonly, analyses of moderation and mediation have not been included when reporting the results of randomised controlled trials (RCTs) in order to focus principally on efficacy, though this has been recommended (Kraemer, Wilson, Fairburn, & Agras, 2002). Kazdin (2007)

argued that a greater understanding of these mechanisms of change will help to produce more parsimonious accounts of therapeutic effects, allowing for the refinement and more efficient delivery of interventions.

2.6.1 Approaches to Assessing Mediation

The analysis of mediation hypotheses has traditionally followed the 'Causal Steps' approach of Baron and Kenny (1986), using the following series of regression analyses to test for significant associations between variables: 1) The mediator (M) regressed on the independent variable (X), known as the 'a' path, 2) The dependent variable (Y) regressed on the independent variable, known as the 'c' path, and 3) The dependent variable regressed on both the mediator and the independent variable together, paths 'b' and 'c-prime' (denoted as c'; see Figure 4). The final step then compares the association between independent and dependent variables when calculated in isolation (path c from Step 2), to when it was calculated controlling for the effect of the mediator (path c' in Step 3). If the significant direct effect from Step 2 disappears when controlling for the mediator, this indicates 'full' mediation, and a reduction in the size of the coefficient suggests 'partial' mediation, which can be assessed for significance using the Sobel Test (Sobel, 1982).

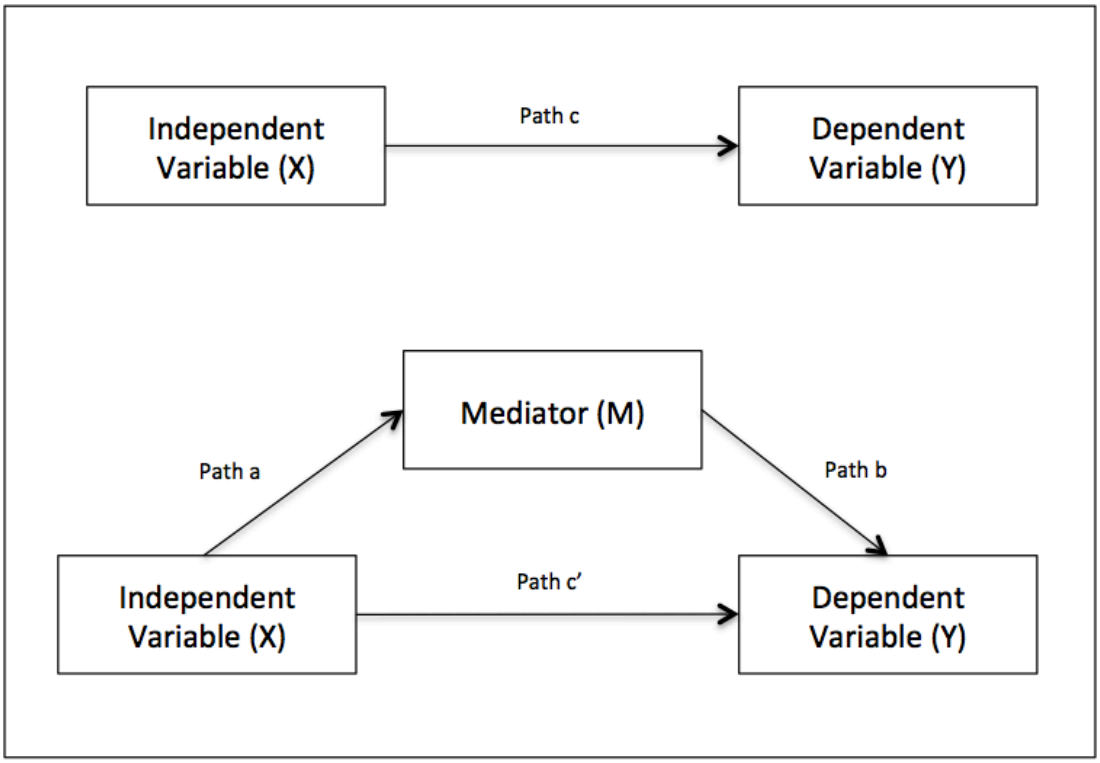


Figure 4

General mediation diagram exploring M as a potential mediator of the relationship between X and Y.

A number of limitations to the Baron and Kenny approach have been identified, including the need for multiple tests, the lack of direct significance testing of the mediated path from independent to dependent variable, and the potential for mediation to be missed where the direct and indirect paths have opposite signs (see Kraemer, Kiernan, Essex, & Kupfer, 2008; Krause et al., 2010; MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002). The term 'full' mediation has also been criticised, principally because it implies that the entire relationship between the independent and dependent variables has been explained, when it has been empirically demonstrated that multiple 'full' mediators of the same relationship are possible (see Rucker, Preacher, Tormala, & Petty, 2011).

Whilst modifications to the Causal Steps approach have been outlined (e.g. Kenny, Korchmaros, & Bolger, 2003; Kraemer et al., 2008), advances in analytic software and statistical methodology have meant that alternative procedures for the analysis of mediation hypotheses are recommended, using structural equation modelling (SEM) to estimate the relationships between independent, mediator, and dependent variables within a single model. In the SEM approach, the mediated (or 'indirect') path (i.e. from X to Y via M) is computed directly through multiplication of the 'a' and 'b' paths, and confidence intervals of the coefficient can be calculated through bootstrapping. A significance test of this path is also calculated, providing a more direct indication of whether mediation is present compared to the Causal Steps approach. More sophisticated indicators of effect size for the indirect path are also calculable, with researchers favouring 'percent mediation' (P_M), which estimates the proportion of change in the dependent variable that is accounted for by the mediator (see Kenny et al., 2003; Moscovitch, Hofmann, Suvak, & In-Albon, 2005).

SEM approaches can also account for multilevel data, where individual datapoints are clustered, such as children within schools, or timepoints within people (Preacher, Zhang, & Zyphur, 2011; Preacher, Zyphur, & Zhang, 2010). Multilevel structural equation modelling (MSEM) provides parameter variance estimates at each level, therefore is better able to account for the fact that scores within a cluster are likely to be more similar to each other than scores between different clusters. For larger longitudinal datasets ($N \approx 200$) other newer methodologies are available, such as cross-lagged autoregressive models, latent growth curve modelling, and latent change score modelling. These approaches

use latent variables to represent underlying constructs rather than using the observed scores, which has the advantage of separating out measurement error. They also model relationships between variables as a function of time, so may permit stronger causal inferences (see Preacher, 2015). Incorporating a temporal lag between mediator and outcome variables, where the mediator measurement precedes the outcome measurement has been recommended as a key aspect of study design when examining mediation (Preacher, 2015), and can be easily implemented within the SEM framework.

2.6.2 Mediation in Psychological Interventions for Social Anxiety Disorder

In Social Anxiety Disorder (SAD), there is a small but growing body of literature exploring mediators of change in psychological therapy. The choice of potential mediators to be assessed is generally derived from theoretical accounts and models of SAD, such as the cognitive models of Clark and Wells (1995), and Heimberg and colleagues (Hope et al., 2006; Rapee & Heimberg, 1997). The Clark and Wells model specifies several anxiety-maintaining factors that are therefore potential mediators of change. These include negative social anxiety-related beliefs, avoidance and safety behaviours, self-focused evaluative attention, anticipatory processing and post-event processing. The Rapee and Heimberg model highlights hypervigilance, avoidance and attentional bias towards perceived threat as potential mechanisms of anxiety maintenance, which along with self-focused attention, have been shown to have empirical support in a review by Bögels and Mansell (2004).

Qualitative studies of patients' therapy experiences may also suggest possible mediators. McManus and colleagues (2010) used interpretative phenomenological analysis to explore eight participants' descriptions of their experiences of face-to-face cognitive therapy (CT). This study found that participants valued the therapeutic relationship in CT, along with having a diagnosis and formulation of their difficulties. They described that the experiential exercises completed during therapy helped them learn to interpret their social experiences differently. Lastly, participants noted the emotional challenges involved in CT-SAD, along with some difficulties in transferring this new learning into real-world settings. Although not a mediation study, these findings highlight factors such as the therapeutic alliance, changes in social cognition, managing negative emotions, and the generalisation of learning, each of which could also be considered potential mediators of clinical improvement.

The studies investigating mediation of clinical improvement in psychological therapy for SAD are shown in Table 2. These were identified via searches of PsycINFO, Medline, and EMBASE databases using the following terms: ("social anxiety disorder" OR SAD OR "social anxiety" OR "social phobia") AND (mediat* OR moderat* OR predict* OR determin* OR "sudden gain" OR (change AND mechanism) OR (change AND trajector*)) AND (therapy OR treatment OR intervention OR outcome* OR trial). Studies were required to be peer-reviewed, English-language papers reporting mediation of SAD outcomes in the context of psychological therapy, and no date limits were set. Searches were performed and updated between January 2016 and August 2018.

As shown in Table 2, all the 13 reviewed studies related to cognitive and/or behavioural therapies, mostly in an individual format, though some used a group approach. Most analysed the data using a SEM procedure, and incorporated the multilevel structure of the data, though there was variation in the exact procedures used for analysis. Most commonly the studies investigated cognitive factors as mediators of clinical improvement, including negative beliefs and appraisals of social situations, and beliefs about the probability and cost of negative social events. Avoidance, working alliance and self-focused attention were also assessed as possible mediators in more than one study. Participants' use of exposure techniques and thought records, physiological symptoms of anxiety, and depression have also been examined as candidate mediators. Five studies (Boden et al., 2012; Calamaras, Tully, Tone, Price, & Anderson, 2015; Goldin et al., 2014; Gregory, Wong, Marker, & Peters, 2018; Hoffart, Borge, Sexton, Clark, & Wampold, 2012) found evidence that changes in cognition-related factors (such as interpersonal or self-related beliefs, or threat reappraisals) mediated improvements in social anxiety, while two studies (Mörtberg, Hoffart, Boecking, & Clark, 2015; Niles et al., 2014) did not find evidence of mediation. Evidence of self-focused attention mediating clinical improvement was found in the study by Mörtberg and colleagues (2015), and in both individual and group CT in the study by Hedman and colleagues (2013). Two studies showed support for avoidance as a mediator (Aderka, McLean, Huppert, Davidson, & Foa, 2013; Hedman et al., 2013), and the study of participants' use of exposure and thought records (Hawley, Rector, & Laposa, 2016) also supported a mediation relationship for these factors. In contrast, the two studies analysing working alliance either did not find a mediation

relationship (Calamaras et al., 2015) or found that the alliance-outcome relationship was itself mediated by cognitive factors (Hoffart et al., 2012). The one study investigating physiological anxiety symptoms did not find evidence of mediation (Aderka et al., 2013), while the one study examining depression found a weak effect (Moscovitch et al., 2005).

Table 2

Studies Assessing Mediation of Clinical Improvement in Psychological Therapy for Social Anxiety Disorder

Study	Treatment type	Number of participants	Analyses used	Candidate mediators assessed	Results
Aderka, McLean, Huppert, Davidson, & Foa, (2013)	Group CBT (partially based on Heimberg model)	177	Cross-lagged structural equation modelling	Avoidance; fear; physiological symptoms of anxiety	During first 8 weeks of treatment, avoidance predicted subsequent fear, but not vice versa. In the last 6 weeks of treatment, avoidance and fear predicted subsequent changes in each other
Boden et al., (2012)	Individual CBT (Heimberg model)	47	Causal steps method	Maladaptive interpersonal beliefs	Reductions in maladaptive interpersonal beliefs strongly (87.6%) mediated the effect of CBT on social anxiety
Calamaras, Tully, Tone, Price, & Anderson, (2015)	Virtual Reality Exposure Therapy (VRE) or Exposure Group Therapy (EGT)	35 VRE and 26 EGT (groups combined for analysis)	Multiple mediators path model, cross-lagged modelling	Probability of negative social outcomes; cost of negative social outcomes; working alliance; threat reappraisals	The effect of treatment on outcome was mediated by reductions in probability and cost biases. Lower levels of probability bias at midtreatment predicted greater subsequent reduction in social anxiety (and not vice versa)
Gregory et al., (2018)	Group CBT (Heimberg, and Rapee models)	77	Latent difference /Latent change score modelling	Maladaptive self-beliefs	Changes in maladaptive self-beliefs predicted subsequent changes in social anxiety, but not vice versa
Goldin et al., (2012)	Individual CBT (Heimberg model)	38	Modified Causal Steps Method (following Kraemer et al., 2008)	Cognitive Reappraisal Self-Efficacy (CR-SE)	CR-SE fully mediated the effect of CBT on posttreatment social anxiety

Study	Treatment type	Number of participants	Analyses used	Candidate mediators assessed	Results
Goldin et al., (2014)	Individual CBT (Heimberg model)	57	Multivariate multilevel modelling, Granger causality analysis	Emotion regulation strategies (Cognitive reappraisal and expressive suppression: frequency and success)	Increases in cognitive reappraisal success predicted subsequent reductions in social anxiety, but not vice versa
Hawley, Rector, & Laposa, (2016)	Manualised Group CBT	100	Latent difference /Latent change score modelling	Use of exposure techniques; use of thought records	Engagement in exposure and thought record techniques was associated with subsequent reductions in social anxiety, with exposure showing the stronger association
Hedman et al., (2013)	Individual CT (Clark & Wells model), and group-based CT (Heimberg model)	32 individual and 62 group	Multilevel modelling (moderated mediation)	Avoidance; Self-focused attention; Anticipatory processing; Post-event processing	Reduced avoidance and self-focused attention mediated improvement in individual CT; reduced self-focused attention, anticipatory processing, and post-event processing mediated improvement in group CBT
Hoffart, Borge, Sexton, Clark, & Wampold, (2012)	Residential Individual CT (Clark & Wells model) or Residential Interpersonal Therapy (IPT; Lipsitz, Markowitz, & Cherry, 1997)	40 CT and 40 IPT	Multilevel mediation modelling	Working alliance; Cognitive process (composite measure of cognitive factors)	Cognitive process (composite) mediated the relationship between initial patient-rated alliance and social anxiety scores

Study	Treatment type	Number of participants	Analyses used	Candidate mediators assessed	Results
Mörtberg, Hoffart, Boecking, & Clark, (2015)	Individual CT (Clark & Wells model)	29	Multilevel mediation modelling	Self-focused attention; Frequency of, and belief in, negative social cognitions	Changes in self-focused attention mediated subsequent reductions in social anxiety
Moscovitch, Hofmann, Suvak, & In-Albon, (2005)	Group CBT (Beck model of anxiety)	66	Multilevel Causal Steps method (following Kenny et al., 2003)	Depression; Social anxiety	Reductions in social anxiety fully (91%) mediated reductions in depression. Reductions in depression only partially (6%) mediated reductions in social anxiety
Niles et al., (2014)	Individual CBT (Heimberg model) or Individual Acceptance and Commitment Therapy (ACT)	25 CBT and 27 ACT	Multilevel modelling (moderated mediation)	Experiential Avoidance; Negative cognitions	Rate of change (curvature) in avoidance mediated reductions in SAD symptoms in ACT but not CBT. Curvature of the negative cognitions slope over time predicted, but did not mediate, outcome
Schweden et al., (2016)	Individual CT (Clark & Wells model)	20	Linear Regression (Causal steps method)	Depersonalisation	Analysis not computed due to insufficient sample size and lack of significant direct relationship between independent and dependent variable

What is notable from Table 2 is 1) the limited number of studies overall, and 2) the lack of consistency regarding study design, to the point that no two studies examine the same candidate mediators within the same treatment using the same analytic approach. At present, it is therefore very difficult to draw conclusions about which factors reliably mediate clinical improvement and further investigation is warranted, particularly in the four areas below:

Firstly, as the studies to date suggest preliminary support for cognitions and self-focused attention acting as mediators of clinical improvement, further examination of these variables in other datasets would help to evaluate the reliability of these findings. The present thesis will examine these two factors given this initial evidence and their theoretical importance in maintaining anxiety according to the Clark and Wells cognitive model (1995). Additionally, a third candidate mediator, depressed mood, is investigated. Depressed mood is not a component of the cognitive model, and was therefore chosen as a 'control' to examine the specificity of any mediation found using the other two factors (see Preacher, 2015). There is, however, a plausible rationale for depressed mood mediating clinical improvement, in that a reduction in depressed mood over time may elicit greater hopefulness and optimism about treatment and the future, leading to improved clinical outcomes. Only one of the studies listed in Table 2 reported the use of a control mediator (Calamaras et al., 2015).

Second, only four of the studies to date have examined CT based on the Clark and Wells (1995) model (Hedman et al., 2013; Hoffart et al., 2012; Mörtberg et al., 2015; Schweden et al., 2016). These have shown limited consistency in the

candidate mediators assessed, and inconsistent findings regarding the role of negative social cognitions in this treatment, given this was not found to mediate clinical improvement in Mörtberg and colleagues' (2015) study.

Third, as shown in Hedman and colleagues' (2013) study, two formats of the same treatment can show different patterns of mediation, suggesting that individual and group therapy could be having their effects through different mechanisms. Given the growing interest and empirical support for internet-based therapies, researchers have highlighted a significant need for mediation studies within online treatments (Andersson, Carlbring, Berger, Almlöv, & Cuijpers, 2009).

Fourth, all but one of the samples in the studies to date were drawn from research trials, so it is currently unclear whether the same results would be found in routine clinic samples. In principle, mediators of clinical improvement should show their effects consistently across different clinical settings, but this has yet to be investigated.

2.6.3 Summary

Studies investigating which factors mediate clinical improvement in psychological therapy are rare compared to studies of overall efficacy, however they constitute an important step in understanding how and why treatments work. In SAD at present, mediation has been explored in a small group of mostly cognitive-behavioural studies. These studies are inconsistent regarding the candidate mediators examined, and the analytic methods used, meaning it is

difficult to draw broad conclusions, but there appears to be some support for cognitive change, and reductions in self-focused attention, acting as mediators of clinical improvement. Further examination of such mediators is required, particularly in the context of routine clinical practice, and for internet-based interventions. There are at present no studies comparing mediation processes across face-to-face and online versions of the same intervention.

2.7 Sudden Gains in Psychological Therapy

Clinical improvement during psychological therapy is not always linear, and there are a range of trajectories of change that can be experienced (Aderka, Nickerson, Bøe, & Hofmann, 2012). Tang and DeRubeis (1999) noted that some of these trajectories involve a marked improvement in scores on a session-by-session outcome measure from one session to the next (see Figure 5). They suggested that these 'sudden gains' may represent key moments of therapy, and thus it is important to understand more about when and how often they occur, and the therapeutic activities and processes that trigger them. Further, it is plausible that if common triggers can be identified, therapies can be improved by focusing on these more directly and earlier on in treatment.

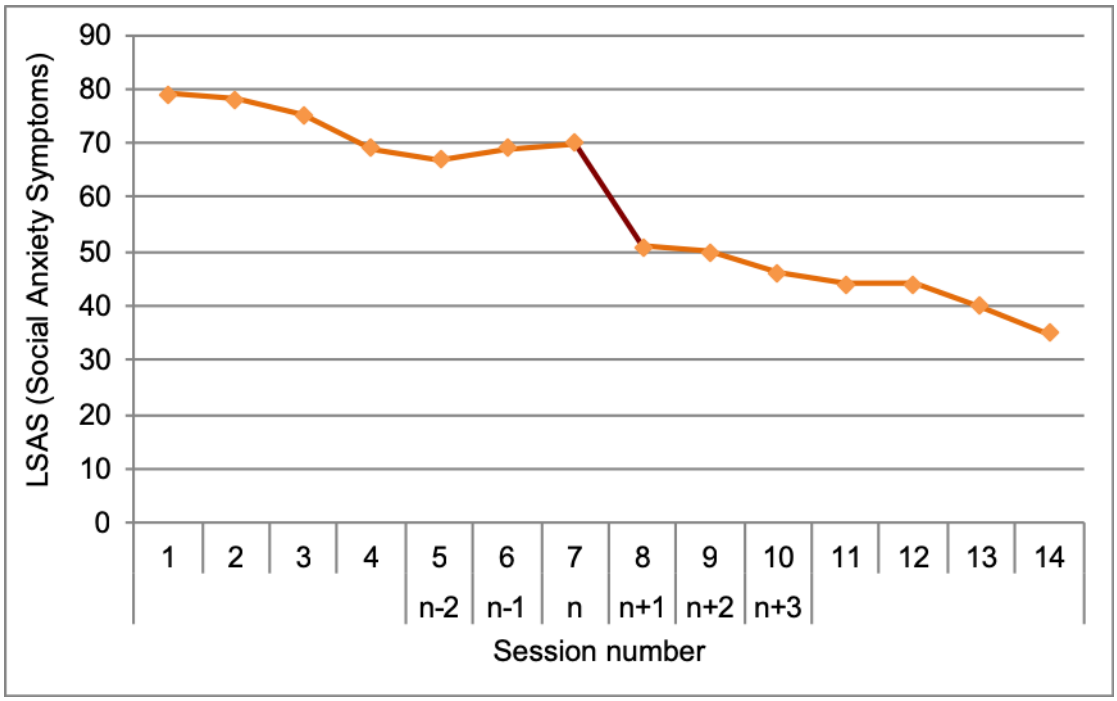


Figure 5

Example weekly scores on the Liebowitz Social Anxiety Scale (LSAS) for a patient who experiences a sudden gain between session 7 and 8. The pregain session is referred to as session 'n', and the postgain session as session 'n+1'.

2.7.1 Criteria to Identify Sudden Gains

Tang and DeRubeis (1999) outlined three criteria to define a sudden gain.

The first criterion is that the gain should be large in absolute terms. The original study investigated sudden gains in CBT for depression using the Beck Depression Inventory (BDI) as the primary outcome measure. A change of seven BDI points or greater was suggested to identify gains of sufficient magnitude. While this was acknowledged to be an arbitrary cutoff score, Stiles and colleagues (2003) noted this was close to the reliable change index (RCI) for the BDI, shown to be 6.18 in a previous study (Barkham et al., 1996). As a result, subsequent studies have used the RCI to determine a cutoff value for criterion one when using scales other than the BDI. The RCI is calculated using the mean

pre-to-post difference in scores and standard error of measurement for the dataset as described in Jacobson and Truax (1991). Thus, this criterion ensures that gains are large enough to be considered reliable.

The second criterion is that the gain is large relative to the previous score, specifically the gain should be at least 25% of the pregain session score.

Finally, criterion three aims to ensure that there is sufficient stability around the gain to ensure the change is reliable and not a product of general fluctuations in scores from session to session. The original definition was that the mean score of the three sessions prior to the gain should be significantly greater than the mean of the three sessions after the gain, using a two-sample *t*-test and alpha of .05, which uses a critical *t* value of 2.78 (df = 4). This was later reworded to state that the mean difference between these two groups of sessions should be at least 2.78 times greater than the pooled standard deviation of the two groups (Tang, DeRubeis, Beberman, & Pham, 2005), thereby placing less emphasis on the significance test, which is likely to be inaccurate due to autocorrelation effects between the sequential measurement points (Hardy et al., 2005; Vittengl, Clark, & Jarrett, 2005).

Other studies have revised this criterion further. Hardy and colleagues (2005) used the criteria that the *t* value of the significance test should be at least 2.50 (and for situations where only two pregain or postgain observations are available, *t* should be at least 3.00). This has been used in later papers (e.g. Adler, Harmeling, & Walder-Biesanz, 2013). An alternative third criterion was put

forward by Kelly and colleagues (Kelly, Roberts, & Bottonari, 2007; Kelly, Roberts, & Ciesla, 2005) that the gain should be at least 1.5 standard deviations different from the person's mean score on the measure across all sessions. This was intended to ensure that the gain does not simply reflect the individual's normal fluctuations in scores.

Kelly and colleagues' criterion also carries the potential advantage that gains between sessions one and two, and those at the very end of therapy, can be analysed (Clerkin, Teachman, & Smith-Janik, 2008; Kelly et al., 2007). This is not possible using the original criteria due to the need for at least two datapoints both before and after the gain. Studies examining early gains in therapy have either included pretreatment scores as one of the pregain datapoints (e.g. König, Karl, Rosner, & Butollo, 2014), or used a criterion suggested by Gaynor and colleagues (2003) that 50% of the gain should be maintained for at least two sessions following the gain (Busch, Kanter, Landes, & Kohlenberg, 2006; Haugen, Goldman, & Owen, 2015).

As was acknowledged by Tang and DeRubeis (1999), the original criteria were chosen somewhat arbitrarily in order to capture the changes of interest in a reliable way. As such there remain concerns about the methodology used to identify gains. In particular it has been suggested that the criteria are not stringent enough, in that is possible for session-to-session changes that are in line with a gradual linear or curvilinear trajectory of change to be classed as sudden gains (Thomas & Persons, 2013). This does not therefore fit with the conceptual idea that sudden gains reflect a significant shift away from a pattern

of gradual change. Similarly, another study using computer simulations of therapy scores over time highlighted the potential for a high false positive rate using the original criteria (Vittengl, Clark, Thase, & Jarrett, 2015). Thomas and Persons (2013) suggested that this is a particular concern when an individual is showing a good response to treatment, in that the linear trend of scores over time is steeper. This means that random variation in scores is more likely to tip over into meeting sudden gains criteria compared to individuals whose change occurs more slowly.

Despite criticising the Tang and DeRubeis criteria, Vittengl and colleagues (2015) note the absence of plausible alternative methods to define and identify gains. It is perhaps for this reason, along with an aim to achieve consistency across studies, that most work on sudden gains uses the original criteria (Tang & DeRubeis, 1999) or minor adaptations of these.

While studies on sudden gains originated in the field of depression research, the methodology has since been applied to a range of psychological problems, including Obsessive Compulsive Disorder (Aderka, Anholt, et al., 2012), Panic Disorder (Clerkin et al., 2008), SAD (Bohn, Aderka, Schreiber, Stangier, & Hofmann, 2013; Hofmann, Schulz, Meuret, Moscovitch, & Suvak, 2006), PTSD (Doane, Feeny, & Zoellner, 2010; Haugen et al., 2015; Kelly, Rizvi, Monson, & Resick, 2009; König et al., 2014), Eating Disorders (Utzinger, Goldschmidt, Crosby, Peterson, & Wonderlich, 2016), Health Anxiety (Hedman, Lekander, et al., 2014), and Generalised Anxiety Disorder (Present et al., 2008). A recent meta-analysis of 16 sudden gains studies in anxiety and depression (1104

participants in total) found that experiencing a sudden gain was associated with greater improvement on primary outcome measures at end of treatment and follow-up compared to those who did not experience gains, and that this effect was greater in CBT relative to other treatment approaches (Aderka, Nickerson, et al., 2012). Across the studies reviewed, the majority of which used depressed samples and the BDI as the primary outcome measure, 17-52% of patients experienced a sudden gain.

2.7.2 Correlates and Predictors of Sudden Gains

A key question in the field of cognitive behavioural therapies is whether sudden gains are associated with, or possibly preceded by, shifts in cognitions. Evidence that cognitive shifts are occurring prior to sudden gains would constitute important empirical support for the hypothesised cognitive mechanisms that underpin these therapies. Tang and colleagues (Tang & DeRubeis, 1999; Tang et al., 2005) found evidence in their studies of depression that pregain sessions contained greater cognitive change relative to control sessions (the same participant's 'pre-pregain' session), as measured by observer-ratings of session videotapes using the Patient Cognitive Change Scale (see Tang & DeRubeis, 1999). Similarly, there is some evidence to suggest that pregain sessions are associated with new levels of insight and understanding of problematic experiences (Goodridge & Hardy, 2009), and Norton and colleagues (2010) reported a similar finding in cognitive behavioural group therapy for anxiety disorders.

Studies generally note an improvement in therapeutic alliance following, but not immediately prior to, a sudden gain (Lutz et al., 2013; Tang & DeRubeis, 1999), and there is evidence from one study that therapeutic alliance early in therapy did not predict the occurrence of sudden gains (Hardy et al., 2005). This suggests that alliance changes result from, rather than predict, sudden gains. Other studies have investigated whether demographic factors or baseline questionnaire scores are associated with subsequent sudden gains (Aderka, Anholt, et al., 2012; Adler et al., 2013; Kelly et al., 2007; Kelly et al., 2005). While some significant predictors have been reported in these studies, they do not appear to occur consistently, suggesting such results could be spurious and a product of multiple analyses. Generally these studies report that demographic and baseline characteristics do not reliably predict the occurrence of sudden gains.

2.7.3 Sudden Gains in Social Anxiety Disorder

There are to date three studies of sudden gains in SAD. Hofmann and colleagues (2006) analysed data from a previous study comparing cognitive-behavioural group therapy (CBGT) with exposure group therapy (EGT), which found that both were superior to waitlist controls, with no difference between the two active conditions at posttreatment, but a superior effect of CBGT at six-month follow-up (Hofmann, 2004). Sudden gains were calculated using the Liebowitz Social Anxiety Scale (LSAS; Heimberg et al., 1999), using a cutoff score of 10 points for criterion one (absolute magnitude). Compared to studies involving participants with other clinical conditions such as depression, the frequency of sudden gains was relatively low (19% of participants) and this did not vary

between treatment groups. For the combined sample, the average gain magnitude was 15.78 points, and gains most frequently occurred in session five, although they were distributed throughout therapy sessions. On average, gains represented 50% of the overall improvement shown by participants across therapy. The extent of this change was significantly greater in those with sudden gains compared to those without, though participants with sudden gains had higher pretreatment LSAS scores (i.e. more severe social anxiety) so had more room for improvement across therapy. On a different measure of social anxiety, the Social Phobia and Anxiety Inventory (Turner, Beidel, Dancu, & Stanley, 1989), which was the primary outcome measure of the original study, participants with sudden gains did not show better outcomes at posttreatment or six-month follow-up. This lack of relationship between sudden gains and better treatment outcome is in contrast to the findings of many other studies, including the Aderka et al (2012) metaanalysis.

To assess whether gains were associated with prior cognitive change, Hofmann and colleagues examined difference scores on the Negative Self-Statements During Public Speaking scale (SSPS-N; Hofmann & DiBartolo, 2000) between the pre-pregain and pregain sessions (also referred to as session 'n-1' and session 'n', respectively; using this terminology the sudden gain occurs between session n and session n+1, see Figure 5). This did not reveal significantly greater cognitive change compared to the previous between-session interval (i.e. the difference between sessions n-2 and n-1). There was also no cognitive change found between the pregain (n) and postgain (n+1) sessions. This suggested that greater cognitive changes did not appear to occur immediately prior to sudden

gains, and that cognitive changes were not observed simultaneously with the gain. However, the authors highlighted that the SSPS-N only assesses negative self-perceptions, which may not be the only cognitive change expected to occur across therapy. Further, these items relate to public speaking situations, which may not be the primary concern of all patients with SAD.

The second paper (Bohn et al., 2013) analysed data from a RCT comparing individual Cognitive Therapy (CT) with Interpersonal Therapy (IPT)(Stangier et al., 2011). This trial found that both treatments were superior to waitlist controls, but that CT was more effective than IPT at reducing social anxiety symptoms. To identify sudden gains among their sample of 67 participants who attended at least seven sessions, this study used a different primary outcome measure than Hoffman and colleagues (2006), the Social Phobia Weekly Summary Scale (SPWSS; Clark et al., 2003). This study found that 22% of participants experienced gains, two-thirds of whom were in the CT group, though this difference was not significant. In contrast to Hofmann and colleagues (2006), participants with sudden gains did show better therapy outcomes than participants without, with significantly lower posttreatment social anxiety scores on the LSAS and Social Phobia Inventory (SPIN; Connor et al., 2000), and on the LSAS at 12-month follow-up.

Cognitive change was assessed using weekly scores on the Social Cognitions Questionnaire (Clark, 1995), a broader scale compared to the SSPS-N, which assesses both the frequency of, and the degree of belief in, 22 common negative social cognitions. No differences were found when comparing the pregain

session (session n) scores with the pre-pregain session (n-1) scores, suggesting that large shifts in cognitions were not occurring immediately prior to gains. The difference between pregain (n) and postgain (n+1) was significant for both frequency and belief, with lower scores in the postgain session. This suggests that sudden gains were associated with significant cognitive changes, but that these occurred in parallel rather than cognitive change being temporally precedent.

The third study (Thorisdottir, Tryggvadottir, Saevarsson, & Bjornsson, 2018) analysed sudden gains from a trial dataset comparing brief CBGT with group psychotherapy among college students (Bjornsson et al., 2011), which found both treatments to be similarly efficacious. Gains were calculated based on the Brief Fear of Negative Evaluation scale (BFNE; Leary, 1983) and Social Interaction Phobia Scale (SIPS; Carleton et al., 2009). Ten participants (22%) experienced a gain, and gains were not found to be associated with a better overall treatment outcome, though the proportion of participants with posttreatment scores in the nonclinical range was somewhat higher among those with sudden gains. Predictors of sudden gains were not examined in this study.

Taken together, these studies would suggest sudden gains occur in 20% of patients undergoing psychological therapy, that these are not accompanied by preceding cognitive change, and that they are inconsistently associated with better overall clinical outcomes. However, further investigation of sudden gains in SAD is warranted for a number of reasons, not least that three studies is an insufficient sample to draw firm conclusions. As mentioned above, the finding

that sudden gains did not predict clinical outcomes in the Hofmann et al (2006) and Thorisdottir et al (2018) studies is inconsistent with the Bohn et al (2013) study and the broader sudden gains literature, hence this requires further examination in therapies for SAD. It is also noted that in the Hofmann et al study, participants' baseline severity of social anxiety was low (mean LSAS = 40.75 and 44.58 in EGT and CBGT respectively) compared to other treatment studies; the mean baseline LSAS in Bohn and colleagues (2013) was 72.46. This will have reduced the likelihood of sudden gains given there is less room for improvement and thus may not be representative of these treatments more generally. Regarding changes in cognitions, it is possible that the two studies described were not able to demonstrate this due to limitations of measurement (e.g. the use of the public-speaking-focused SSPS-N), or limited negative cognitions at baseline. Additionally, it could be suggested that the use of a group therapy format, which has been shown to be less effective than individual treatment (Mayo-Wilson et al., 2014), and the use of trainee therapists in both Bohn et al (2013) and Thorisdottir et al (2018), may have resulted in less than optimal conditions in which to assess sudden gains and cognitive change. Further investigation of whether cognitive changes occur prior to gains would require measurement of a range of negative cognitions, within a CT intervention delivered by experienced cognitive therapists.

One further consideration is the increasing body of work on cognitive behavioural interventions delivered over the internet, and the evidence indicating that when these are therapist-guided they show equivalent efficacy to face-to-face therapy (Andersson et al., 2014). It is perhaps then reasonable to

assume that sudden gains may be present in this form of treatment delivery. One study on internet-based CBT for health anxiety has demonstrated in principle that sudden gains can occur (Hedman, Lekander, et al., 2014), but it is not known whether they may happen in internet programmes for SAD or other conditions, or whether the frequency and nature of these gains are comparable to those occurring in face-to-face therapy. This is an important step to understand whether the mechanisms underlying face-to-face and internet-based treatments are similar.

2.7.4 Summary

Sudden gains have been found in many studies of psychological therapies for mental health problems, though their frequency is variable across studies. As sudden gains have been shown to predict therapy outcomes, they represent an interesting clinical phenomenon that may have implications for how therapies can be improved. The majority of empirical work has been undertaken in depression, though there is a trend for an increasing number of studies in other conditions. In SAD, the three studies to date suggest around 20% of patients experience sudden gains, though some inconsistent findings and possible limitations of these studies mean that more work is needed to explore this in detail, in particular examining whether sudden gains predict therapy outcome, and whether they are preceded by changes in cognitions. Given the increasing use of internet-based treatments for SAD, it is also important to understand whether sudden gains occur in this treatment format, and if these are comparable to face-to-face therapy. To date, this has yet to be investigated.

2.8 Dissemination of Evidence-based Psychological Interventions

As outlined in Chapter 1, there is a distinct dissemination gap between research into effective psychological interventions, and their implementation in routine clinical practice. As this is a global problem, therapist-guided internet interventions may offer a promising, efficient, and scalable route to disseminate evidence-based therapies. However, for such online treatments to be implemented successfully in a global context, there are three key requirements: 1) to be able to effectively train local therapists in their delivery, 2) to reliably assess therapists' competence in delivering the treatments, and 3) to understand whether international and intercultural dissemination is indeed possible, that is, whether treatments developed in one cultural context will be applicable and efficacious in another.

2.8.1 Therapist Training

Research on therapist training is much lacking when compared to studies focused on psychological therapies themselves (Rakovshik & McManus, 2010). Training most commonly falls into one of three formats: a standalone face-to-face workshop session (or sessions); the 'workshop plus supervision' model, where workshop attendees subsequently see training cases under supervision from those experienced in the intervention (Fairburn & Wilson, 2013); and the training course approach, where participants learn and deliver an intervention under supervision over a more extended period, and are evaluated against a set of core competencies (e.g. high intensity therapist training for IAPT; see Liness et

al., in preparation; McManus, Westbrook, Vazquez-Montes, Fennell, & Kennerley, 2010). The latter two approaches are considered to be 'gold standard' methods of training provision given they allow trainees to practise implementing what they have learnt under expert guidance, and the importance of supervision in therapist training has been highlighted empirically, with supervised trainees demonstrating greater competence (Mannix et al., 2006; Rakovshik, McManus, Vazquez-Montes, Muse, & Ougrin, 2016).

Studies reporting data on the effectiveness of therapist training most commonly relate to CBT interventions, and largely report increases in both therapist knowledge and competence following training (Barnfield, Mathieson, & Beaumont, 2007; McManus, Westbrook, et al., 2010). One recent large-scale study evaluating an IAPT CBT High Intensity training programme demonstrated the high efficacy of this training approach at achieving competence in the delivery of CBT for anxiety and depression (Liness et al., in preparation), with subsequent work demonstrating that the majority of trainees maintained competence and continued to achieve good clinical outcomes 12 months post-training (Liness & Beale, in preparation).

There are two studies to date which presented clinician training data in relation to internet interventions, with promising results (Hadjistavropoulos, Thompson, Klein, & Austin, 2012; Rose et al., 2011). Rose and colleagues (2011) described the training of primary care staff in the delivery of an online CBT anxiety intervention. The clinicians were assessed for both adherence and competence via audio recordings of face-to-face and telephone role-plays with fictitious

clients. Results indicated it was well received and highly acceptable to the clinicians, who acquired a high degree of proficiency delivering the intervention. Hadjistavropoulos and colleagues (2012) examined the training of 20 clinical psychology graduates in an ICBT program for anxiety and depression. The training workshop included education and experiential exercises (e.g. writing messages to clients), and was shown to lead to increases in self-reported ICBT knowledge, attitudes, and confidence, with 85% of the cohort subsequently providing the treatment under supervision within their clinical practice.

While the 'workshop plus supervision' and training course approaches are probably the most appropriate for training small numbers of therapists, and may provide an important first step in treatment dissemination, the time and resources required mean they cannot easily be used at scale. Addressing the global dissemination gap requires alternatives to be considered in order to train many more professionals who can deliver EBTs (Fairburn & Patel, 2017; Fairburn & Wilson, 2013; Gunter & Whittal, 2010; Sanders & Turner, 2005). A range of different methods have been suggested, including training large numbers of less qualified professionals, or using the 'train-the-trainer' model, where each therapist receives, and subsequently delivers training to their local area (Fairburn & Patel, 2014; Fairburn & Wilson, 2013). Greater use of the internet has the potential to make a significant impact here, for example through fully online training, online support resources, or online supervision (Bennett‐Levy, Hawkins, Perry, Cromarty, & Mills, 2012; Fairburn & Patel, 2017; Sholomskas et al., 2005), with some initial evidence that an online training programme for enhanced CBT (face-to-face) for eating disorders can lead to

significant increases in therapist competence with only minimal or no external guidance (Cooper, Bailey-Straebler, et al., 2017; Fairburn, Allen, Bailey-Straebler, O'Connor, & Cooper, 2017). Bennett-Levy and colleagues (2009; 2012) highlighted online CBT training as a promising and cost-effective approach, particularly in more rural or remote communities.

The dissemination of internet interventions is also likely to benefit from such developments in therapist training approaches, though it has been noted that extra considerations need to be made within training for online therapy. These include computer literacy, online communication, legal and confidentiality issues, and supervision of therapists' online work (Mallen, Vogel, & Rochlen, 2005; Shandley et al., 2011). The little evidence to date suggests small scale training for online interventions can be implemented effectively, but further research into the results of the range of different training methods is of particular importance (Weisz, Ng, & Bearman, 2014).

2.8.2 Assessment of Therapist Competence

Along with a limited number of studies of training effectiveness, there is a lack of valid and reliable methods to evaluate therapist competence (Simons, Rozek, & Serrano, 2013), which may also be contributing to the dissemination gap in that therapists may be delivering treatments suboptimally (Shafran et al., 2009). A review by Muse and McManus (2013) highlighted that while a range of assessment tools and measures exist, including knowledge questionnaires, academic assignments, role play assessments, and session rating scales, these may not always be standardised and psychometric information is not commonly

presented. It has been suggested that standardised role plays could offer a greater degree of reliability and validity compared to some other assessment methods, and are recommended as a priority for further research (Fairburn & Cooper, 2011; Muse & McManus, 2013).

Fortunately, some well-validated measures do exist, and one of the most widely-used within the cognitive-behavioural therapies is the Cognitive Therapy Scale – Revised (CTS-R; Blackburn et al., 2001). For this assessment, a trained assessor reviews an audio/video recording of a full therapy session, and rates the trainee across a range of both general (e.g. interpersonal warmth) and specific (e.g. agenda setting) competencies. In SAD, an adapted form of this tool, also with good psychometric properties, has been developed: the Cognitive Therapy Competence Scale for Social Phobia (CTCS-SP; Clark, von Consbruch, Hinrichs, & Stangier, 2007; von Consbruch, Clark, & Stangier, 2012). This allows the assessor to rate skills and techniques specific to the CT-SAD treatment protocol. However, while it is possible to use the CTCS-SP to carefully evaluate therapist competence for face-to-face CT-SAD, the same is not true for online therapist-guided interventions such as iCT-SAD, given that much of the treatment content is delivered in written or video form rather than by the therapist, meaning that the clinical skills required to deliver the treatment competently are not identical to face-to-face work.

Despite strong research interest in therapist-guided internet interventions, to the author's knowledge there are as yet no published competency assessments for online interventions. Given the intention to disseminate such treatments at

scale, it is clear that greater research attention is required regarding the training of therapists to deliver online treatments, and to evaluate competency, particularly since this medium is likely to require adaptation of existing assessment tools, or preclude some altogether. Cooper and colleagues (2015) have developed an online measure of therapist competence in relation to the face-to-face enhanced CBT treatment for eating disorders. This tool assesses therapy knowledge, and was shown to predict competence as measured by standardised role plays (Cooper, Doll, et al., 2017). They recommend using such knowledge measures alongside skills assessments, which more directly assess clinical performance though are less scalable.

In addition to knowledge and skills assessments (Cooper et al., 2015; Fairburn & Cooper, 2011), evaluating patient outcomes as an indicator of therapist competence may also be beneficial. These outcomes can obviously be influenced by patient factors such as complexity or severity (Fairburn & Cooper, 2011), but there is some evidence suggesting a relationship between competence and clinical outcomes (Brown et al., 2013; Huppert et al., 2001; Kuyken & Tsivrikos, 2009; Liness et al., in preparation; Trepka, Rees, Shapiro, Hardy, & Barkham, 2004). However, findings are mixed; one large study by Branson, Shafran and Myles (2015) did not find evidence of such an association overall among IAPT therapists and patients, although therapist competence was associated with reliable change on clinical outcome measures, with patients of the most and least competent therapists showing above chance rates of reliable improvement and deterioration respectively. One metaanalysis found no evidence of a competence-outcome relationship overall, but noted significant heterogeneity within the

findings of the 17 included studies (Webb, DeRubeis, & Barber, 2010). Given there was a trend for a stronger relationship among studies of depression, it is possible that the type of clinical condition may act as a moderator. In SAD, a significant association between the CTCS-SP competence measure and patient outcomes on both general (Clinical Global Impression Improvement scale) and social anxiety-specific (LSAS) measures has been demonstrated (Ginzburg et al., 2012). Using a range of methods to assess competence, including patient outcomes, and examining the extent to which convergent evidence of competence is demonstrated, is therefore a sensible approach. However, this has yet to be taken in the literature.

2.8.3 International and Intercultural Dissemination

One of the reasons why internet interventions are thought to have much potential to address the global dissemination gap is that much of the treatment content is fixed, which is thought to mean easier transportation and implementation across international, linguistic, and cultural boundaries (see Fairburn & Patel, 2017; Holmes et al., 2018). While this makes intuitive sense, research examining whether such dissemination is feasible and effective is currently limited.

A few studies have undertaken dissemination efforts to implement internet-based EBTs in countries or cultures different from where they were developed (see Table 3), with some additional large-scale projects ongoing, for example the Europe-wide 'MasterMind' project of ICBT and collaborative care videoconferencing for depression (see study protocol: Vis et al., 2015). These

'transporting' studies are an important step if the global potential of internet interventions is to be realised. As shown in Table 3, most of these studies have investigated interventions for SAD (including fear of public speaking). The results have suggested that following translation and some cultural adaptation, these particular interventions were efficacious in new cultural contexts, and were superior to waitlist controls where RCT designs were used. However, the number of studies is limited, meaning a great deal of further research is required examining other interventions, clinical conditions, and cultural settings, before we can assess the generalisability of the findings to date, and draw conclusions about the global potential of online treatments more broadly. Further, as treatment content and delivery can vary widely between different programs, even among CBT-based interventions for the same clinical presentation, greater understanding of how individual treatments perform internationally is required. To date, no English-language treatments, including iCT-SAD have been studied in settings outside the UK. As iCT-SAD includes many components that do not feature in other internet interventions for SAD (e.g. the self-focused attention and safety behaviours experiment, video feedback, virtual audiences, testimony videos etc.), we cannot assume that the clinical effects seen in the UK will transfer to another culture based on the literature to date.

Table 3

Studies Disseminating Internet Interventions Internationally.

Study	Treatment	Design	Developed in	Implemented in	Cultural adaptation	Results summary
Gallego et al., (2011)	Unguided ICBT for SAD (fear of public speaking)	RCT (ICBT vs. waitlist), n = 41	Spain	Netherlands	Translated into Dutch. Example scenarios changed to reflect Dutch culture.	ICBT superior to waitlist on measures of fear of public speaking, avoidance, and work impairment. Mean within-group pre-post d_{Cohen} = 1.13 for SAD measures. High dropout (46% in treatment group).
Jakobsen et al., (2017)	Guided ICBT for mild and moderate depression	Open pilot benchmarking study, n = 22	Sweden	Norway	Translated into Norwegian. Minimal other adaptation given 'cultural overlap'.	Large effects for depression (d_{Cohen} = 1.13 on BDI), small to medium effects for anxiety. 55% classed as recovered at posttreatment. Effects comparable to Swedish studies.
Kishimoto et al., (2016),	ICBT for SAD	RCT (guided vs. unguided vs. waitlist), n = 197	Switzerland	China	Translated into Chinese. Adaptations made but not described.	SAD measures showed both treatment conditions superior to waitlist (Mean d_{Cohen} = 1.10 for guided, d_{Cohen} = 0.92 for unguided). No significant difference between treatments regarding outcome or adherence.
Tulbure et al., (2015)	Guided ICBT for SAD	RCT (ICBT vs. waitlist), n = 76	Sweden	Romania	Translated into Romanian. Module content reduced by 50%. Adaptations reported but not described.	ICBT superior to waitlist. Mean within-group pre-post d_{Cohen} = 1.52 for primary SAD measures. 34% full remission. Gains maintained at 6-month follow-up.

The studies shown in Table 3 all implemented a full translation of the original intervention into the target language. All reported at least a minimal degree of cultural adaptation prior to implementation in the new setting, such as changes to example scenarios in the programme to be more culturally relevant to the new setting. However, overall the adaptations made were poorly described, making it difficult to determine what was changed, how much, and how often. While these adapted interventions can be evaluated using standard study designs, it may be more difficult to evaluate the specific effects of the cultural adaptation itself. This means our understanding of whether and to what extent the cultural adaptation of online treatments is necessary, and how this should be done, is limited.

There is evidence from the literature on face-to-face interventions suggesting that treatments adapted to the culture and context of those receiving them show moderate efficacy; a meta-analysis of 76 studies reporting interventions adapted for culture, ethnicity, or race showed a random effects weighted average effect size of $d = 0.45$ (Griner & Smith, 2006). This study highlighted the benefits of some forms of adaptation, for example that treatments conducted in participants' native language (if non-English) were twice as effective as those conducted in English. However, the authors noted that often the process and details of adaptations made were poorly described. An additional problem is that these studies rarely include the unadapted treatment as a control intervention, so it is not possible to estimate how much additional benefit in terms of efficacy is provided by adaptation.

Some authors have offered frameworks to guide cultural adaptation, for example the eight dimensions of therapy interventions to be considered for adaptation suggested by Bernal and colleagues (Bernal, Bonilla, & Bellido, 1995), namely language, persons, metaphors, content, concepts, goals, methods, and context. Others outline more procedural frameworks suggesting how adaptations could be developed iteratively in collaboration with consumers (Hwang, 2009; Naeem et al., 2016). In social anxiety, cross-cultural research is somewhat rare. It has been suggested that culture may influence the norms and standards about what signs of anxiety are publicly acceptable, and that social anxiety may be more common in collectivistic (rather than individualistic) cultures, where social rules and embarrassment may be particularly significant (Hofmann, Asnaani, & Hinton, 2010).

So while there is some evidence that culturally-adapted treatments are effective, and some guidance on how this should be achieved, there is little research examining how much additional benefit is obtained through cultural adaptation, and whether this justifies the time and resources required. An initial step to address this question would be to examine the efficacy of unadapted interventions in new cultural settings, which could then provide a benchmark for subsequent adaptations if the findings suggest this is warranted. This approach has not yet been taken in relation to disseminating online interventions. The benchmarking approach compares the effectiveness of an adapted intervention to a standard, typically the efficacy of the intervention in its original context, for example from one or more RCTs in research settings (Spilka & Dobson, 2015). In general, benchmarking may help to evaluate the performance of internet

interventions in new cultural settings, and to review whether any adaptations made are effective.

2.8.4 Summary

As the majority of therapy content within internet interventions is fixed within the programme, translation into new languages, and dissemination into new cultural settings might in principle be easier compared to face-to-face therapies, where extensive therapist training may be required to achieve standardisation in how the content is delivered. However, research in this area at present is minimal, meaning we are yet to establish whether this potential benefit is actually observed in practice. The successful global dissemination of internet interventions will require effective methods to train new therapists to deliver treatments to a competent standard. At present, there are few studies evaluating therapist training, and no established methods for assessing competence in this modality. The four studies evaluating the efficacy of online (ICBT) interventions following 'transportation' to new countries show promising results, but a wider range of interventions and geographical locations is required to review if these results are generalisable. While these studies implemented some cultural adaptation of the treatments, it is unknown whether, or to what extent, this had an effect on outcomes. One possible method to investigate this is to start by reviewing the efficacy of unadapted treatments in new settings, and benchmarking this against previous research findings to review whether subsequent cultural adaptation is warranted. This approach has not yet been taken within the field.

2.9 Aims and Research Questions

This thesis presents eight empirical studies over Chapters 3 to 7, followed by a general discussion in Chapter 8. The principal aims and research questions of each chapter are outlined below.

2.9.1 Chapter 3

This chapter aims to explore the mechanisms of clinical improvement in CT-SAD and iCT-SAD, specifically whether key maintaining processes from the Clark and Wells model mediate reductions in social anxiety. The research questions for Study 1 are:

- Do negative social cognitions, self-focused attention, and depressed mood act as mediators of clinical improvement in CT-SAD and iCT-SAD?
- Are the patterns of mediation similar between face-to-face and online forms of treatment?

2.9.2 Chapter 4

The two studies in this chapter further explore the hypothesised mediators of clinical improvement from Chapter 3, using a large CT-SAD dataset from routine clinical practice. The research questions for Studies 2a and 2b are:

- Do negative social cognitions, self-focused attention, and depressed mood act as mediators of clinical improvement in CT-SAD?
- Are the patterns of mediation from routine clinical practice similar to those found in a randomised controlled trial of the same treatment (Chapter 3)?

2.9.3 Chapter 5

This chapter presents three studies that examine the occurrence of sudden gains within CT-SAD and iCT-SAD, and aims to explore which factors might be involved in their occurrence. The research questions for Studies 3a, 3b, and 3c are:

- Do sudden gains occur in CT-SAD and iCT-SAD, and if so, how often?
- Are there differences between the two treatment formats?
- Are sudden gains predictive of overall therapy outcomes?
- How do negative social cognitions, and other psychological constructs change around the period of the gain?
- Are there any techniques or factors that occur consistently in the period immediately prior to sudden gains?

2.9.4 Chapter 6

This chapter describes the implementation and evaluation of a programme of therapist training in iCT-SAD, and a pilot case series of the treatment implemented in Hong Kong by local therapists. It aims to examine the effectiveness of the training programme, and assess the feasibility of implementing the treatment in another culture. The research questions for Study 4 are:

- Is the programme of therapist training effective at improving therapists' skills and knowledge in delivering iCT-SAD?
- Is it feasible and acceptable for English-speaking patients with SAD in Hong Kong to undertake iCT-SAD?
- How effective is iCT-SAD among a pilot case series?

- What practical or cultural adaptations might be required prior to starting a randomised controlled trial?

2.9.5 Chapter 7

This chapter examines the dissemination of iCT-SAD into a new cultural context. It aims to examine its efficacy in a randomised controlled trial. The research questions for Study 5 are:

- Is iCT-SAD superior to a waitlist control group when implemented in Hong Kong?
- How does the efficacy of iCT-SAD in Hong Kong compare to the results of UK research trials?

2.9.6 Chapter 8

This chapter discusses the findings of the studies presented in the context of existing literature, and considers their implications for research, theory, and clinical practice.

3

Mediation of Clinical Improvement in Face-to-face and Internet-based Cognitive Therapy for Social Anxiety Disorder

3.1 Study 1: Analysis of CT and iCT Randomised Controlled Trial Data

Chapter 2 highlighted the potential for mediation research to understand how and why treatments are effective, and therefore offer ways to enhance them. There is a small body of mediation studies examining psychological therapies for SAD, though it is heterogeneous regarding the mediators examined, analyses used, and interventions studied. There is some support for cognitive change and reductions in self-focused attention acting as mediators of clinical improvement, but these require further examination, especially in routine clinic samples, and for online treatments.

The aim of Study 1 was therefore to explore mediation of clinical improvement within two forms of Cognitive Therapy for SAD: the standard face-to-face

therapy protocol (CT-SAD), and an internet-based version of the same protocol (iCT-SAD). The principal research questions were:

- Do negative social cognitions, self-focused attention, and depressed mood act as mediators of clinical improvement in CT-SAD and iCT-SAD?
- Are the patterns of mediation similar between face-to-face and online forms of treatment?

3.2 Method

3.2.1 Participants

Data from all 99 participants from a randomised controlled trial of Cognitive Therapy for SAD (Clark, Wild, et al., in preparation) were analysed. The trial compared three conditions: face-to-face Cognitive Therapy (CT), internet-based Cognitive Therapy (iCT), and a waitlist control group. Participants in the waitlist condition were subsequently randomised to one of the two active treatments. Participants in the present study had therefore all received a course of Cognitive Therapy for SAD delivered either face-to-face (CT; n=50) or via a therapist-supported internet-based programme (iCT; n=49). The results of this trial indicated both treatments were superior to waitlist, with no significant differences found between the two regarding social anxiety outcomes.

Participants were recruited from local clinical services and self-referrals from the community. Inclusion criteria were: a) meeting DSM-IV (American Psychiatric Association, 1994) criteria for SAD; b) duration of SAD was at least six months; c) SAD considered to be the patient's main problem; d) age 18-65 years; e) not meeting DSM-IV criteria for current alcohol or substance

dependency; f) no current or past psychosis; g) no current psychotropic medication or a stable dose for at least two months without improvement and willing to keep the dosage constant during the trial; h) agrees not to start any additional treatment during the trial; i) able to read English, j) willing to be randomised to either treatment condition; k) adequate access to an internet-enabled computer; l) not meeting DSM-IV criteria for borderline personality disorder.

3.2.2 Treatments

The face-to-face CT protocol was based on the Clark and Wells (1995) model, and is the first-line recommended treatment for SAD according to NICE guidelines (2013b). The iCT intervention implements the full content of CT, presented online in a series of treatment modules that include psychoeducation, written and behavioural tasks, videos demonstrating key behavioural experiments or treatment principles, case examples, and patient testimony. Each participant is assigned a therapist, whom they communicate with via asynchronous messaging from within the programme, weekly phonecalls, and webcam chats. The website also contains a library of therapy resources, an online log where people can plan and record the results of behavioural experiments, and videos of virtual audiences where people can record themselves giving presentations. Further details of the programme are given in Stott et al. (2013) and described in Chapter 2. Both treatments lasted 14 weeks, followed by three booster sessions at subsequent monthly intervals.

3.2.3 Therapists

Both treatments were delivered by three highly experienced cognitive therapists, with each therapist delivering both CT and iCT interventions, receiving clinical supervision throughout.

3.2.4 Measures

Liebowitz Social Anxiety Scale – Self Report version (LSAS-SR; Baker et al., 2002; Heimberg et al., 1999): a 24-item scale describing a range of social situations. Respondents give two scores per item in relation to the last week; firstly the extent of fear or anxiety they would experience in the situation (0 = none, 1 = mild, 2 = moderate, 3 = severe), and secondly how much they would tend to avoid the situation (0 = never, 0%, 1 = occasionally, 1-33%, 2 = often, 34-67%, 3 = usually, 68-100%). The total of all ratings is calculated, with a maximum score of 144 and higher scores indicating more severe social anxiety. The scale is frequently used in the assessment of social anxiety, with good psychometric properties for both clinician-rated and self-report versions (Fresco et al., 2001; Heimberg et al., 1999). Cronbach's alpha in the present sample was 0.90 at baseline and 0.96 at posttreatment.

Social Cognitions Questionnaire (SCQ; Clark, 1995): This scale presents 22 negative social cognitions, each of which is rated for both the frequency with which it occurred in the last week when the respondent was anxious (rated from 1 = thought never occurs to 5 = thought always occurs when I am nervous), and the degree to which they believe the thought to be true when it occurs (rated from 0 = I do not believe this thought, to 100 = I am completely convinced this

thought is true). Total scores are calculated for Frequency (range 22-110) and Belief (range 0-2200) with higher scores indicating more negative social cognition. Cronbach's alpha in the present sample was 0.88 at baseline and 0.91 at posttreatment for the frequency subscale and 0.86 at baseline and 0.94 at posttreatment for the belief subscale.

Social Phobia Weekly Summary Scale (SPWSS; Clark, 1995): This six-item scale produces a self-report summary of the respondent's social anxiety over the previous week. In addition to an overall rating of social anxiety severity, the items elicit ratings of avoidance, self-focused attention (in general, and in more difficult social situations), anticipatory worry, and post-event rumination. All items are rated on 0-8 Likert scales, with total scores ranging between 0 and 48. Cronbach's alpha in the present sample was 0.74 at baseline and 0.94 at posttreatment.

Patient Health Questionnaire – 9-item version (PHQ; Kroencke et al., 2001): A nine-item scale assessing depression symptom severity over the previous two weeks, the PHQ is a widely-used and validated assessment; scores ≥5 are clinically significant, with scores 5-9, 10-14, 15-19, and 20 and above reflecting mild, moderate, moderately severe, and severe depression, respectively (Maximum score 27). Cronbach's alpha in the present sample was 0.83 at baseline and 0.84 at posttreatment.

Measures were completed on a weekly basis throughout the treatment, prior to each session in the CT group, and online in the iCT group. Copies of all measures are given in Appendix A.

3.2.5 Analysis

A series of multilevel structural equation models to assess mediation were computed (see Preacher et al., 2011; Preacher et al., 2010) based on the analytic strategy of Mörtberg and colleagues (2015), where timepoints (level 1) were nested within participants (level 2). Therapist was not included as a third level given the limited number of therapists[1], and that this model structure would be too complex for the sample size. For two-level models, data simulations have shown that sample sizes of 50 and above produce unbiased parameter estimates under a range of conditions (Hox, Maas, & Brinkhuis, 2010). The number of elapsed days in treatment was used as the independent variable, and LSAS score as the dependent variable. Three putative mediators were assessed: 1) self-focused attention, measured using the general self-focused attention item of the SPWSS (item 3); 2) negative social cognitions, measured using the SCQ. A composite z score was computed from the two SCQ subscales to incorporate both the frequency of, and belief in, these cognitions, and to reduce the number of models required; 3) depressed mood, measured using the total PHQ score.

All variables were measured at the lower level following the procedure described by Bauer and colleagues (2006). To incorporate temporal precedence

[1] Maas and Hox (2005) suggest group sizes over 50 at the higher level of multilevel models are most appropriate to avoid biased estimates.

of the mediator, lagged scores were used, where LSAS scores at any given assessment point (time j) were regressed on the scores on the mediator variable at the previous assessment point (time j-1; see Figure 6). As such, LSAS scores from the first week of therapy were not included in the analysis due to the absence of prior scores on the mediator. LSAS data from the three-month booster period were included given the model could incorporate the longer time gap between these assessment points.

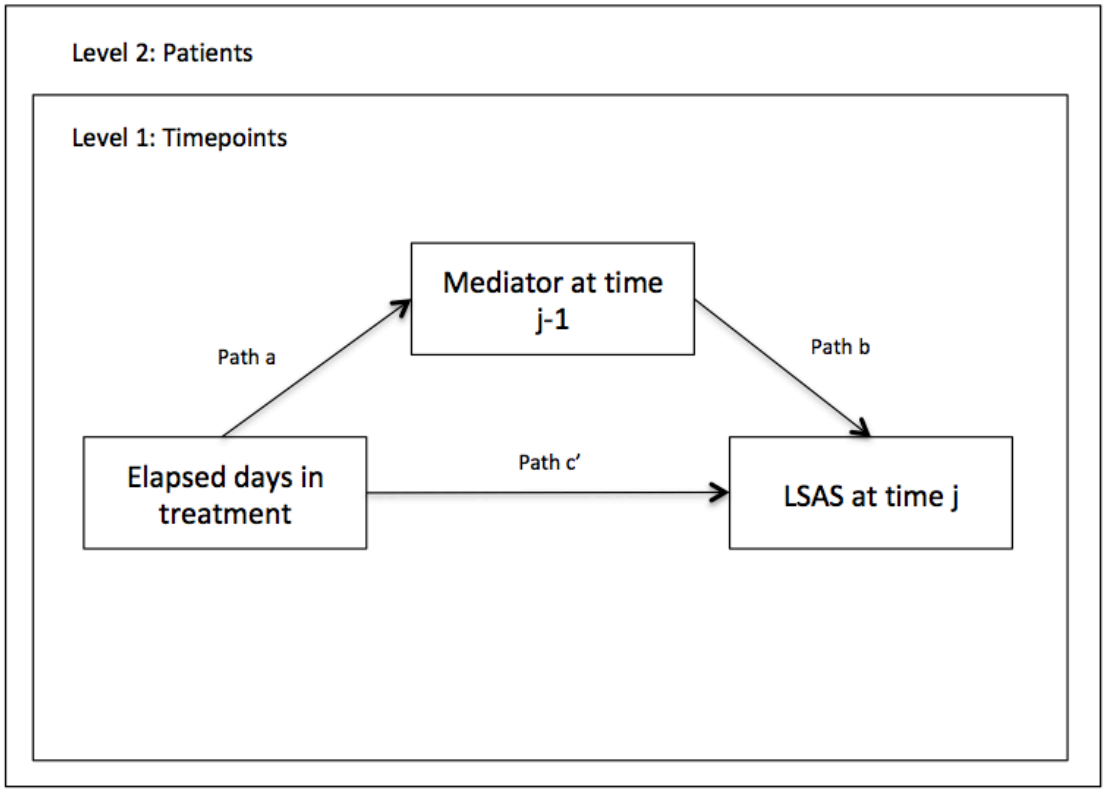


Figure 6

Diagram of multilevel structural equation model to test mediation hypotheses of the relationship between elapsed days in treatment and scores on the Liebowitz Social Anxiety Scale (LSAS).

Models were computed in MPlus version 7 (Muthén & Muthén, 1998-2015) using robust maximum likelihood estimation (MLR). Paths a and c' were allowed to

vary across participants and were therefore estimated as random, while path b was modelled as a fixed effect given that the influence of a successful mediator on the dependent variable must by definition be present across participants (Mörtberg et al., 2015). To prevent the conflation of within- and between-subjects variance, independent and mediator variables were disaggregated into within- and between-level components via group mean centering. This means the participant (group) mean-centered scores, and the participant mean scores across all timepoints represented the within and between components of these variables, respectively, and were entered into the model separately (see Hoffart, Borge, & Clark, 2016; Preacher et al., 2010). Inspection of the intraclass correlation coefficients for each model indicated there was sufficient between-subject variance to justify multilevel analysis (ICC = 0.34 – 0.58). The assumption of normally distributed residuals was examined using Q-Q plots and found to be met. Alongside *p*-values, confidence intervals of parameter estimates were reviewed to assess statistical significance.

Percent mediation (P_M) was calculated as an indicator of the strength of any mediated effects following the procedures described in Kenny and colleagues (2003) and Moscovitch and colleagues (Moscovitch et al., 2005); $P_M = 100 \times [((ab+c'+\sigma ab)-c')/(ab+c'+\sigma ab)]$, where a, b, and c' represent the respective path coefficients, and σab is the covariance between a and b. However, as path b was specified as fixed, and the covariance between a random and fixed path equals zero, the formula simplifies to $P_M = 100 \times (ab/ab+c')$, and the indirect effect to a × b (see Mörtberg et al., 2015).

To further examine the direction of the mediated effect, a series of models were computed which were identical to those in Figure 6 apart from the mediator and outcome variables, which were swapped. These therefore examined the 'reverse' mediation hypothesis, using LSAS at time j-1 as the potential mediator, and self-focused attention, negative social cognitions, or depressed mood at time j as the dependent variable.

3.3 Results

Overall findings from the trial are reported elsewhere (Clark, Wild, et al., in preparation). For the purposes of the present study, it is noted that scores on the LSAS, SCQ, SPWSS and PHQ showed significant decreases over the course of therapy in both the CT and iCT treatment groups (see Table 4).

Table 4

Baseline and Three-Month Follow-up Mean Scores on the Outcome and Process Measures Assessed.

Measure	CT (n = 50)				iCT (n = 49)			
	Baseline *M (SD)*	Follow-up *M (SD)*	Test Statistic	d_{Cohen} [95%CI]	Baseline *M (SD)*	Follow-up *M (SD)*	Test Statistic	d_{Cohen} [95%CI]
LSAS	78.5 (18.6)	23.4 (20.0)	t (48) = 16.26, p<.001	2.85 [2.30, 3.41]	77.7 (17.7)	25.9 (16.3)	t (46) = 16.96, p<.001	3.04 [2.46, 3.63]
SPWSS (mean)	5.1 (1.1)	1.9 (1.3)	t (48) = 12.91, p<.001	2.66 [2.12, 3.20]	5.5 (1.1)	2.1 (1.2)	t (46) = 13.99, p<.001	2.95 [2.38, 3.53]
SFA	5.2 (1.4)	2.1 (1.3)	t (48) = 11.71, p<.001	2.29 [1.79, 2.80]	5.3 (1.2)	2.1 (1.4)	t (46) = 12.09, p<.001	2.45 [1.93, 2.98]
SCQ-f (mean)	2.9 (0.8)	1.3 (0.4)	t (48) = 12.96, p<.001	2.53 [2.00, 3.06]	3.0 (0.6)	1.4 (0.3)	t (46) = 15.34, p<.001	3.37 [2.76, 3.99]
SCQ-b (mean)	46.7 (19.4)	7.4 (9.6)	t (48) = 14.26, p<.001	2.57 [2.04, 3.10]	48.7 (13.6)	10.6 (9.8)	t (46) = 18.85, p<.001	3.21 [2.61, 3.81]
PHQ	7.3 (5.4)	2.1 (2.5)	t (48) = 6.30, p<.001	1.24 [0.81, 1.66]	9.1 (5.5)	3.1 (3.0)	t (46) = 6.87, p<.001	1.35 [0.92, 1.79]

Note. t statistics represent paired *t*-tests comparing baseline and follow-up scores. LSAS = Liebowitz Social Anxiety Scale (Self-report); SPWSS = Social Phobia Weekly Summary Scale (Total); SFA = Self-Focused Attention (general item of SPWSS); SCQ-f = Social Cognitions Questionnaire – frequency; SCQ-b = Social Cognitions Questionnaire – belief; PHQ = Patient Health Questionnaire. M = Mean; SD = Standard Deviation. d_{Cohen} calculated using the pooled standard deviation. Cohen (1988) suggested that broadly, effect sizes of 0.2, 0.5, and 0.8 indicated small, medium, and large effects, respectively.

3.3.1 Model Results

In both CT and iCT negative social cognitions and self-focused attention showed significant indirect effect estimates, indicating these variables mediated the effect of time on social anxiety as measured by the LSAS (see Table 5 for path coefficients and indirect effect estimates). The significant and negative path a coefficients highlighted that as time in therapy increased, scores on the mediator variables decreased, with the significant, positive path b coefficients indicating that these lower scores predicted lower social anxiety at the following assessment.

Depressed mood showed significant mediation in CT but not iCT. Inspection of the percent mediation values indicated that negative social cognitions showed the strongest mediation in both treatment formats, and the mediating effect of depressed mood in CT was weaker than that of the other two mediators examined. The percent mediation estimates for iCT were marginally smaller than those of the equivalent models in the CT group.

Table 5

Unstandardised Path Coefficients, Indirect Effect Estimates, and Random Slope Variances for the Three Potential Mediators Assessed, Across CT and iCT.

	CT			iCT		
	Coefficient	SE	P_M	Coefficient	SE	P_M
			Self-focused attention			
a	-0.014**	0.001		-0.012**	0.001	
b	4.209**	0.683		3.376**	0.535	
c'	-0.224**	0.017		-0.186**	0.019	
Var_a	<0.001**	<0.001		<0.001**	<0.001	
$Var_{c'}$	0.009**	0.002		0.014*	0.005	
Indirect effect ab	-0.057**	0.011	20	-0.041**	0.008	18
			Negative social cognitions			
a	-0.017**	0.001		-0.015**	0.001	
b	8.089**	0.633		6.621**	0.708	
c'	-0.143**	0.016		-0.129**	0.015	
Var_a	<0.001**	<0.001		<0.001**	<0.001	
$Var_{c'}$	0.006*	0.002		0.010*	0.004	
Indirect effect ab	-0.138**	0.014	49	-0.098**	0.014	43
			Depressed mood			
a	-0.021**	0.003		-0.021**	0.003	
b	1.533**	0.374		0.626*	0.280	
c'	-0.249**	0.018		-0.214**	0.018	
Var_a	<0.001**	<0.001		<0.001*	<0.001	
$Var_{c'}$	0.010**	0.003		0.016*	0.005	
Indirect effect ab	-0.032**	0.009	11	-0.013	0.007	ns

Note. Path a represents the effect of time on the mediator variable. Path b represents the effect of the mediator on LSAS score at the subsequent assessment (with time held constant). Path c' represents the effect of time on LSAS score controlling for the effect of the mediator. CT = cognitive therapy (face-to-face), iCT = internet-based cognitive therapy, SE = standard error, P_M = percent mediation (i.e. the percentage of the total effect of time on LSAS score that is accounted for by the mediated path ab), Var = variance.
*p<.05 **p<.001

3.3.2 Models Reversing Mediator and Outcome

In both CT and iCT, the reversed mediation models, which swapped the mediator and outcome variables but maintained the time-lag component, were significant for self-focused attention and negative social cognitions (see Table 6). This indicated that lower social anxiety scores were strongly associated with lower self-focused attention and negative social cognitions at the following assessment. The model for depressed mood was significant in CT but not iCT, indicating that lower social anxiety scores were associated with improved mood at the following assessment, but only within the face-to-face treatment format. The percent mediation values for these models were similar across the three mediators examined, with their values indicating a particularly strong mediated effect in this direction.

Table 6

Unstandardised Path Coefficients, Indirect Effect Estimates, and Random Slope Variances for the Models Reversing the Temporal Order of Mediator and Outcome.

	CT			iCT		
	Coefficient	SE	P_M	Coefficient	SE	P_M
			Self-focused attention			
a	-0.302**	0.018		-0.244**	0.020	
b	0.028**	0.004		0.025**	0.004	
c'	-0.003*	0.001		-0.004**	0.001	
Var_a	0.013**	0.003		0.017*	0.007	
$Var_{c'}$	(see notes)			<0.001**	<0.001	
Indirect effect ab	-0.009**	0.001	74	-0.006**	0.001	58
			Negative social cognitions			
a	-0.302**	0.018		-0.244**	0.020	
b	0.035**	0.003		0.032**	0.003	
c'	-0.004**	0.001		-0.006**	0.001	
Var_a	0.013**	0.003		0.017*	0.006	
$Var_{c'}$	<0.001**	<0.001		<0.001**	<0.001	
Indirect effect ab	-0.010**	0.001	71	-0.008**	0.001	57
			Depressed mood			
a	-0.302**	0.018		-0.245**	0.020	
b	0.044**	0.010		0.016	0.011	
c'	-0.003**	0.003		-0.015**	0.003	
Var_a	0.013**	0.003		0.017*	0.007	
$Var_{c'}$	<0.001**	<0.001		<0.001**	<0.001	
Indirect effect ab	-0.013**	0.003	81	-0.004	0.003	ns

Note. Path a represents the effect of time on the mediator (i.e. LSAS at time j-1). Path b represents the effect of this mediator on self-focused attention, negative social cognition, or depressed mood scores at the subsequent assessment. Path c' represents the effect of time on the outcome variable controlling for the effect of the mediator. CT = cognitive therapy (face-to-face), iCT = internet-based cognitive therapy, SE = standard error, PM = percent mediation (i.e. the percentage of the total effect of time on LSAS score that is accounted for by the mediated path ab), Var = variance. Due to lack of model convergence when the c' path was specified as random, the model for self-focused attention in CT was run using a fixed c' path therefore no variance is given.

*p<.05 **p<.001

3.3.3 Exploring Treatment Type as a Moderator

Although the results from the above models were generally similar between the two treatment types, a test of the influence of treatment on the mediation relationship (moderated mediation) was performed to examine this directly. Initially, multilevel moderated mediation models (examining the effect of the moderator on the b path) both with and without disaggregation of the within- and between-subject variances were attempted. However, the complexity of these models meant that model estimation did not converge with the given sample size. Therefore a series of single-level models were run, assessing moderated mediation as shown in Figure 7, examining the effect of the moderator on all paths (Model 59 using the PROCESS tool, see Hayes, 2013).

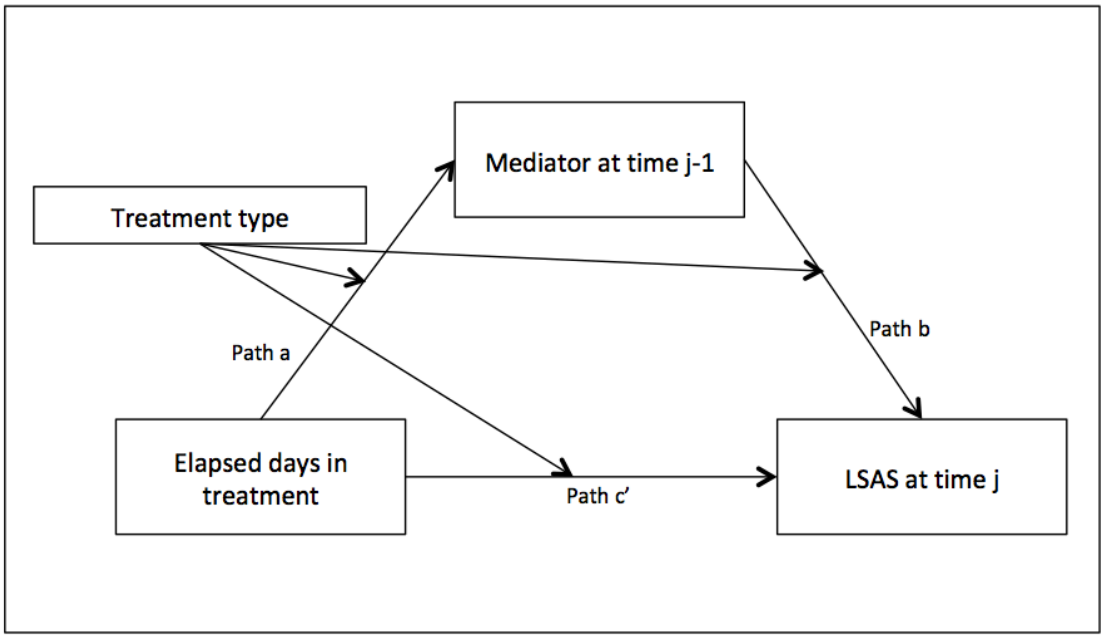


Figure 7

Moderated mediation model examining the influence of treatment type on the three mediation paths shown. LSAS = Liebowitz Social Anxiety Scale – Self-report.

These models (see Table 7) were consistent with the above findings in showing evidence for significant indirect paths (mediation) for self-focused attention and negative social cognitions, in both treatment groups, and for depressed mood in CT. In this model, the mediating effect of depressed mood was also significant in iCT. The index of moderated mediation, which tests whether the difference in mediated effects between the two values of the moderator differs from zero, showed that none of the three mediators assessed showed evidence of moderated mediation. This indicates that the mediation relationship did not significantly differ between the two treatments.

The moderator appeared to have an effect on the c' path in the self-focused attention, and depressed mood models, where the CT group showed a slightly stronger relationship between time and LSAS compared to iCT. In the negative social cognitions model, the moderator had an influence on the 'a' path indicating a stronger negative relationship between time in treatment and SCQ scores in CT compared to iCT. This suggests SCQ scores may have decreased more rapidly in CT. The moderator did not show an effect on any other individual paths.

Table 7

Unstandardised Path Coefficients, Parameter Estimates, and Indices of Moderated Mediation for the three Potential Mediators Assessed.

	Self-focused attention				Negative social cognitions				Depressed mood			
Parameter	Coefficient	SE	Lower CI	Upper CI	Coefficient	SE	Lower CI	Upper CI	Coefficient	SE	Lower CI	Upper CI
a	-0.011**	0.001	-0.013	-0.010	-0.016**	0.001	-0.017	-0.014	-0.019**	0.002	-0.024	-0.015
b	7.491**	0.463	6.584	8.399	10.151**	0.429	9.310	10.992	2.258**	0.223	1.821	2.695
c'	-0.164**	0.012	-0.188	-0.139	-0.095**	0.012	-0.119	-0.072	-0.205**	0.013	-0.231	-0.180
Int_1	0.002	0.001	-0.001	0.004	0.004*	0.001	0.001	0.006	0.004	0.004	-0.003	0.010
Int_2	-0.133	0.634	-1.376	1.111	0.008	0.621	-1.211	1.227	-0.446	0.282	-0.998	0.106
Int_3	0.046*	0.017	0.011	0.080	0.029	0.017	-0.003	0.062	0.045*	0.018	0.009	0.081
$R^2_{Mediator}$	0.147				0.274				0.132			
$R^2_{Dependent}$	0.474				0.586				0.368			
$Direct_{CT}$	-0.164**	0.012	-0.188	-0.139	-0.095**	0.012	-0.119	-0.072	-0.205**	0.013	-0.231	-0.180
$Direct_{iCT}$	-0.118**	0.012	-0.142	-0.094	-0.066**	0.012	-0.089	-0.043	-0.161**	0.013	-0.186	-0.135
$Indirect_{CT}$	-0.085[a]	0.009[b]	-0.102[b]	-0.068[b]	-0.158[a]	0.010[b]	-0.178[b]	-0.138[b]	-0.044[a]	0.007[b]	-0.057[b]	-0.031[b]
$Indirect_{iCT}$	-0.071[a]	0.011[b]	-0.093[b]	-0.049[b]	-0.123[a]	0.017[b]	-0.155[b]	-0.090[b]	-0.028[a]	0.006[b]	-0.041[b]	-0.017[b]
Mod-Med	0.014	0.014[b]	-0.015[b]	0.042[b]	0.035	0.020[b]	-0.004[b]	0.072[b]	0.015	0.009[b]	-0.003[b]	0.033[b]

Note. a = the effect of time on the mediator; b = the effect of the mediator on LSAS score (including time lag); c' = the effect of time on LSAS score controlling for the effect of the mediator; Int_1 = the moderation effect of treatment type on the a path; Int_2 = the moderation effect of treatment type on the b path; Int_3 = the moderation effect of treatment type on the c' path; $Direct_{CT}$ = estimate of the c' path for the CT group; $Direct_{iCT}$ = estimate of the c' path for the iCT group; $Indirect_{CT}$ = estimate of the indirect (a*b) effect for the CT group; $Indirect_{iCT}$ = estimate of the indirect (a*b) effect for the iCT group; Mod-Med = index of moderated mediation.
[a]Significant upon inspection of confidence interval
[b]Obtained through bias-corrected bootstrapping
*p<.05, **p<.001

3.4 Discussion

In face-to-face CT, self-focused attention, negative social cognitions, and depressed mood were all found to be mediators of the relationship between time in therapy and social anxiety, and this mediation was such that scores on these mediator variables predicted the level of social anxiety at the following assessment point. These findings are generally consistent with existing literature, in that where self-focused attention has been assessed as a potential mediator of clinical improvement in SAD, it has been shown to significantly mediate this relationship (Hedman et al., 2013; Mörtberg et al., 2015). The present findings also add to the body of work supporting reduced negative social cognitions as a mediator of reductions in social anxiety (Boden et al., 2012; Calamaras et al., 2015; Goldin et al., 2014; Hoffart et al., 2012), though it is noted that the only other study using the SCQ to assess cognitive change did not find the frequency of, or belief in, negative social cognitions to be a significant mediator of clinical improvement (Mörtberg et al., 2015). It is possible that the smaller sample size (n = 28), and lower overall extent of change on the LSAS (mean 34.8 points) in that study compared to the present findings may have masked a possible mediating effect of cognitions, so further examination of mediation using the SCQ is recommended.

The results are consistent with the cognitive model underpinning the therapy (Clark & Wells, 1995), which suggests that self-focused attention and negative cognitions are two important factors involved in maintaining anxiety, and therefore need to be addressed in order to reduce it. Whilst depressed mood is

not a feature of this cognitive model, and was examined as a 'control' mediator, the present findings suggest that it does play a role in mediating treatment outcome in CT. However, the strength of this mediated effect was much lower compared to the other two mediators, and significant mediation was not shown in iCT, which provides some support for the specificity of the mediators derived from the cognitive model. These findings support the approach of using control mediators to examine specificity and support causal inference (see Preacher, 2015). This represents a strength of the current study, though is currently rare within the psychotherapy mediation literature and should be considered in future studies.

It is interesting to note that a similar pattern of results was also found in the iCT group, with significant mediation found for self-focused attention and negative social cognitions. Depressed mood was not a significant mediator in the iCT group. This similarity shows that despite a very different form of delivering the intervention, self-focused attention and negative social cognitions did also mediate clinical improvement across therapy. The moderated mediation results supported this conclusion, indicating that the mediation relationship did not differ between the two treatment types, across any of the three mediators assessed.

Given that other studies have shown it is possible for mediators to vary across different formats of the same therapeutic approach (Hedman et al., 2013), the present findings indicate that the CT and iCT protocols assessed here appear to have their clinical effects through similar mechanisms. However, the study by

Hedman and colleagues compared therapies based on two different cognitive models, meaning that to date this is the first study to compare mediators across two formats of the same SAD therapy protocol. The similarity found between CT and iCT appears to suggest that it is the therapeutic content that is of primary importance in determining clinical outcomes, rather than the format of delivering the therapy. However, further comparisons of mediators between different formats of the same therapy content would help to confirm this.

The finding that the 'reverse' mediation models were also significant in both treatment groups, with high percent mediation values, indicated that the level of social anxiety strongly predicted subsequent self-focused attention and negative social cognitions in both treatment groups, and depressed mood in the CT group. It is likely that decreases in social anxiety provide a sense of progress, which could perhaps lead to further reductions on the mediator variables through increases in self-efficacy, hopefulness, motivation to engage in therapy tasks, or in the strength of the therapeutic alliance. As self-focus and negative cognitions are key features of the clinical presentation of SAD, it is perhaps not surprising these continue to reduce following improvements in social anxiety. While the 'forward' models showed a degree of specificity regarding the strength of mediation, with negative social cognitions showing the strongest effect, it is noted that the reversed models showed similar percent mediation values for all three mediators. This reduced specificity may support the view that the reverse effects reflect more global clinical improvement resulting from reduced social anxiety. Taken together the findings suggest a cyclical pattern of improvement, where changes in either the mediators or social anxiety lead to subsequent

changes in the other. The fact that the therapy protocols contain interventions that target self-focused attention and negative cognitions directly suggests it is most likely that initial change in these mediator variables precedes change in outcome, but further investigation would be required to understand this more clearly.

From a clinical perspective the findings suggest that prioritising therapy techniques designed to target self-focused attention and negative social cognitions is likely to enhance clinical outcomes. These include attention training to promote external rather than self-focus in social situations, and the use of cognitive strategies and behavioural experiments to examine, test, and reframe negative social cognitions.

3.4.1 Limitations

The present findings may be limited by the fact that self-focused attention was measured using a single item, although analyses using the SPWSS item relating to self-focused attention specifically in difficult social situations showed the same pattern of results. Secondly, it remains possible that other factors may be mediating the effect of time on social anxiety in the present therapies but were not assessed. Similarly, there is the possibility of an unknown third variable influencing both the mediators and outcome as a function of time, meaning that the mediators and outcome may not be directly associated. However, these limitations are common to mediation designs and are not easily avoided.

Given the present sample size it was not possible to run a more complex model containing the three mediators together, meaning the findings are not fully able to demonstrate their relative influence beyond the percent mediation statistics given. These values suggested that negative social cognitions were the strongest mediator, and this result was supported by the moderated mediation models, where the model containing negative social cognitions explained the largest amount of variance in LSAS scores (R^2). Further work in larger datasets could usefully examine models incorporating these mediators in parallel. It is also possible that the mediators may influence each other in producing their effects on social anxiety, and this could not be examined in the present sample. Lastly, as outlined above, as the moderated mediation models were run using a single-level structure, they were not able to distinguish within- and between-subject variance. It is noted however that the findings were consistent with the multilevel models examined for each treatment condition separately.

3.4.2 Conclusion

Overall, the present findings suggest that reductions in self-focused attention and negative social cognitions mediated subsequent reductions in social anxiety. This process also appears to be reciprocal, leading to a 'virtuous circle' where participants experience less social anxiety, fewer and less powerful negative social cognitions, and show a greater external focus of attention as they progress through therapy. Depressed mood mediated clinical improvement in CT but not iCT, but self-focused attention and negative social cognitions showed comparable results between the two treatment formats. This provides some

initial evidence that the format of therapy does not significantly alter the mechanisms of clinical improvement where the therapy content is the same.

4

Mediation of Clinical Improvement in Cognitive Therapy for Social Anxiety Disorder in Routine Clinical Practice

4.1 Study 2a: Analysis of CT Audit Data 2008-2010

The findings of Study 1 indicated support for the role of negative social cognitions and self-focused attention in mediating the relationship between time in therapy and social anxiety symptoms. Results were similar between CT and iCT, providing an initial indication of the consistency of these mediators within this therapy. Support for depressed mood as a mediator of clinical improvement was found for CT but not iCT.

Further examination of the robustness of these results requires replication in a new sample of patients undergoing the same therapy. Additionally, as Study 1 analysed data from a randomised controlled trial, a further test would be to examine data from CT administered in a different setting such as routine clinical practice. Datasets from these settings typically include a larger number of therapists, some therapists who are less experienced, and fewer inclusion criteria relative to an RCT. Just as the importance of effectiveness studies in

routine clinical settings has been emphasised as an adjunct to efficacy studies, in that they can test whether findings from controlled research settings apply in routine practice (Gunter & Whittal, 2010; Kettlewell, 2004; Weisz et al., 2014), it can be argued that for a mediator to be considered reliable, it should operate similarly regardless of setting. It is therefore important to examine mediation effects within data from routine clinical practice.

The aim of Study 2 was to explore mediation of clinical improvement during CT-SAD delivered in routine clinical practice, using data from an audit of clinical outcomes from a specialist NHS anxiety clinic in London. This audit spanned a period of nine years, during which time the clinic became part of the initial wave of services under the Improving Access to Psychological Therapies (IAPT) programme. This meant there was a change in the outcome measures being collected routinely, so for the present analysis the overall sample was divided into two based on which set of outcome measures were completed (Studies 2a and 2b). Different analytic methods were chosen for each study based on sample size, as described below. The research questions for Studies 2a and 2b were therefore:

- Do negative social cognitions, self-focused attention, and depressed mood act as mediators of clinical improvement in CT-SAD?
- Are the patterns of mediation from routine clinical practice similar to those found in a randomised controlled trial of the same treatment (Chapter 3)?

4.2 Method

4.2.1 Participants

Participants were drawn from an audit of clinical outcomes of psychological therapy for SAD, which examined consecutive referrals to the Centre for Anxiety Disorders and Trauma, a UK NHS specialist clinic in London. The service receives referrals from general practitioners and community mental health teams. Assessments were completed between May 2001 and August 2010. All assessments were conducted by a trained clinician and included the Structured Clinical Interview for DSM-IV (SCID-IV; First, Spitzer, Gibbon, & Williams, 2002) to determine primary and comorbid diagnoses. The personality disorder screener questions of the SCID-II (First, Gibbon, Spitzer, Williams, & Benjamin, 1997) were also given, with further assessment undertaken as clinically indicated. All participants met DSM-IV criteria for SAD, with SAD being judged to be the main problem by the assessing clinician. Exclusion criteria were current psychosis, or dependence on alcohol or substances.

Across the audit period, 427 people were treated for SAD, of whom 317 received standard Cognitive Therapy (34 people received Exposure and Applied Relaxation, and 76 received a brief form of the CT treatment). Three of these people were re-referred during the audit period and received a second course of treatment; only their first course of treatment was included in the analysis. Seven participant files were not available for data entry. To be included in the present studies, participants were required to have attended at least five treatment sessions and completed the weekly questionnaires on at least five occasions. This ensured a sufficient number of measurement points per

participant to permit the analysis of candidate mediators. As 23 participants attended fewer than five sessions, and 13 completed insufficient questionnaire data for analysis, the final sample size for the analysis of standard CT-SAD was 271.

These participants completed an average of 12.3 sessions (SD = 2.9). Six participants (2%) had more than 18 sessions and the greatest number of sessions attended was 26. Treatment, including booster sessions, extended over an average of 204.3 days (SD = 103.7). There were 69 participants who received their treatment as part of research trials running at the time.

As described above, the clinic's set of weekly outcome measures changed in September 2008 upon joining the IAPT programme, so participants treated before and after this date were analysed separately. Those treated from 2008-2010 (n = 86) are presented first (Study 2a) given this study used the same multilevel structural equation modelling approach as Study 1. A larger number of participants were treated from 2001-2008 (n = 185), permitting use of a more complex analytic approach, bivariate latent change score modelling (Study 2b). Demographic and clinical characteristics of both samples are shown in Table 8.

Table 8

Demographic and Clinical Characteristics.

	Study 2a (n = 86)	Study 2b (n = 185)	Total (n = 271)
% Female	52	48	49
Mean age (SD)	33.2 (9.5)	32.2 (8.6)	32.5 (8.9)
Marital status *n* (%)			
Married	22 (26)	19 (10)	41 (15)
Cohabiting	8 (9)	28 (15)	36 (13)
Widowed	0	1 (1)	1 (0)
Divorced	0	3 (2)	3 (1)
Separated	3 (3)	5 (3)	8 (3)
Single/Never married	45 (52)	120 (65)	165 (61)
Not given	8 (9)	9 (5)	17 (6)
Ethnicity *n* (%)			
Black	8 (9)	11 (6)	19 (7)
Caucasian	37 (43)	140 (76)	177 (65)
Indian	2 (2)	2 (1)	4 (1)
Pacific Asian	0	1 (1)	1 (0)
Other	0	6 (3)	6 (2)
Not given	39 (45)	25 (14)	64 (24)
Highest qualification *n* (%)			
Doctoral degree	2 (2)	7 (4)	9 (3)
Masters degree	11 (13)	18 (10)	29 (11)
Professional qualification	5 (6)	15 (8)	20 (7)
Bachelors degree	27 (31)	71 (38)	98 (36)
A Levels	12 (14)	31 (17)	43 (16)
GCSEs	9 (10)	23 (12)	32 (12)
None	3 (3)	12 (6)	15 (6)
Other	3 (3)	7 (4)	10 (4)
Not given	14 (16)	1 (1)	15 (6)
Employment status *n* (%)			
Unemployed	11 (13)	33 (18)	44 (16)
Full time	52 (60)	103 (56)	155 (57)
Part time	6 (7)	20 (11)	26 (10)
Self-employed	5 (6)	4 (2)	9 (3)
Sick leave	1 (1)	3 (2)	4 (1)
Retired	2 (2)	0	2 (1)
Student	2 (2)	17 (9)	19 (7)
Homemaker	1 (1)	2 (1)	3 (1)
Freelance	1 (1)	0	1 (0)
Compassionate leave	1 (1)	0	1(0)
Not given	4 (5)	3 (2)	7 (3)
Mean age of SAD onset in years (SD)	19.1 (7.1)	19.3 (8.4)	19.3 (8.0)
Mean duration of SAD in years at assessment (SD)	13.9 (10.8)	12.9 (9.5)	13.2 (9.9)
% Prescribed psychotropic medication	25	30	29

4.2.2 Treatment

All participants received face-to-face CT-SAD as described in Chapter 2. In the routine clinic setting, the standard structure of 14 weekly sessions, followed by up to three booster sessions at monthly intervals was followed for most but not all participants. Some participants received fewer or greater than 14 sessions, or received the booster sessions more frequently than once per month. As this resulted in a lack of clearly defined phases of the intervention (i.e. treatment phase versus booster phase), the 'end of treatment' timepoint used here represents the last available score, including any booster sessions.

4.2.3 Therapists

Therapists were a range of practitioners, including clinical psychologists, IAPT High Intensity Therapists, and clinicians on training placements within the service (trainee clinical psychologists, trainee high intensity therapists, and specialist psychiatry registrars). A total of 36 therapists provided treatment for the participants of Study 2a, and a total of 22 therapists for Study 2b. Across both studies the number of participants seen by each therapist ranged from 1 to 24.

4.2.4 Measures

4.2.4.1 Self-focused attention.

For both Studies 2a and 2b, this was measured using the third item of the Social Phobia Weekly Summary Scale (SPWSS; Clark, 1995) where people provide a 0-8 rating of their self-focused attention in general over the past week. Further information on this measure is given in Chapter 3. Cronbach's alpha in the

present sample for the full scale was 0.78 at baseline and 0.93 at end of treatment.

4.2.4.2 Negative social cognitions.

For both Studies 2a and 2b, this was measured using the Social Cognitions Questionnaire (SCQ; Clark, 1995)(see description in Chapter 3). Following the procedure used in Study 1, the frequency and belief subscales were standardised and averaged to produce a composite z score. Cronbach's alpha in the present sample was 0.90 (baseline) and 0.96 (end of treatment) for the frequency subscale and 0.91 (baseline) and 0.97 (end of treatment) for the belief subscale.

4.2.4.3 Depressed mood.

For Study 2a, this was measured using the Patient Health Questionnaire – 9-item version (PHQ; Kroencke et al., 2001) (see description in Chapter 3). Cronbach's alpha in the present sample was 0.88 at baseline and 0.92 at end of treatment.
For Study 2b, this was measured using the Beck Depression Inventory (BDI; Beck & Steer, 1993). The BDI is one of the most widely used depression measures, with good psychometric properties (Beck, Steer, & Carbin, 1988). There are 21 items, with each response scored from 0-3 with respect to the last week, and higher scores indicating greater depressive symptoms. Cronbach's alpha in the present sample was 0.91 at baseline and 0.94 at end of treatment.

4.2.4.4 Social anxiety.

For Study 2a, this was measured using the Social Phobia Inventory (SPIN; Connor et al., 2000), which is a 17-item scale listing a range of SAD-related problems, incorporating fear, avoidance, and physical symptoms. Respondents are asked to indicate the extent to which they have been bothered by each in the past week, ranging from 0 ('not at all') to 4 ('extremely'). The maximum score is therefore 68, and scores of 20 or above are considered clinically significant. The scale shows good reliability and validity (Antony, Coons, McCabe, Ashbaugh, & Swinson, 2006; Connor et al., 2000), and is the IAPT-recommended measure for SAD (Clark, 2018). Cronbach's alpha for the baseline and end of treatment scores were 0.90 and 0.93 respectively. For Study 2b, this was measured using the SPWSS (Clark, 1995). As this scale contains two items addressing self-focused attention, a total score was computed without these items to prevent content confounding.

4.2.5 Analysis

A series of multilevel structural equation models to assess mediation were computed following the same analytic approach used in Study 1, with total scores at each session (level 1) nested within participants (level 2). Therapist was not included as a third level given the limited number of therapists[2], and the variability in the number of participants seen by each therapist. The same candidate mediators (self-focused attention, negative social cognitions, and depressed mood) were examined, and the models incorporated the temporal

[2] Maas and Hox (2005) suggest group sizes over 50 at the higher level of multilevel models are most appropriate to avoid biased estimates.

precedence of the mediator and disaggregation of the within- and between-level components of the independent and mediator variables (see Figure 8). 'Reversed' mediation models were also tested, along with a 'parallel' mediation model including all three candidate mediators together. Inspection of the intraclass correlation coefficients for each model indicated sufficient between-subject variance to justify multilevel analysis (ICC = 0.43 – 0.68). The assumption of normally distributed residuals was examined using Q-Q plots and found to be met. Alongside *p*-values, confidence intervals of parameter estimates were reviewed to assess statistical significance. Analyses were performed using MPlus version 7.0 (Muthén & Muthén, 1998-2015) and R version 3.4.3 (R Core Team, 2017) using the R package 'MplusAutomation' (Hallquist & Wiley, 2018).

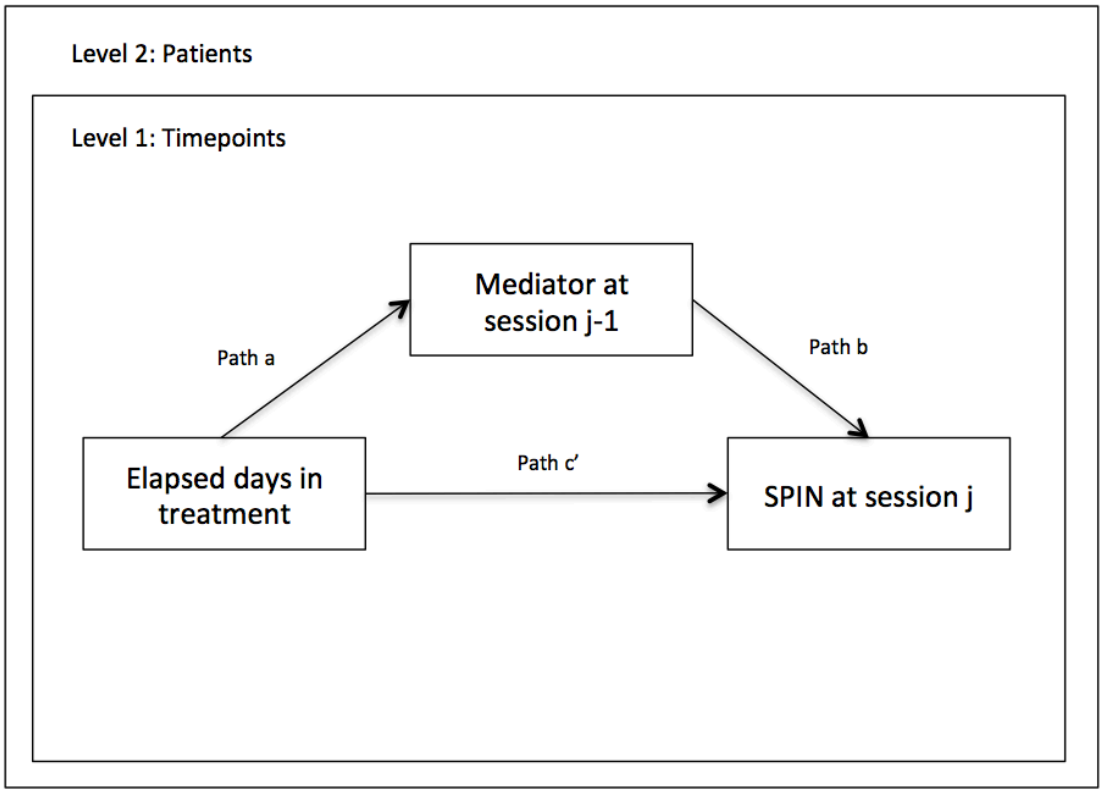


Figure 8

Diagram of multilevel structural equation model to test mediation hypotheses of the relationship between elapsed days in treatment and scores on the Social Phobia Inventory (SPIN).

4.3 Results

The principal findings of the audit regarding clinical outcomes are reported in Clark et al (in preparation). Baseline and end of treatment means and standard deviations for the Study 2a sample are shown in Table 9. Significant decreases were observed across treatment on all of the measures assessed.

Table 9

Baseline and End of Treatment Mean Scores for Study 2a.

Measure	Baseline *M (SD)*	End of treatment *M (SD)*	Test statistic	d_{Cohen} [95%CI]
SPIN	41.52 (12.72)	21.71 (15.67)	t (70) = 12.35, p<.001	1.39 [1.02, 1.75]
SPWSS	30.72 (8.87)	17.21 (9.89)	t (84) = 12.60, p<.001	1.44 [1.10, 1.78]
SFA	4.82 (1.80)	2.92 (1.83)	t (82) = 9.21, p<.001	1.05 [0.72, 1.37]
SCQ-c	1.42 (1.29)	-0.74 (1.34)	t (77) = 15.34, p<.001	1.64 [1.28, 2.01]
PHQ	11.17 (6.85)	5.21 (6.17)	t (83) = 9.59, p<.001	0.91 [0.60, 1.23]

Note. N = 86. Baseline scores are taken from the initial assessment, or the session 1 score in cases where no assessment score was available. End of treatment scores used the last available score. *t* statistics represent paired *t*-tests comparing baseline and end of treatment scores. SPIN = Social Phobia Inventory; SPWSS = Social Phobia Weekly Summary Scale (Total); SFA = Self-Focused Attention (general item of SPWSS); SCQ-c = Social Cognitions Questionnaire – composite z score; PHQ = Patient Health Questionnaire. M = Mean; SD = Standard Deviation. d_{Cohen} calculated using the pooled standard deviation as the denominator, calculated as $\text{SQRT}((\text{SD}^2_{\text{initial}} + \text{SD}^2_{\text{post}})/2)$(Van Etten & Taylor, 1998). Confidence intervals for d_{Cohen} were calculated using the Hedges and Olkin formula (see Lee, 2016). Cohen (1988) suggested that broadly, effect sizes of 0.2, 0.5, and 0.8 indicated small, medium, and large effects, respectively.

4.3.1 Model Results

Results of the mediation models are shown in Table 10. Significant indirect effect estimates were observed for all three of the mediators assessed, indicating that negative social cognitions, depressed mood, and to a lesser extent self-focused attention, all mediated the effect of time on social anxiety as measured by the SPIN. The significant and negative path a coefficients highlighted that as time in therapy increased, scores on the mediator variables decreased, with the significant, positive path b coefficients indicating that these lower scores predicted lower social anxiety at the following assessment. Inspection of the percent mediation values indicated that negative social cognitions showed the strongest mediation effect.

Table 10

Unstandardised Path Coefficients, Indirect Effect Estimates, and Random Slope Variances for the Three Potential Mediators Assessed.

	Coefficient	SE	*p*	P_M
Self-focused attention				
a	-0.015	0.001	<.001	
b	0.462	0.222	.038	
c’	-0.134	0.011	<.001	
Var_a	<0.001	<0.001	<.001	
$Var_{c'}$	0.007	0.001	<.001	
Indirect effect ab	-0.007	0.004	.047	5
Negative social cognitions				
a	-0.016	0.001	<.001	
b	3.159	0.443	<.001	
c’	-0.092	0.010	<.001	
Var_a	<0.001	<0.001	<.001	
$Var_{c'}$	0.005	0.001	<.001	
Indirect effect ab	-0.050	0.008	<.001	35
Depressed mood				
a	-0.036	0.005	<.001	
b	0.428	0.123	<.001	
c’	-0.127	0.011	<.001	
Var_a	0.001	<0.001	<.001	
$Var_{c'}$	0.007	0.001	<.001	
Indirect effect ab	-0.015	0.005	.002	11

Note. Path a represents the effect of time on the mediator variable. Path b represents the effect of the mediator on SPIN score at the subsequent assessment (with time held constant). Path c’ represents the effect of time on SPIN score controlling for the effect of the mediator. SE = standard error, P_M = percent mediation (i.e. the percentage of the total effect of time on SPIN score that is accounted for by the mediated path ab), Var = variance.

4.3.2 Models Reversing Mediator and Outcome

The reversed mediation models, which swapped the mediator and outcome variables but maintained the time-lag component, were significant for the three mediators assessed (see Table 11). These findings suggest that lower social anxiety scores were associated with reduced self-focused attention, reduced negative social cognitions, and improved mood at the following assessment. The percent mediation values for these models were similar across the three mediators examined.

Table 11

Unstandardised Path Coefficients, Indirect Effect Estimates, and Random Slope Variances for the Models Reversing the Temporal Order of Mediator and Outcome.

	Coefficient	SE	*p*	P_M
	Self-focused attention			
a	-0.157	0.012	<.001	
b	0.030	0.007	<.001	
c’	-0.010	0.002	<.001	
Var_a	0.010	0.002	<.001	
$Var_{c'}$	<0.001	<0.001	<.001	
Indirect effect ab	-0.005	0.001	<.001	32
	Negative social cognitions			
a	-0.158	0.012	<.001	
b	0.040	0.005	<.001	
c’	-0.007	0.001	<.001	
Var_a	0.010	0.002	<.001	
$Var_{c'}$	(see notes)			
Indirect effect ab	-0.006	0.001	<.001	47
	Depressed mood			
a	-0.159	0.012	<.001	
b	0.078	0.021	<.001	
c’	-0.021	0.005	<.001	
Var_a	0.010	0.002	<.001	
$Var_{c'}$	0.001	<0.001	.001	
Indirect effect ab	-0.012	0.004	.001	37

Note. Path a represents the effect of time on the mediator variable (i.e. SPIN at time j-1). Path b represents the effect of the mediator on self-focused attention, negative social cognition, or depressed mood scores at the subsequent assessment. Path c’ represents the effect of time on the outcome variable controlling for the effect of the mediator. SE = standard error, P_M = percent mediation (i.e. the percentage of the total effect of time on SPIN score that is accounted for by the mediated path ab), Var = variance. Due to lack of model convergence when the c’ path was specified as random, the model for negative social cognitions was run using a fixed c’ path therefore no variance is given.

4.3.3 Parallel Mediation Model

A model including all three mediators in parallel was run to further examine the relative mediation relationships between these variables (see Figure 9). Apart from the inclusion of multiple mediators, this model was specified identically to those described above. The results, shown in Table 12, indicated that when all three mediators were analysed together their relative strengths (percent mediation values) were comparable to the individual models, with negative social cognitions showing the strongest mediation relationship, followed by depressed mood. In this model the weak mediating effect of self-focused attention found in the individual model was no longer significant, suggesting it was better accounted for by the other two mediators.

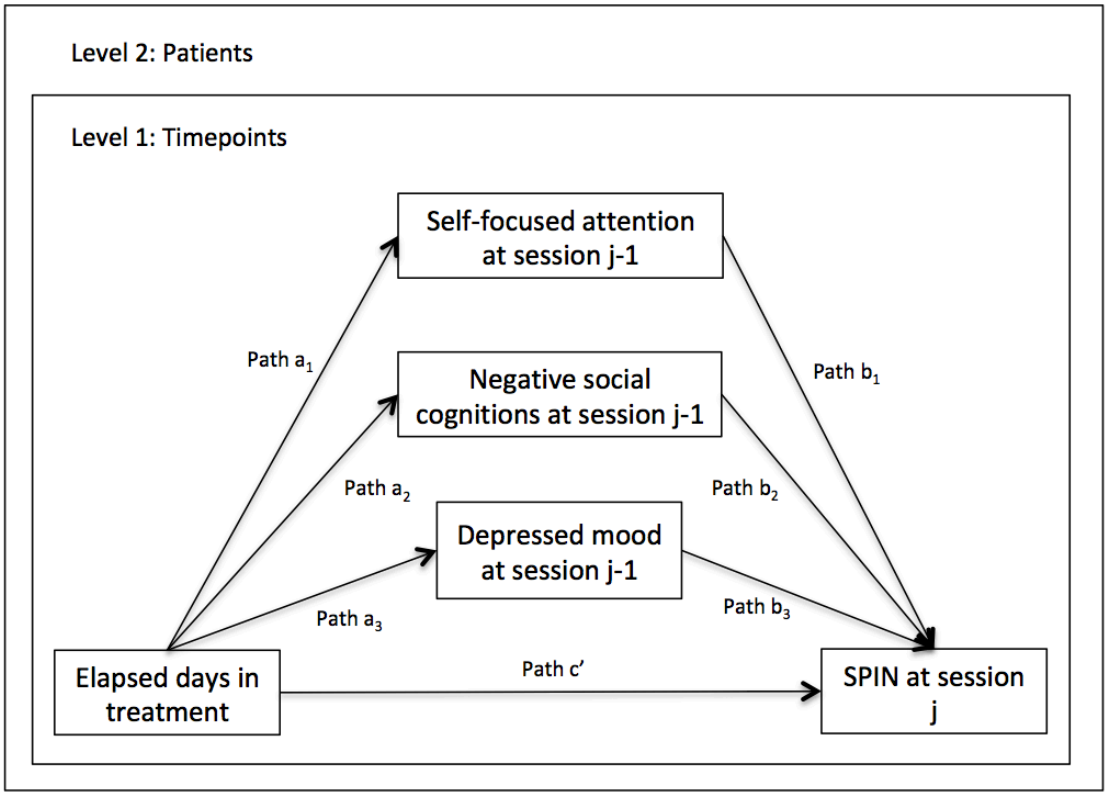


Figure 9

Parallel mediation model to test mediation of the relationship between elapsed days in treatment and scores on the Social Phobia Inventory (SPIN).

Table 12

Unstandardised Path Coefficients, Indirect Effect Estimates, and Random Slope Variances for the Parallel Mediation Model.

	Coefficient	SE	*p*	P_M
	Self-focused attention			
a_1	-0.015	0.001	<.001	
b_1	-0.261	0.210	.214	
Var_{a1}	<0.001	<0.001	<.001	
Indirect effect a_1b_1	0.004	0.003	.211	ns
	Negative social cognitions			
a_2	-0.016	0.001	<.001	
b_2	2.955	0.424	<.001	
Var_{a2}	<0.001	<0.001	<.001	
Indirect effect a_2b_2	-0.046	0.008	<.001	33
	Depressed mood			
a_3	-0.035	0.005	<.001	
b_3	0.245	0.108	.023	
Var_{a3}	0.001	<0.001	.001	
Indirect effect a_3b_3	-0.009	0.004	.037	6
	Direct effect			
c’	-0.091	0.010	<.001	
$Var_{c'}$	0.004	0.001	<.001	

Note. ‘a’ paths represent the effect of time on each mediator variable. ‘b’ paths represent the effect of each mediator on SPIN score at the subsequent assessment (with time held constant). Path c’ represents the effect of time on SPIN score controlling for the effect of the mediators. SE = standard error, P_M = percent mediation (i.e. the percentage of the total effect of time on SPIN score that is accounted for by the mediated path ab), Var = variance.

4.4 Study 2b: Analysis of CT Audit Data 2001-2008

4.5 Method

The participants, treatment, therapists, and measures for Study 2b were as described in section 4.2.

4.5.1 Analysis

As the number of participants in this study (n = 185) was larger than Study 2a, it was possible to examine mediation relationships using more complex modelling techniques that include a series of timepoints rather than pairs of consecutive timepoints (as done in MSEM models of Studies 1 and 2a). A series of bivariate latent change score models were performed to examine the temporal relationships between social anxiety symptoms and each of the three candidate mediators (self-focused attention, negative social cognitions, and depressed mood). The latent change score modelling approach combines elements of latent growth curve modelling, and autoregressive cross-lagged models (Grimm, Ram, & Estabrook, 2016). It therefore has the advantages of both approaches, including the use of latent variables to account for measurement error, the ability to include multiple timepoints with a single model, the ability to examine bidirectional relationships over time, and the ability to accurately model data containing variability both within and between individuals (see Curran, Obeidat, & Losardo, 2010; Ghisletta & McArdle, 2012; Hesser, 2015). The additional advantage of the latent change score approach is that these models explicitly include the changes between consecutive timepoints as latent variables, and

therefore permit the direct examination of these changes as a predictor or outcome variable (McArdle & Hamagami, 2001). Given interest in examining mediators of clinical *improvement* i.e. change, this approach is therefore highly suited to psychotherapy research, though is only possible in studies where the sample size permits models of greater complexity[3].

As indicated in section 4.2.1, to be included in the present analysis participants were required to have attended at least five sessions, and provided outcome data on at least five occasions. For the present models, data from the first nine sessions of therapy were used. Firstly, this ensured that the majority of participants contributed to each measurement point. Second, visual inspection of mean scores across sessions indicated a mostly linear change on symptom and process measures up to session nine, with a subsequent flattening of the gradient after this point, which may be linked to smaller samples at these later assessment points. Lastly, restricting to the first nine sessions aimed to limit the overall complexity of the models by reducing the number of included paths.

Confirmatory factor analysis models were developed to examine longitudinal measurement invariance of the questionnaires used. However, due to the large number of items on the SCQ and BDI, the number of parameters to be estimated exceeded the sample size, leading to problems with model convergence, including when the number of timepoints included was restricted to two. It was

[3] The present analysis followed the approach of Grimm et al (2012), which sampled 149 participants. The authors considered this sample small, but acceptable given the generally good psychometric properties of the measures, and several assessment points, as is the case in the present study.

therefore not possible to examine measurement invariance of these questionnaires. The SPWSS, which contains only four items after removing the two self-focused attention items for this study, was possible to examine over a restricted range of timepoints (sessions one, four, and nine were chosen to cover the start, midpoint, and end of the range of sessions included in this study). Strong factorial invariance was shown (where factor loadings and item intercepts were constrained to equality over time), indicating that the scale appeared to be measuring social anxiety in the same way across therapy.

Following the recommended procedures for latent change score modelling (Grimm et al., 2016; McArdle, 2009; McArdle & Hamagami, 2001) and those used in similar studies of longitudinal change processes (Grimm et al., 2012; Hawley et al., 2016; McArdle, Hamagami, Chang, & Hishinuma, 2014), the analysis proceeded in three phases as described below:

Phase 1 implemented a series of univariate latent change score models for each of the four variables in the study (the three candidate mediators, and social anxiety), to establish the best fitting trajectory of change over time for each variable. Three models are compared: proportional change, constant change, and dual change. Figure 10 shows the dual change model, which includes both the proportional and constant change components. This path diagram indicates how the latent change score approach divides each observed score (X1, X2 etc.) into a latent true score (x1, x2 etc.), and a 'unique', or residual, score (u1, u2 etc.), and that the change from one latent true score to the next is explicitly modelled by a further series of latent variables (Δx2, Δx3 etc.). The proportional change

component (β) allows each change score to be influenced by the previous latent true score, meaning the rate of change is allowed to increase or decrease across time. The constant change component (the latent variable 's') assumes that within each individual, there is a fixed amount of change between consecutive timepoints. The proportional, constant, and dual change models therefore include either or both of these change components. The proportional change model specifies that changes are only influenced by the prior true score. The constant change model is functionally equivalent to a linear growth model (i.e. a fixed linear slope), and the dual change model equates to an exponential growth curve (i.e. continuous change that is accelerating or decelerating)(Grimm et al., 2012).

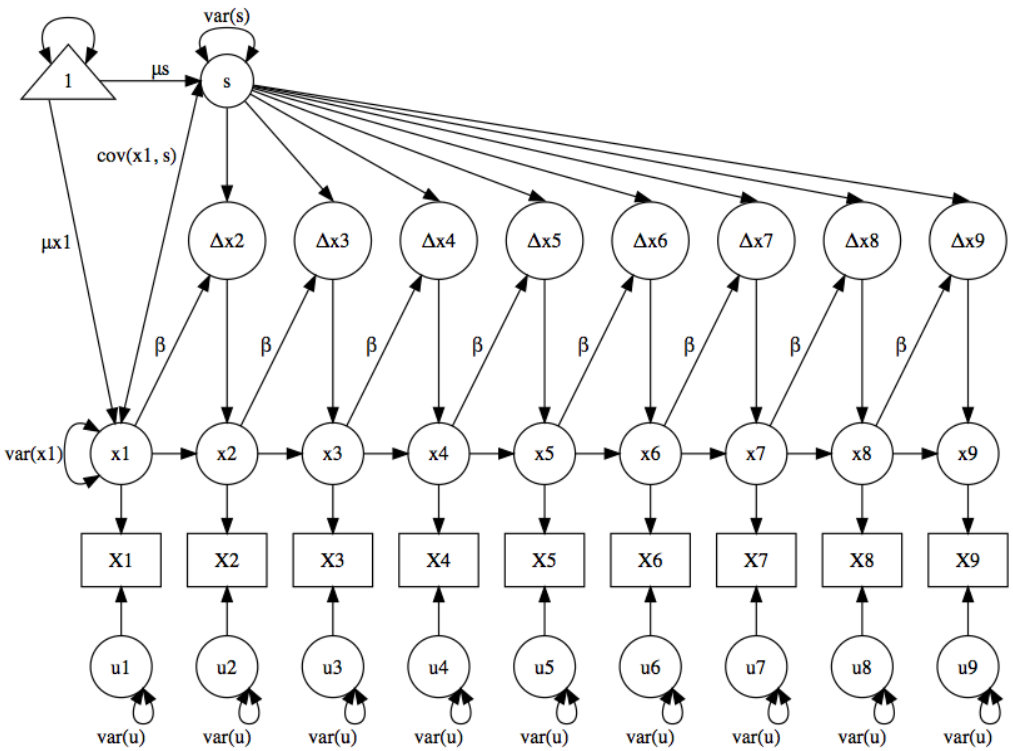


Figure 10

Path diagram for a univariate latent change score model for a given variable, X. Boxes indicate observed scores, and circles indicate latent variables. The dual change model is shown, including both the constant change component, s, and the proportional change parameter, β. Unlabelled paths are fixed to 1. Var = variance; cov = covariance.

Models were compared using a range of absolute and comparative fit indices to determine which provided the best fit to the data (see Hu & Bentler, 1999; Little, 2013; Schermelleh-Engel, Moosbrugger, & Müller, 2003): the loglikelihood statistic (LL), the Akaike Information Criterion (AIC), and the Bayesian Information Criterion (BIC) are compared across competing models, with lower values indicating better fit. The Comparative Fit Index (CFI), and Tucker-Lewis Index (TLI) are also compared across models, with values ≥0.9 considered adequate fit, and values ≥0.95 good fit. The Root Mean Square Error of Approximation (RMSEA) indicates adequate fit when ≤0.08, and good fit when ≤0.06. Where models are nested, i.e. one represents a subset of another, the significance of any change in model fit can also be tested using the Chi-square difference test (based on the LL values and scaling correction factors provided when using MLR estimation in MPlus). The best-fitting models were then used in Phase 2.

Phase 2 then implemented a series of bivariate latent change score models, containing two change score trajectories, one for symptoms, and one for the mediator variable. The relationship between variables can then be examined by the inclusion of cross-lagged regression paths between each latent true score, and the subsequent change score of the other variable (see Figure 11). These coupling paths are labeled γ. These paths were not of direct interest for the present study, given that a relationship between the raw mediator score at a given timepoint, and subsequent change in symptoms was not hypothesised. However it was important to examine whether the inclusion of these paths

improved model fit, so they could be retained if appropriate and therefore controlled for in Phase 3.

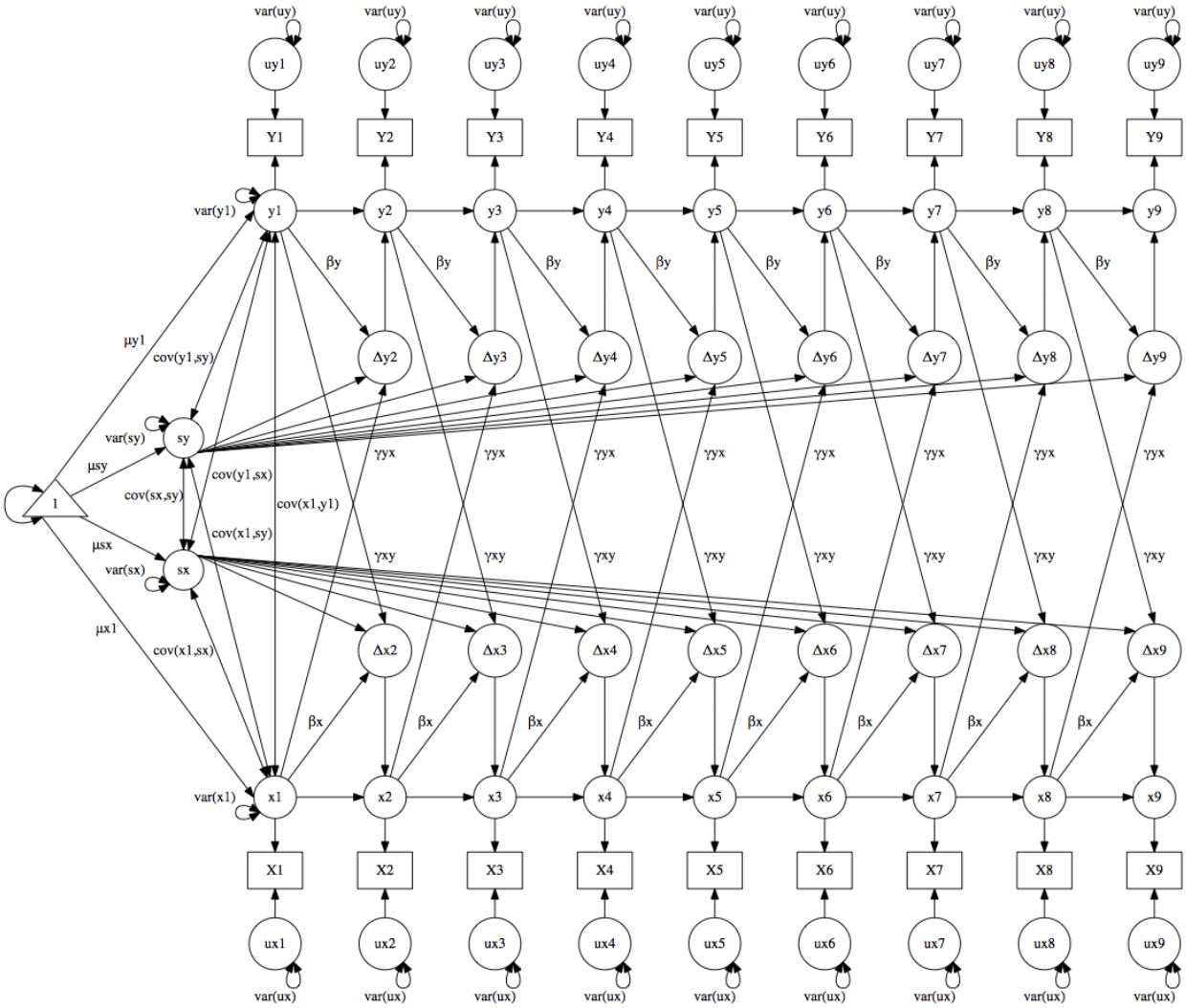


Figure 11

Path diagram for a bivariate latent change score model for the variables X and Y. Boxes indicated observed scores, circles indicate latent variables. The dual change model is shown for both variables. The coupling paths (γ) model the relationship between the latent true score at a given timepoint, and the change score on the other variable at the subsequent timepoint. For clarity of presentation, the covariance between the unique (residual) scores of X and Y is not shown but is estimated in the model. Unlabelled paths are fixed to 1. Var = variance; cov = covariance.

Four sequential models are run to determine which fits best and whether such paths should be retained in Phase 3 (N.B. subscripts 'j' indicate relative timepoints):

1. No coupling
2. Unidirectional coupling ($mediator_{j-1}$ to $\Delta outcome_j$)
3. Unidirectional coupling ($outcome_{j-1}$ to $\Delta mediator_j$)
4. Full (bidirectional) coupling

Phase 3 implemented an extension to the standard bivariate latent change score models from Phase 2, as described by Grimm and colleagues (2012; 2016). This extension involves the inclusion of change-change relationships, and is therefore recommended when the hypothesised relationship between the variables is that changes in one cause subsequent changes in the other. This is of primary interest in the present study, to examine the principal research question of whether changes in the candidate mediator variable predict subsequent clinical improvement (i.e. change in social anxiety). A further sequence of models is therefore used to examine such change-change relationships, to examine whether the inclusion of these paths within the model leads to an improvement in fit (see Figure 12).

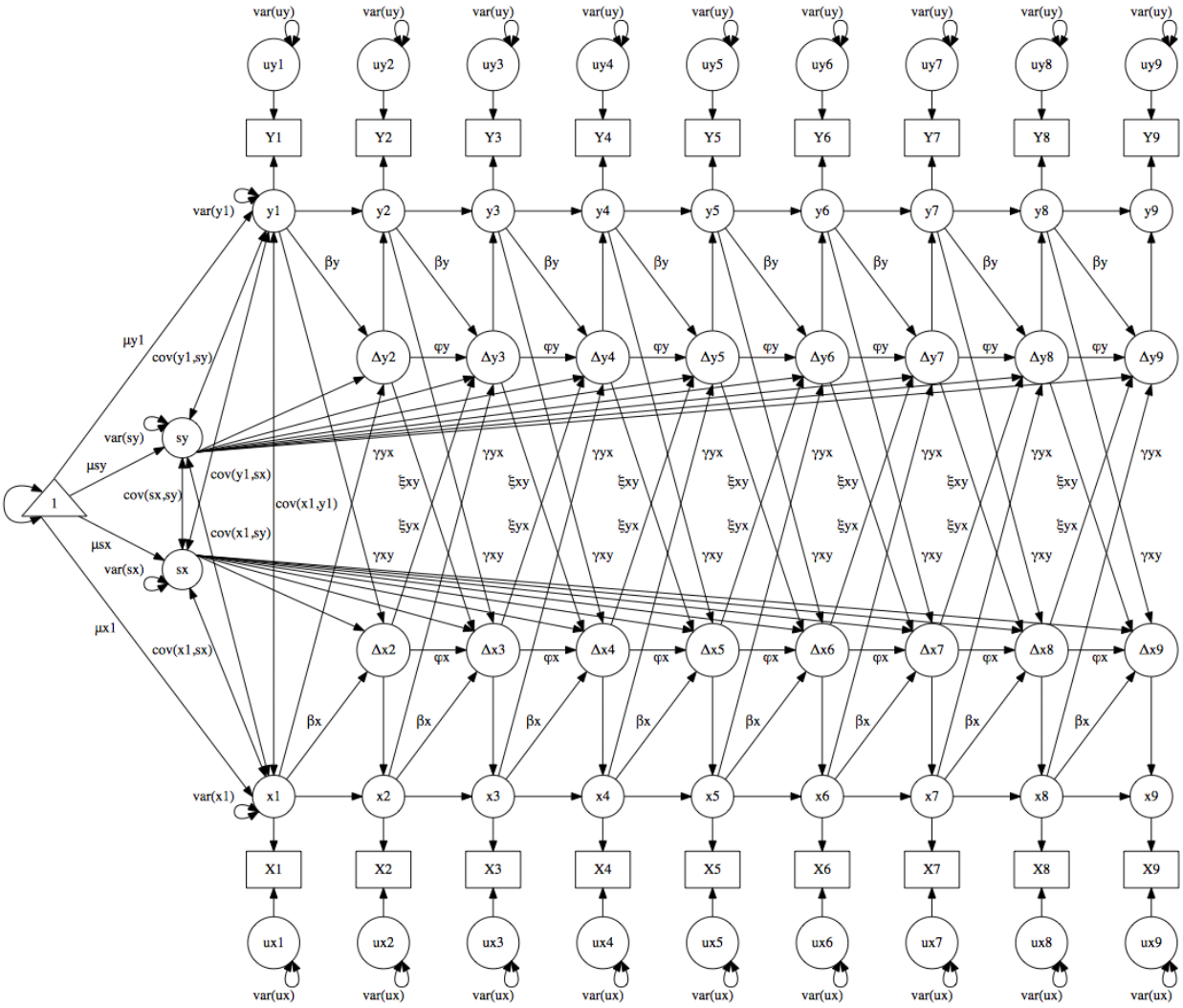


Figure 12

Path diagram for a bivariate latent change score model including change-change relationships. The autoregressive (φ), and the cross-lagged (ξ) change-change paths model the relationship between consecutive change scores within and between the two variables, respectively. For clarity of presentation, the covariance between the unique (residual) scores of X and Y is not shown but is estimated in the model. Unlabelled paths are fixed to 1. Var = variance; cov = covariance.

Firstly, autoregressive change-change paths (φ) are included to examine whether changes predict subsequent changes within the same variable. Unidirectional models including the cross-lagged paths (ξ), and the fully coupled model are then fit sequentially:

5. Autoregressive change-change models (no coupling)
6. Unidirectional change-change coupling ($\Delta mediator_{j-1}$ to $\Delta outcome_j$)
7. Unidirectional change-change coupling ($\Delta outcome_{j-1}$ to $\Delta mediator_j$)
8. Full (bidirectional) change-change coupling

The parameter estimates of the best fitting of these four models are then examined to review the strength and significance of the change-change relationships. Analyses were performed using MPlus version 7.0 (Muthén & Muthén, 1998-2015) and R version 3.4.3 (R Core Team, 2017) using the R package 'MplusAutomation' (Hallquist & Wiley, 2018). The R package 'DiagrammeR' (Iannone, 2018) was used to create model diagrams. All models used robust maximum likelihood estimation (MLR). The assumption of normally distributed residuals was examined using Q-Q plots and found to be met. As shown in Figure 12, all proportional change, coupling, and change-change parameters, and unique (residual) variances and covariances were constrained to be equal over time. This was done as there was no prior theoretical reason to expect changes in mediation relationships within the therapy period.

4.6 Results

Baseline, session nine, and end of treatment means and standard deviations for the Study 2b sample are shown in Table 13. Significant decreases were observed across treatment on all of the measures assessed.

Table 13

Baseline, Session 9, and End of Treatment Mean Scores for Study 2b.

Measure	Baseline	Session 9	End of treatment	Test statistic	Pre - session 9 d_{Cohen}	Pre-post d_{Cohen}
	M (SD)	*M (SD)*	*M (SD)*		[95%CI]	[95%CI]
SPWSS (4-item)	21.07 (5.04)	12.28 (6.36)	9.41 (7.18)	t (183) = 22.23, p<.001	1.53 [1.30, 1.76]	1.88 [1.63, 2.13]
SFA	5.30 (1.48)	3.08 (1.59)	2.52 (1.75)	t (176) = 18.59, p<.001	1.45 [1.21, 1.68]	1.72 [1.47, 1.96]
SCQ-c	1.38 (1.22)	-0.62 (1.24)	-0.91 (1.36)	t (182) = 22.77, p<.001	1.63 [1.39, 1.86]	1.77 [1.53, 2.01]
BDI	18.32 (11.03)	8.86 (8.59)	7.94 (10.07)	t (184) = 14.68, p<.001	0.96 [0.74, 1.17]	0.98 [0.77, 1.20]

Note. N = 185. Baseline (Pre) scores are taken from the initial assessment, or the session 1 score in cases where no assessment score was available. End of treatment (Post) scores used the last available score. *t* statistics represent paired *t*-tests comparing baseline and end of treatment scores. SPWSS = Social Phobia Weekly Summary Scale (Total without self-focused attention items); SFA = Self-Focused Attention (general item of SPWSS); SCQ-c = Social Cognitions Questionnaire – composite z score; BDI = Beck Depression Inventory. M = Mean; SD = Standard Deviation. d_{Cohen} calculated using the pooled standard deviation as the denominator, calculated as SQRT(($SD^2_{initial}$ + SD^2_{post})/2)(Van Etten & Taylor, 1998). Confidence intervals for d_{Cohen} were calculated using the Hedges and Olkin formula (see Lee, 2016). Cohen (1988) suggested that broadly, effect sizes of 0.2, 0.5, and 0.8 indicated small, medium, and large effects, respectively.

4.6.1 Phase 1: Univariate Latent Change Score Models

Proportional change, constant change, and dual change models were run for social anxiety and each of the candidate mediator variables. Fit statistics for these models are shown in Table 14. The dual change model was chosen for negative social cognitions and depressed mood, given these showed the best model fit, and significant proportional change paths. The constant change model was chosen for self-focused attention and social anxiety, as the additional proportional change paths in the dual change model were not significant and did not lead to significant improvements in model fit.

Parameter estimates for the chosen models are given in Table 15. Consistent with the decline in scores over time shown in Table 13, the univariate models specified in Phase 1 showed negative constant change coefficients (μs), with the exception of the model for depressed mood. For self-focused attention and social anxiety, where the constant change model was selected, these coefficients indicated negative slopes, with scores therefore showing a stable rate of decline within each individual, with the extent of this decline showing significant variation between individuals. The dual change model for negative social cognitions showed negative constant (μs) and proportional (β) change components, indicating a negative slope that showed a deceleration over time. For depressed mood, large variance in the starting true scores was observed, which is understandable given that not all participants show significant depressive symptoms at the start of treatment. The nonsignificant constant change component suggests that on average, scores within individuals did not show a consistent pattern of change over time. However, the proportional

change component was significant, and the dual change model provided best fit. While this may simply result from the dual change model being more complex, it is possible it reflects a greater degree of between-person variability in change trajectories, and that at least for some participants a decelerating negative change over time was appropriate. These models were therefore carried forward to Phase 2.

Table 14

Fit Statistics for the Univariate Latent Change Score Models

	Proportional change model	Constant change model	Dual change model
	Self-focused attention		
Parameters	4	6	7
LL	-2586	-2525	-2524
AIC	5180	5062	5062
BIC	5192	5081	5084
CFI	0.717	0.955	0.957
TLI	0.796	0.967	0.967
RMSEA	0.117	0.048	0.047
	Negative social cognitions		
Parameters	4	6	7
LL	-2260	-1688	-1678
AIC	4529	3388	3371
BIC	4541	3407	3393
CFI	0.183	0.904	0.913
TLI	0.411	0.928	0.933
RMSEA	0.333	0.116	0.112
	Depressed mood		
Parameters	4	6	7
LL	-4806	-4706	-4701
AIC	9621	9424	9416
BIC	9634	9444	9439
CFI	0.861	0.976	0.980
TLI	0.900	0.982	0.985
RMSEA	0.120	0.051	0.047
	Social anxiety		
Parameters	4	6	7
LL	-4639	-4526	-4525
AIC	9285	9063	9064
BIC	9298	9083	9087
CFI	0.722	0.957	0.957
TLI	0.800	0.968	0.967
RMSEA	0.156	0.063	0.063

Note. LL = Log Likelihood; AIC = Akaike Information Criterion; BIC = Bayesian Information Criterion; CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; RMSEA = Root Mean Square Error of Approximation.

Table 15

Parameter Estimates for the Chosen Univariate Latent Change Score Models

	Self-focused attention (Constant change model)			Negative social cognitions (Dual change model)			Depressed mood (Dual change model)			Social anxiety (Constant change model)		
	Estimate	SE	*p*	Estimate	SE	*p*	Estimate	SE	*p*	Estimate	SE	*p*
μx1	5.213	0.095	<.001	1.265	0.098	<.001	15.940	0.810	<.001	20.094	0.405	<.001
μs	-0.280	0.017	<.001	-0.210	0.015	<.001	0.321	0.550	.559	-1.008	0.063	<.001
β	–	–	–	-0.070	0.022	.002	-0.093	0.043	.032	–	–	–
Var(x1)	1.120	0.176	<.001	1.704	0.172	<.001	111.628	14.225	<.001	25.424	2.846	<.001
Var(s)	0.027	0.006	<.001	0.030	0.007	<.001	1.061	0.557	.057	0.488	0.086	<.001
Cov(x1, s)	-0.053	0.024	.026	0.016	0.038	.666	4.299	4.441	.333	-1.076	0.395	.007
Var(u)	1.209	0.082	<.001	0.274	0.021	<.001	13.676	1.688	<.001	12.022	0.852	<.001

Note. N = 185. Parameter estimates are unstandardised. Var = variance; Cov = covariance; μx1 = mean true score at time 1 (intercept); μs = constant change component; β = proportional change component; u = unique score (residual). '–' indicates parameter was not included in the model.

4.6.2 Phase 2: Bivariate Latent Change Score Models

Fit statistics for the bivariate models are given in Table 16. For all three candidate mediators, the best fitting model from models 1-4 was model 1, as indicated by lower LL, AIC, BIC, and RMSEA values, and higher CFI and TLI values. The addition of coupling paths between the latent true score at a given timepoint, and the change score on the other variable at the subsequent timepoint (models 2-4) did not lead to improved fit. This indicated that a participant's score on a mediator variable at a given timepoint did not predict how much their social anxiety is about to change, and vice versa. As described in the method, this type of change relationship was not hypothesised for the present study. This finding was therefore in line with this prediction, and indicated that these paths did not need to be controlled for in Phase 3. They were therefore not included in Phase 3, thus model 1 was used as the baseline to evaluate subsequent models.

Table 16

Fit Statistics for the Bivariate Latent Change Score Models (Phases 2 and 3)

Self-focused attention				
	1. No coupling	2. $Mediator_{j-1}$ to $\Delta Anxiety_j$	3. $Anxiety_{j-1}$ to $\Delta Mediator_j$	4. Full coupling
Parameters	17	18	18	19
LL	-6802	-6802	-6802	-6801
AIC	13637	13639	13639	13641
BIC	13692	13697	13697	13702
CFI	0.954	0.953	0.953	0.953
TLI	0.959	0.958	0.958	0.957
RMSEA	0.052	0.052	0.052	0.053
	5. Autoregressive change-change	6. $\Delta Mediator_{j-1}$ to $\Delta Anxiety_j$	7. $\Delta Anxiety_{j-1}$ to $\Delta Mediator_j$	8. Full change-change coupling
Parameters	19	20	20	21
LL	-6801	-6801	-6798	-6796
AIC	13641	13642	13637	13633
BIC	13702	13706	13701	13701
CFI	0.953	0.954	0.955	0.956
TLI	0.958	0.958	0.959	0.960
RMSEA	0.052	0.052	0.052	0.051
Negative social cognitions				
	1. No coupling	2. $Mediator_{j-1}$ to $\Delta Anxiety_j$	3. $Anxiety_{j-1}$ to $\Delta Mediator_j$	4. Full coupling
Parameters	18	19	19	20
LL	-5950	-5950	-5950	-5950
AIC	11936	11937	11937	11939
BIC	11994	11998	11999	12003
CFI	0.939	0.939	0.937	0.937
TLI	0.946	0.945	0.943	0.943
RMSEA	0.075	0.075	0.076	0.077
	5. Autoregressive change-change	6. $\Delta Mediator_{j-1}$ to $\Delta Anxiety_j$	7. $\Delta Anxiety_{j-1}$ to $\Delta Mediator_j$	8. Full change-change coupling
Parameters	20	21	21	22
LL	-5933	-5931	-5933	-5931
AIC	11906	11904	11908	11905
BIC	11970	11971	11976	11976
CFI	0.948	0.949	0.947	0.939
TLI	0.953	0.954	0.951	0.944
RMSEA	0.069	0.069	0.071	0.076

(continued)

	Depressed mood			
	1. No coupling	2. $Mediator_{j-1}$ to $\Delta Anxiety_j$	3. $Anxiety_{j-1}$ to $\Delta Mediator_j$	4. Full coupling
Parameters	18	19	19	20
LL	-9064	-9064	-9064	-9064
AIC	18164	18166	18165	18167
BIC	18222	18227	18226	18232
CFI	0.974	0.974	0.974	0.974
TLI	0.977	0.977	0.977	0.976
RMSEA	0.046	0.046	0.046	0.047
	5. Autoregressive change-change	6. $\Delta Mediator_{j-1}$ to $\Delta Anxiety_j$	7. $\Delta Anxiety_{j-1}$ to $\Delta Mediator_j$	8. Full change-change coupling
Parameters	20	21	21	22
LL	-9063	-9063	-9062	-9061
AIC	18166	18167	18167	18167
BIC	18230	18235	18234	18238
CFI	0.975	0.975	0.975	0.973
TLI	0.977	0.977	0.977	0.975
RMSEA	0.046	0.046	0.046	0.048

Note. LL = Loglikelihood; AIC = Akaike Information Criterion; BIC = Bayesian Information Criterion; CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; RMSEA = Root Mean Square Error of Approximation. $\Delta Anxiety_j$ indicates the change in social anxiety score at time j, and $Mediator_{j-1}$ indicates the true score on the mediator variable at time j-1 (i.e. the previous timepoint).

4.6.3 Phase 3: Bivariate Latent Change Score Models Including Change-Change Relationships

The fit statistics for models 5-8 (see Table 16) indicated that for self-focused attention, the full change-change coupling model (model 8) provided the best fit to the data. For negative social cognitions, the best fitting model was model 6, which included both the autoregressive change-change paths from model 5 and cross-lagged paths where the change in cognitions at time j-1 predicted change in social anxiety at time j. Models 7 and 8 showed poorer fit by comparison, suggesting the inclusion of cross-lagged paths from social anxiety change to subsequent cognitive change was not warranted. For depressed mood, none of models 5-8 showed a significant improvement in fit relative to model 1 (Chi-

square difference test), indicating that the inclusion of change-change paths, within or between the two variables, was not justified.

Parameter estimates for the chosen bivariate models are shown in Table 17. For self-focused attention, the full change-change coupling model indicated that changes in self-focused attention did not predict subsequent changes in social anxiety (ξyx), but that the 'reverse mediation' relationship (ξxy) was significant and positive i.e. that larger decreases in social anxiety predicted larger decreases in self-focused attention the following week. For negative social cognitions, the hypothesised mediation relationship was supported, as indicated by the significant and positive ξyx parameter; larger decreases in the frequency and degree of belief in negative social cognitions predicted subsequent larger decreases in social anxiety. As the best-fitting model for depressed mood included no change-change relationships, a mediation relationship between depressed mood and social anxiety in either direction was not supported.

Table 17

Parameter Estimates for the Chosen Bivariate Latent Change Score Models

	Self-focused attention (8. Full change-change coupling)			Negative social cognitions (6. $\Delta Mediator_{j-1}$ to $\Delta Anxiety_j$)			Depressed mood (1. No coupling)		
	Estimate	SE	*p*	Estimate	SE	*p*	Estimate	SE	*p*
μx1	5.128	0.099	<.001	1.194	0.095	<.001	15.941	0.812	<.001
μy1	20.040	0.398	<.001	19.987	0.398	<.001	20.086	0.405	<.001
μsx	-0.110	0.050	.029	-0.034	0.028	.221	0.307	0.508	.545
μsy	-0.625	0.133	<.001	-0.837	0.212	<.001	-1.005	0.063	<.001
βx	–	–	–	-0.112	0.012	<.001	-0.092	0.040	.020
φx	-1.182	0.777	.128	0.698	0.101	<.001	–	–	–
φy	1.944	0.932	.037	-0.985	0.113	<.001	–	–	–
ξyx	-5.633	3.283	.086	4.756	1.235	<.001	–	–	–
ξxy	0.504	0.195	.010	–	–	–	–	–	–
Var(x1)	1.091	0.209	<.001	1.661	0.167	<.001	111.711	14.334	<.001
Var(y1)	23.391	2.773	<.001	25.270	2.922	<.001	25.236	2.848	<.001
Var(sx)	0.046	0.024	.053	0.020	0.004	<.001	1.046	0.500	.036
Var(sy)	0.288	0.221	.192	1.020	0.212	<.001	0.489	0.087	<.001
Cov(x1, sx)	-0.062	0.042	.139	0.132	0.026	<.001	4.210	4.162	.312
Cov(y1, sy)	0.305	0.509	.549	-1.386	0.641	.031	-1.048	0.396	.008
Var(ux)	1.191	0.082	<.001	0.265	0.021	<.001	13.674	1.687	<.001
Var(uy)	11.874	0.866	<.001	11.966	0.855	<.001	12.023	0.852	<.001
Cov(x1, y1)	3.702	0.655	<.001	4.566	0.609	<.001	32.203	5.178	<.001
Cov(x1, sy)	-0.174	0.091	.056	0.073	0.154	.633	-0.115	0.665	.863
Cov(y1, sx)	0.233	0.151	.123	0.405	0.084	<.001	1.041	1.313	.428
Cov(sx, sy)	0.104	0.080	.193	0.033	0.016	.037	0.342	0.091	<.001
Cov(ux, uy)	1.504	0.227	<.001	0.790	0.088	<.001	4.851	0.624	<.001

Note. N = 185. Parameter estimates are unstandardised. x refers to the mediator variable, y to social anxiety, and yx refers to the regression of y on x (i.e. x predicting y). Var = variance; Cov = covariance; μx1/μy1 = mean true score at time 1 (intercept); μsx/μsy = constant change component; β = proportional change component; φ = autoregressive change-change path; ξ = cross-lagged change-change path; u = unique score (residual). '–' indicates parameter was not included in the model.

4.7 Discussion

The two studies presented here aimed to examine whether self-focused attention, negative social cognitions, and depressed mood mediated clinical improvement in CT-SAD delivered in a routine clinic setting. In Study 2a, all three candidate variables showed significant mediation effects, in which scores on the mediator variable predicted the level of social anxiety at the subsequent assessment point one week later. Negative social cognitions showed the strongest mediation effect in terms of percent mediation, with depressed mood and self-focused attention showing comparatively weak effects. The indirect (mediated) effect for self-focused attention was no longer significant when all three candidate mediators were included in a single parallel mediation model. The models reversing mediator and outcome showed significant effects, indicating that the level of social anxiety predicted self-focused attention, negative social cognitions and depressed mood scores at the subsequent assessment. The percent mediation values were similar across these models suggesting the strength of the mediating effect of social anxiety was similar across the variables tested.

Comparing these results to those of the CT condition in Study 1, which used the same analytic approach, a number of similarities are notable. Negative social cognitions were a significant mediator of the relationship between time in therapy and social anxiety in both studies, showing strong effects compared to the other candidate mediators. Depressed mood showed significant, but comparatively weak mediation in both studies, and significant, strong reverse

mediation was shown for all three of the variables tested. Further, as was observed in Study 1, the percent mediation values for the reversed models were similar across the three variables. As suggested previously, this lack of specificity in the reversed effects may reflect more global clinical improvement arising from reduced social anxiety. The main difference between the studies was for the mediating effect of self-focused attention, which was significant in Study 1, but showed only a weak effect in Study 2a that was not retained in a parallel mediation model. This may suggest that the mediating effect of self-focused attention is better accounted for by that of negative social cognitions, though as self-focused attention was measured using a single item, this finding may reflect differences in the accuracy of measurement. Further work examining these two variables concurrently would be beneficial. The level of consistency overall suggests that in general, the findings from the trial dataset used in Study 1 were replicated in the routine clinic data from Study 2a.

Study 2b used a bivariate latent change score modelling approach, and found evidence for a significant mediating effect of negative social cognitions, such that changes in cognitions predicted subsequent changes in social anxiety. The addition of the reverse relationship (i.e. changes in social anxiety predicting changes in cognitions) led to poorer model fit indicating this relationship was not supported by the data. The observed mediation effect for cognitions is therefore consistent with Studies 1 and 2a, suggesting a reliable effect within CT-SAD. As highlighted in Chapter 3, this is line with results from a number of other studies investigating cognitions as a possible mediator of improvements in social anxiety (Boden et al., 2012; Calamaras et al., 2015; Goldin et al., 2014; Gregory et

al., 2018; Hoffart et al., 2012). Additionally, the study by Hawley and colleagues (2016), which also used latent change score modelling, showed that the frequency of clients' use of exposure predicted subsequent improvement in social anxiety. The present results perhaps build on this finding, and may indicate that the relationship between exposure use and improved social anxiety is mediated by reductions in negative social cognitions.

For self-focused attention, the bidirectional change-change model provided the best fit to the data, which included the relationship between changes in self-focused attention and subsequent changes in social anxiety, as well as the reverse. However, only the reverse relationship coefficient was significant within the model, meaning that self-focused attention was not supported as a mediator in this study. The fact that this was true for both Studies 2a and 2b, but that mediation was supported in Study 1, might suggest a distinction between the RCT context and routine clinical care. One possibility is that there were differences in the implementation of the self-focus aspects of treatment between the two settings. For example, the clinical methods to address self-focused attention were still being refined during the audit period, so it is likely that not all participants completed an 'attention training' session or had this consistently emphasised during treatment. In contrast, participants in the RCT (Study 1) all completed attention training, and were supported to practise externally focussed attention throughout therapy. Other RCT studies where self-focused attention was emphasised in treatment have also found mediation and/or process-outcome effects for this variable (Hoffart et al., 2016; Mörtberg et al., 2015), which is consistent with this idea. Further investigation of mediation in therapies

delivered in routine care would help evaluate the likelihood that such treatments may be operating differently to those in research trials. The significant 'reversed' relationship coefficient indicated that changes in social anxiety did predict subsequent changes in self-focused attention, which is in line with the findings of Studies 1 and 2a. As mentioned above, this relationship fits the idea of global clinical improvement, where people who have just experienced a reduction in social anxiety subsequently generally better, which may include feeling less need to monitor and focus on themselves in social situations. The reverse mediation findings are discussed further in Chapter 8.

Depressed mood was also not supported as a mediator in this study, as the inclusion of coupling paths between depressed mood and social anxiety did not lead to improvements in model fit. The reverse relationship was therefore also not supported. This differed from Studies 1 and 2a, where significant (though weak) mediation was found. This may be a result of the different analytic approaches used given the sample sizes for each study; unlike the multilevel SEM approach, latent change score modelling includes a series of timepoints and thus can estimate a trajectory over time, as indicated by the proportional and constant change components. This means that while on average, all participants' social anxiety starts high and decreases over time, the same is not true for depressed mood, where some participants show low BDI scores throughout treatment, i.e. no change, while others may show reductions in depressed mood over time. This variation may lead to a lack of consistent change-change relationships between depressed mood and social anxiety, as observed in Study 2b. This finding is therefore in line with the hypothesis regarding depressed

mood; that as it is not part of the theoretical model that underpins CT-SAD, the absence of a mediation effect would be expected and thus lends support to the specificity of the theoretically-derived mediation effects found.

4.7.1 Limitations

As in Study 1, the self-focused attention models of Studies 2a and 2b may be limited by the use of a single item to measure this construct. While this measure has been used in other studies (Hoffart et al., 2016; Mörtberg et al., 2015) future research could usefully develop more nuanced tools to monitor change in this variable over time. It remains possible that other variables not assessed in the present studies could show mediation effects; for example the use of safety behaviours would be hypothesised as a mediator based on the Clark and Wells (1995) model, but could not be examined here given this was not measured weekly. It is noted also that the present models only examine consecutive timepoints, so are not able to assess mediation on broader levels, for example delayed or cumulative effects of changes in candidate mediators. It was not possible to assess measurement invariance for the SCQ and BDI given the sample size, thus models were implemented on the assumption that participants used the scales in a similar way across therapy, which was considered reasonable given the strong psychometric properties of these scales and their wide use in longitudinal treatment studies.

4.7.2 Conclusion

The studies reported in this chapter have extended Study 1 by examining mediation of clinical improvement in CT-SAD delivered in routine care. The

significant role of negative social cognitions as a mediator was observed in all three studies, thus supporting the theoretical model on which the treatment is based, and indicating a degree of similarity in how the treatment is having its clinical effects between research trials and routine clinical care. Studies examining routine care are uncommon in the literature, particularly those comparing this against RCTs of the same treatment, and this would be a valuable area for future studies. Self-focused attention and depressed mood showed more mixed findings across the three studies, with mediation effects observed only inconsistently. While the lack of mediation via depressed mood was hypothesised given it is not part of the theoretical treatment mechanism, self-focused attention does form part of the Clark and Wells (1995) model. In developing further studies, it is suggested that the measurement of self-focused attention could be improved, and that more evidence is needed as to whether it shows independent mediation effects or is better accounted for by cognitive changes, and whether the distinction between RCT and routine clinic data seen here is observed across other datasets. It is hoped that Studies 1, 2a, and 2b presented here may help to address the lack of consistency regarding choice of mediators and analytic approaches seen in the SAD mediation literature to date.

5

Sudden Gains in Face-to-face and Internet-based Cognitive Therapy for Social Anxiety Disorder

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This chapter presents three studies investigating sudden gains in CT-SAD and iCT-SAD. Study 3a identified and explored the occurrence of gains. Studies 3b and 3c explored the content of pregain sessions by analysing session videotapes and behavioural experiment record sheets, respectively. The findings of all three studies are then discussed together.

5.1 Study 3a: Identification and Exploration of Sudden Gains

As reviewed in Chapter 2, sudden gains have been shown to occur in psychological therapies for a range of clinical presentations, and may represent significant moments of therapy. There are only three studies examining sudden gains in SAD (Bohn et al., 2013; Hofmann et al., 2006; Thorisdottir et al., 2018), the findings of which may be limited for reasons including low baseline social anxiety severity, the use of a group therapy format, and the level of therapists' experience. There is also only one study that used an online treatment (Hedman, Lekander, et al., 2014), no studies to date that examined online social anxiety

interventions, and therefore no comparisons between face-to-face and online treatments. Research is therefore needed on the occurrence of sudden gains in SAD, and in internet-based therapies, and should include examination of whether gains are preceded by changes in cognitions, given possible limitations of previous studies (see section 2.7.3). Study 3a aimed to explore these gaps in the literature by investigating the occurrence of sudden gains in CT-SAD, and to compare the standard face-to-face format of treatment delivery to the same treatment delivered using a therapist-guided internet-based programme (iCT-SAD). It aimed to examine the following questions:

1. Do sudden gains occur in CT-SAD and iCT-SAD, and if so, how often?
2. Are there differences between the two treatment formats?
3. Are sudden gains predictive of overall therapy outcomes?
4. How do negative social cognitions, and other psychological constructs change around the period of the gain?
5. Are there any techniques or factors that occur consistently in the period immediately prior to sudden gains?

5.2 Method

5.2.1 Participants

The participant sample was the same as for Study 1 (see Chapter 3). All had received a course of face-to-face CT-SAD (n=50) or therapist-guided internet-based iCT-SAD (n=49).

5.2.2 Treatment and Therapists

Three therapists delivered both the CT and iCT interventions, as described in Study 1 (see Chapter 3). Both treatments were 14 weeks in duration, followed by three booster sessions at subsequent monthly intervals, and a further follow-up assessment at 12 months posttreatment.

5.2.3 Measures

Measures were completed prior to each face-to-face CT session, and on a weekly basis for patients allocated to iCT. The following standardised measures were used (see Chapter 3 for details):

Liebowitz Social Anxiety Scale – Self-report version (LSAS; Baker et al., 2002; Heimberg et al., 1999)
Social Cognitions Questionnaire (SCQ; Clark, 1995)
Social Phobia Weekly Summary Scale (SPWSS; Clark, 1995)
Patient Health Questionnaire – 9-item version (PHQ; Kroencke et al., 2001)

For the analysis of pregain session content in CT, the below measure was also used:

Session content summary table: This table forms part of the therapist's notes on each CT session. The table lists 16 therapeutic activities and techniques within the CT-SAD protocol (e.g. video feedback, surveys, out of office behavioural experiment), with a yes/no response for the therapist to indicate whether each was done within that specific session. Not all items are expected to be done every

session. This table also asks therapists to indicate how many times the patient intentionally engaged in social situations they found difficult during the session, and the total duration of these in minutes.

5.2.4 Analysis

Analyses were performed in R version 3.4.3 (R Core Team, 2017) using the 'tidyverse' (Wickham, 2017), 'nlme' (Pinheiro, Bates, DebRoy, Sarkar, & R Core Team, 2018), and 'suddengains' (Wiedemann, Thew, & Stott, 2018) packages, with some additional analyses performed using SPSS version 24. Statistical assumptions were checked and met for each analysis.

5.2.4.1 Identification of sudden gains.

Sudden gains were identified based on the main outcome measure of the trial, the self-report version of the LSAS, using the three criteria outlined by Tang et al (2005). For criterion one, we calculated the reliable change index (RCI) as described in Jacobson and Truax (1991). Following König and colleagues (2014) and Martinovich, Saunders, and Howard (1996), we used the standard deviation of the baseline assessment scores, and the internal consistency (Cronbach's alpha) of the baseline assessment scores in place of the test-retest reliability, given that these values could be obtained directly from the present data. We calculated the mean change from pretreatment (assessment) to posttreatment by computing a change score for each participant and then taking the mean. The minimum threshold that indicates reliable and clinically-significant change is

calculated in relation to the critical value of 1.96 as shown below (see Seggar, Lambert, & Hansen, 2002):

$$RCI\ Cutoff = 1.96 \times \frac{Mean\ change\ pretreatment\ to\ posttreatment}{\sqrt{2 \times \left(SD \times \sqrt{1-\alpha}\right)^2}}$$

The criterion one cutoff for the LSAS was therefore set at 11.6 points for both CT and iCT datasets. This is similar to the cutoff of 10 points used in the only other sudden gains study using the LSAS (Hofmann et al., 2006). Gains were required to represent a drop of at least 25% of the pregain score (criterion two), and the mean difference between the three pregain and three postgain measurements was required to be greater than 2.78 times the pooled standard deviation of the two groups (criterion three). Where only five of the six datapoints were available (i.e. for gains between session 2 and session 3, or between session 12 and session 13, or where one datapoint was missing), an adjusted critical value of 3.18 was used (see Lutz et al., 2013). Gains occurring following the first session, or the penultimate session were therefore not included in the analysis.

Consistent with previous literature, a sudden gain was deemed to have reversed if 50% of the improvement made during the gain was lost at any subsequent point. For example, where the sudden gain represents a drop in score from 40 to 30 points, the gain is classed as having reversed if a score of 35 or higher is recorded at any later session.

The sessions before and after a sudden gain are referred to as session 'n' (pregain session) and session 'n+1' (postgain session), respectively, with earlier

or later sessions identified in relation to session 'n' (e.g. session 'n-2' is two sessions prior to session 'n'). In iCT, where therapist contact is brief but regular throughout each week, and assessments are completed online on a weekly basis, the notion of therapy 'sessions' is not applicable; here, we use the term 'week', where 'week x' refers to the period between assessment x and assessment x+1.

Sudden gains were identified and descriptive statistics reported in relation to their frequency, magnitude, and likelihood of reversal (research questions 1 and 2). The relationship to therapy outcomes (question 3) was examined using a repeated measures analysis of covariance controlling for baseline LSAS scores. Additional exploratory analyses examined the relationship between having a sudden gain and the stability of LSAS scores during the booster period using Fisher's exact tests. Average session-to-session/week-to-week improvements on the LSAS were compared across participants who did and did not experience gains using independent samples t-tests. Where given, d_{Cohen} effect size values were calculated using the pooled standard deviation as the denominator and are interpreted following the rules of thumb outlined by Cohen (1988), where effect sizes of 0.2, 0.5, and 0.8 indicate small, medium, and large effects, respectively.

5.2.4.2 Analysis of changes on process measures around the gain.

Scores on process measures around the period of sudden gains (question 4) were examined using Linear Mixed Effects models, where timepoint (n-2, n-1, n, n+1) in relation to the gain was specified as a categorical fixed factor, and random intercepts specified to account for variation between participants.

Treatment condition was not specified as an additional fixed factor in order to simplify the models by reducing the number of parameters to be estimated. Maximum likelihood estimation, and an unstructured covariance matrix, was used for all models. Planned contrasts compared consecutive timepoints of interest, along with comparison of the change from n-2 to n-1 with the change from n-1 to n. These models retained cases with missing data. Where participants had more than one sudden gain, only their largest gain was included as this was thought to represent the most clinically significant change. The assumption of normally distributed residuals was examined using Q-Q plots and found to be met. Analyses used the 'nlme' R package (Pinheiro et al., 2018).

5.2.4.3 Analysis of pregain session content.

To examine whether specific techniques or therapy components might be associated with sudden gains (question 5), the content of pregain sessions was reviewed in comparison to other sessions. This was undertaken by analysing iCT participants' use of the internet programme around the period of the gain, and in CT using therapists' session notes, which contain a record of which techniques were used in each session. These analyses included data from all sudden gains, including those of participants with more than one. Cochran's Q tests were conducted to compare the differences in proportions between those who did and did not undertake each therapy component across three sequential timepoints: pre-pregain (n-1) versus pregain (n) versus postgain (n+1) weeks. Post-hoc pairwise comparisons were conducted where appropriate using McNemar's tests. In order for content to be considered associated with the occurrence of

sudden gains, it needed to be 1) prevalent in the pregain session, and 2) more prevalent in this session compared to other 'control' sessions prior to the gain. These analyses therefore compared the pregain session (n) content with the pre-pregain session (n-1) as a control. The pre-pregain session is thought to make a suitable control in that it occurs close to the pregain session, but is not affected by the gain itself (Tang & DeRubeis, 1999). Repeated measures ANOVA was used to examine the number of messages sent and received, and the number of behavioural experiments planned and completed (in iCT), and the number and duration of within-session social interactions (in CT).

5.2.4.4 Missing data.

Where questionnaire item scores were missing, the total score was calculated by prorating missing scores based on the mean of the completed items. If an entire questionnaire was missed and therefore the weekly total score was missing, no replacement method was used to avoid influencing the calculation of sudden gains (see Tang, DeRubeis, Hollon, Amsterdam, & Shelton, 2007). One, two, and three participants were missing data at the posttreatment, three-month follow-up, and 12-month follow-up, respectively. These values were imputed using the 'Multivariate Imputation by Chained Equations' ("mice") R package (Buuren & Groothuis-Oudshoorn, 2011). A series of 100 imputations were calculated using predictive mean matching then combined into a single dataset.

5.3 Results

5.3.1 Frequency and Description of Sudden Gains

Of the 1089 between-session intervals analysed, 77 were classified as sudden gains (7%). In the CT condition, 32 participants (64%) experienced a sudden gain, 11 of whom experienced more than one, leading to a total of 44 sudden gains in this group. In the iCT condition, 25 participants (51%) experienced a sudden gain, with nine of those experiencing more than one, leading to 33 sudden gains in total for this group. Chi-square tests showed that the proportion of patients experiencing a sudden gain did not differ between treatment conditions (χ^2= 1.707, p= .191), nor the proportion of sudden gain sessions relative to the total number of inter-session intervals analysed (χ^2= 1.461, p= .227). Among patients who experienced a sudden gain, the proportion of patients with more than one sudden gain did not differ between treatment conditions (χ^2= .016, p= .898). The lack of treatment differences appears to be consistent with the similar effectiveness of the treatments shown in the primary trial analyses (Clark, Wild, et al., in preparation).

An independent samples t-test showed there was no significant difference in the mean sudden gain magnitude between the CT (M = 23.0, SD = 9.0) and iCT (M= 20.8, SD = 7.3) conditions: t(75)= 1.155, p=.252. On average, sudden gains represented 47% and 56% of participants' overall improvement on the LSAS across the CT and iCT interventions, respectively[4]. None of the sudden gains in CT subsequently reversed, and five participants in iCT (10%) each experienced

[4] These percentages include only the largest gain where a participant had more than one.

one reversal. The distribution of the sudden gains was relatively even across the interventions, with the modal pregain sessions/weeks being five and twelve in CT and four in iCT (see Figure 13). The 'averaged' sudden gains for each treatment are shown in Figure 14.

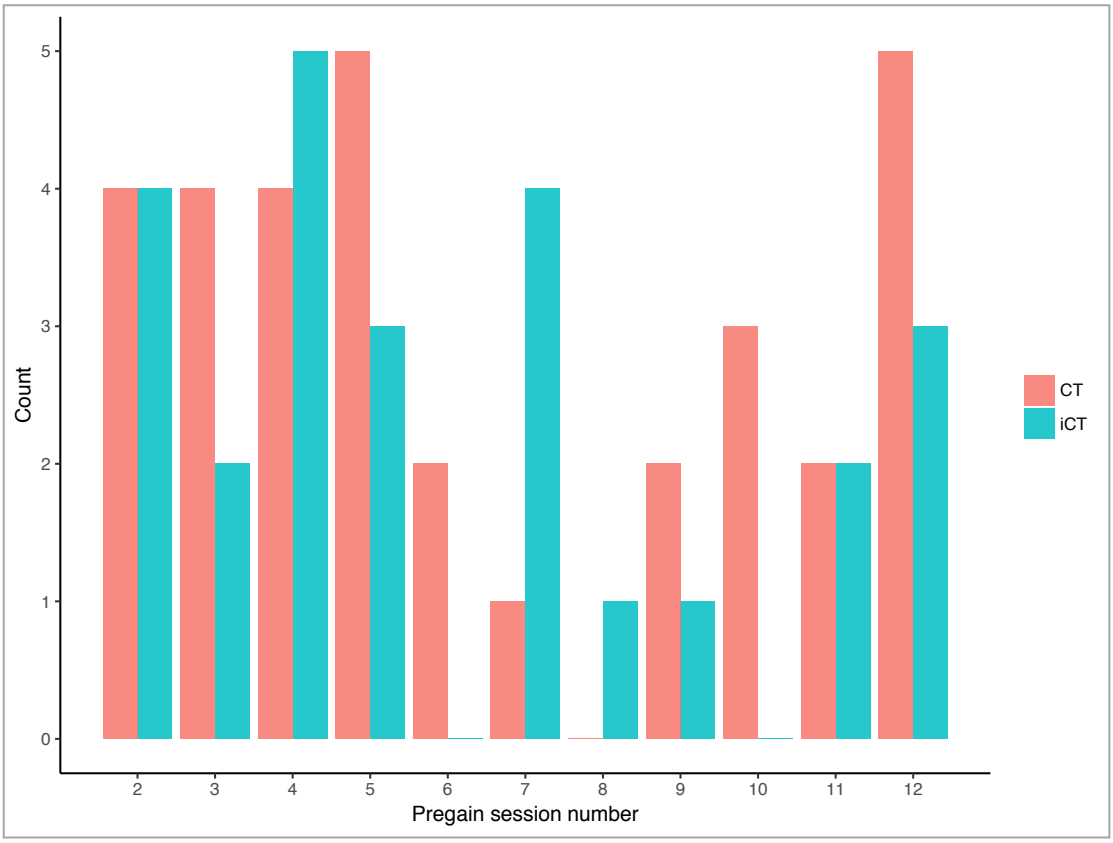


Figure 13

The distribution of sudden gains across the therapy period, by treatment condition. Where a participant had more than one gain, their largest gain is included.
CT = Cognitive Therapy; iCT = Internet-based Cognitive Therapy.

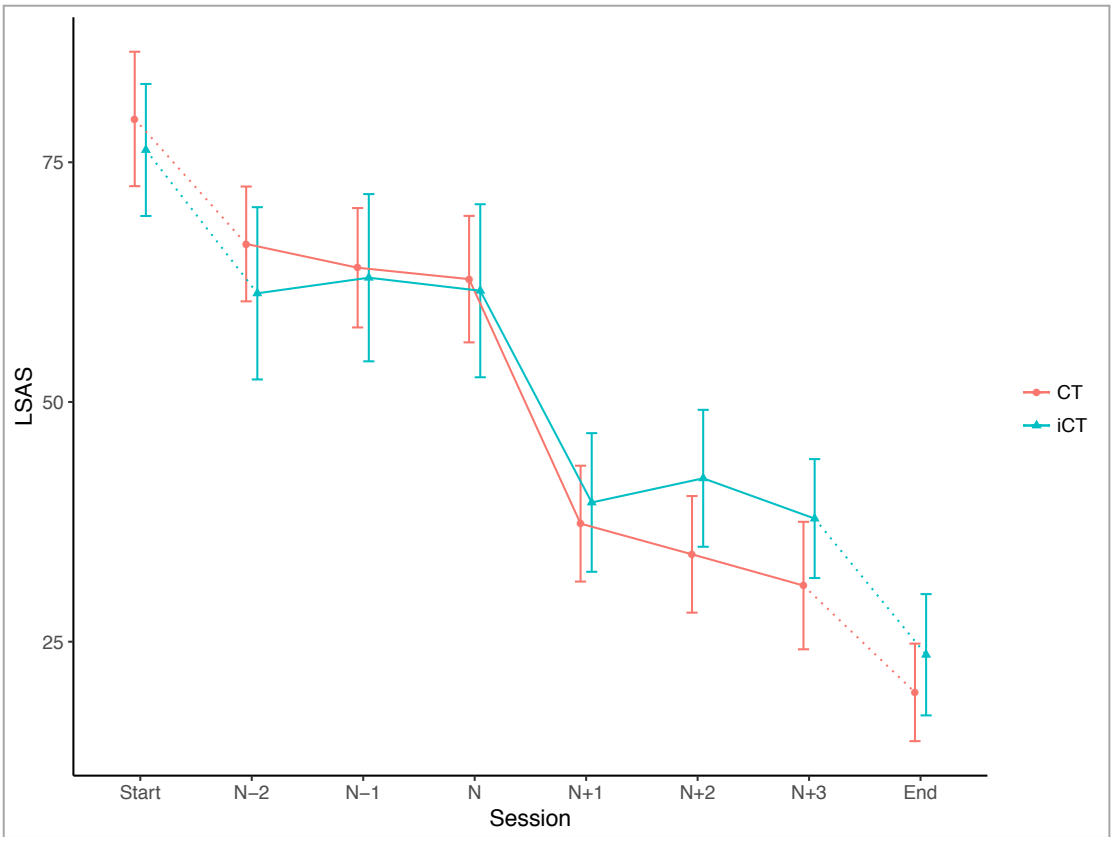


Figure 14

The averaged scores on the Liebowitz Social Anxiety Scale (self-report version; LSAS) before and after sudden gains, defined as occurring between session/week n and session/week n+1, arranged by treatment condition. N = 57. Where a participant had more than one gain, their largest gain is included. Error bars represent 95%CI.
CT = Cognitive Therapy; iCT = Internet-based Cognitive Therapy.

5.3.2 Relationship to Therapy Outcomes

A repeated measures analysis of covariance was used to assess whether there were differences in therapy outcomes between participants who did and did not experience a sudden gain, across the two treatment conditions. Mean LSAS values across the assessment points are shown in Figure 15. This analysis used LSAS scores as the dependent variable, a within-subjects factor of time (posttreatment assessment vs. three-month follow-up vs. 12-month follow-up), and between-subjects factors of treatment condition (CT vs. iCT), and sudden gain status (present vs. absent). Baseline LSAS score was entered as a covariate.

Results showed a significant main effect of sudden gain status: $F(1, 94) = 21.06$, $p<.001$, partial $\eta^2 = .183$ [90%CI 0.078, 0.293], but not of treatment condition: $F(1, 94) = 1.17$, $p=.282$, partial $\eta^2 = .012$, or time: $F(1.8, 169.7) = .920$, $p=.392$, partial $\eta^2 = .010$ (Greenhouse-Geisser adjusted). The two-way interactions (time by sudden gain status, time by treatment condition, and sudden gain status by treatment condition), and the three-way interaction (time by sudden gain status by treatment condition) were nonsignificant (p value range .116 to .382). This suggests that having a sudden gain during treatment was predictive of lower LSAS scores across the three posttreatment timepoints, and that there was no evidence that this differed between CT and iCT. d_{Cohen} for the effect of sudden gain status was 0.87, which is considered large. As indicated in Figure 15, baseline LSAS scores were not significantly different between those with and without gains, both in CT: $t(48)= -0.775$, $p=.442$, and iCT: $t(47)= .568$, $p=.573$.

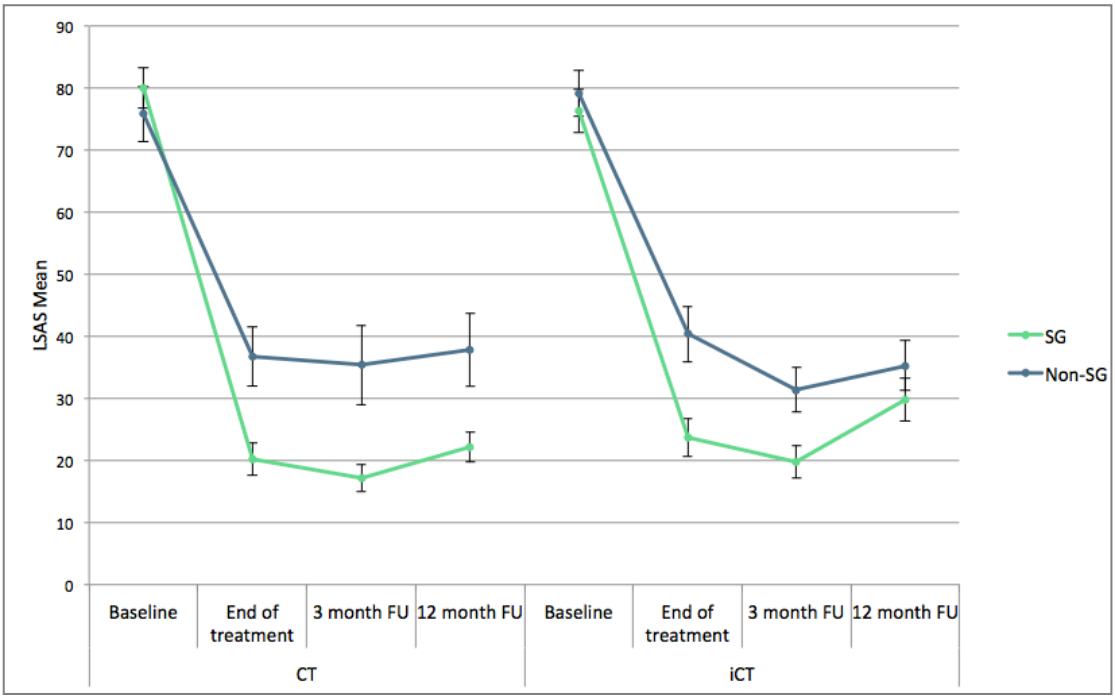


Figure 15

Mean scores on the Liebowitz Social Anxiety Scale (self-report version; LSAS) at Baseline, End of treatment, 3 and 12-month follow-ups, grouped by whether participants had a sudden gain during treatment. N = 99. Error bars represent +/-1SE. CT = Cognitive Therapy; iCT = Internet-based Cognitive Therapy; SG = Sudden Gain.

To explore whether experiencing a sudden gain might be associated with the posttreatment stability of improvements that were made during the therapy period, LSAS scores over the three-month booster period were examined and defined as unstable if they showed an increase equal to or greater than 11.6 points at any point compared to the posttreatment assessment. Fisher's exact tests indicated that the proportion of those experiencing a stable recovery was not significantly different between participants who did and did not have a sudden gain. This was true for both CT and iCT (see Table 18).

Table 18

Numbers of Participants Experiencing Stable or Unstable LSAS Scores within the Initial Three Months Posttreatment.

	Sudden gain		No Sudden gain		Test statistic
	Stable	Unstable	Stable	Unstable	
CT	29	2	16	2	χ^2= 0.330, p= .618
iCT	21	3	23	1	χ^2= 1.091, p= .609

Notes. Fisher's Exact Tests. N = 97 (Two participants had missing data). CT = Cognitive Therapy; iCT = Internet-based Cognitive Therapy.

5.3.3 Average Session-to-Session/Week-to-Week Improvement

One method to examine the extent to which sudden gains might be clinically meaningful is to compare those with and without sudden gains based on the average reduction in scores (having removed the gain interval) between consecutive measurement points. This examines the possibility that sudden gains simply represent one large change within an overall steeper trajectory of change, and thus may not be singular significant moments of therapy.

For this exploratory analysis, where people had a sudden gain, the gain interval was removed. Where people did not experience a sudden gain, their largest gain was removed so as to be comparable. Participants with more than one sudden gain (n = 20) were excluded from this analysis so further gains were not included when calculating the average reduction. Results showed that for CT, the average session-to-session change on the LSAS was 2.6 points for participants who had a sudden gain (*SD* = 1.8), and 1.9 points for those who did not (*SD* = 1.1). This difference was not significant; $t(37) = -1.482$, $p = .147$. The mean gain magnitude of sudden gains (*M* = 25.1) was significantly larger than the mean magnitude of

nongainers' largest gains (*M* = 16.9); *t*(37) = -2.814, *p* = .008. For iCT, the average week-to-week change was 1.5 points for participants who had a sudden gain (*SD* = 1.8), and 1.8 points for those who did not (*SD* = 1.3). This difference was not significant; *t*(38) = .545, *p* = .589. The mean gain magnitude of sudden gains (*M* = 20.5) was significantly larger than the mean magnitude of nongainers' largest gains (*M* = 16.5); *t*(38) = -2.087, *p* = .044. These findings suggest that on average, participants experiencing sudden gains did not show larger weekly LSAS change across therapy in general, and that the sudden gains observed are therefore less likely to have occurred as a consequence of an overall steeper trajectory of change.

5.3.4 Changes on Process Measures Around the Gain

Participants' scores around sudden gains on measures of negative social cognitions, self-focused attention, and depressed mood were analysed using Linear Mixed Effects models as described in the method. Nine participants had incomplete data over the four timepoints of interest (n-2, n-1, n, and n+1) for all process measures and one additional participant had incomplete LSAS data. Figure 16 shows the mean scores on each measure. To give a clearer indication of within-subject change, these graphs show data from participants with complete data over the four timepoints of interest. The analysis results, which included all available data, are shown in Table 19.

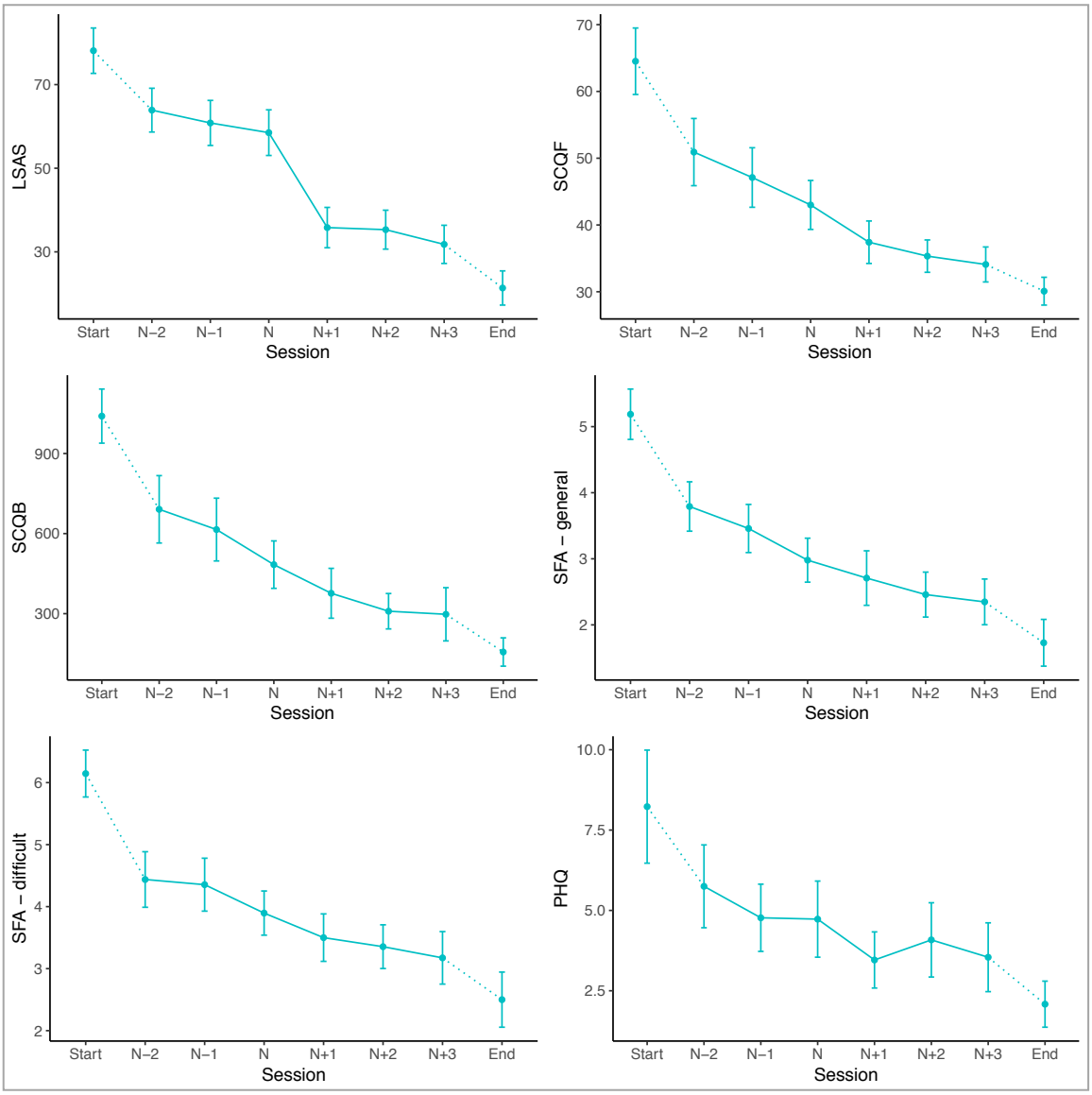


Figure 16

Mean scores on the Liebowitz Social Anxiety Scale (self-report version; LSAS) and process measures around the gain. Sudden gains are calculated based on the LSAS, occurring between session n and session n+1. The two treatment conditions (CT and iCT) are collapsed as no group differences were shown. Error bars represent 95%CI. N = 47 for LSAS, N = 48 for all other measures (participants with complete data over timepoints n-2 to n+1). SCQF = Social Cognitions Questionnaire – Frequency; SCQB = Social Cognitions Questionnaire – Belief; SFA = self-focused attention; PHQ = Patient Health Questionnaire.

Table 19

Results of Linear Mixed Effects Models Examining Process Measures Around Sudden Gains.

Contrast	β (SE)	p
	SCQ-frequency	
n-2 to n-1	-3.55 (1.51)	.018
n-1 to n	-3.64 (1.44)	.011
n to n+1	-6.80 (1.44)	< .001
(n-2 to n-1) vs. (n-1 to n)	0.09 (2.53)	.971
	SCQ-belief	
n-2 to n-1	-63.07 (36.64)	.085
n-1 to n	-135.87 (35.04)	< .001
n to n+1	-117.40 (35.04)	.001
(n-2 to n-1) vs. (n-1 to n)	72.80 (61.50)	.236
	SFA general	
n-2 to n-1	-0.20 (0.20)	.327
n-1 to n	-0.50 (0.19)	.009
n to n+1	-0.48 (0.19)	.012
(n-2 to n-1) vs. (n-1 to n)	0.31 (0.34)	.361
	SFA difficult	
n-2 to n-1	-0.02 (0.20)	.936
n-1 to n	-0.42 (0.19)	.030
n to n+1	-0.51 (0.19)	.009
(n-2 to n-1) vs. (n-1 to n)	0.41 (0.34)	.233
	PHQ	
n-2 to n-1	-0.90 (0.45)	.047
n-1 to n	-0.02 (0.43)	.968
n to n+1	-1.40 (0.43)	.001
(n-2 to n-1) vs. (n-1 to n)	-0.88 (0.76)	.246

Note. N = 57 for all analyses. β = unstandardised mean difference. SCQ = Social Cognitions Questionnaire; SFA = self-focused attention; PHQ = Patient Health Questionnaire.

Results indicated that negative social cognitions (SCQ-frequency and SCQ-belief), self-focused attention, and depressed mood (PHQ) showed a significant decline simultaneously with the gain (n to n+1). There was also evidence for reductions in negative social cognitions and self-focused attention immediately prior to the

sudden gain (n-1 to n). This was not observed for depressed mood. For cognitions and self-focused attention, the comparison of the change from timepoint n-1 to n with the change from n-2 to n-1 showed no significant differences. This would suggest that although changes in cognitions and self-focused attention prior to sudden gains was evident, this change did not appear to be significantly larger than that observed in the previous between-session interval.

5.3.5 Pregain Week Content in iCT

For participants in the iCT condition who experienced a sudden gain, their use of the internet programme around the period of the gain was examined using activity data from the iCT website. Initial inspection of the pregain week data on module use and the use of website features revealed three elements where raw data indicated greater use in pregain (n) weeks relative to pre-pregain (n-1) weeks: making a presentation to a virtual audience, viewing a recording of a virtual audience presentation, and use of the 'My Therapy Blueprint' module. Cochran's Q tests were conducted to compare the differences in proportions of those who did and did not use each website element between three sequential timepoints: pre-pregain (n-1) versus pregain (n) versus postgain (n+1) weeks (see Table 20). Post-hoc pairwise comparisons were conducted where appropriate using McNemar's tests.

Table 20

Activity in iCT around the Period of the Sudden Gain.

	Week			Test statistic
	n-1	n	n+1	
Virtual audience presentation	3	7	4	$\chi^2(2) = 2.36$, $p = .307$
Viewed presentation recording	2	5	4	$\chi^2(2) = 1.40$, $p = .497$
Worked on blueprint module	0	4	4	$\chi^2(2) = 6.40$, $p = .041$
Messages sent (Mean/SD)	2.00 (2.23)	1.64 (1.82)	1.58 (1.60)	$F(2, 64)= .69$, $p= .505$
Messages received (Mean/SD)	3.2 (2.5)	3.6 (3.7)	2.9 (2.6)	$F(1.4, 45.4)= 1.37$, $p= .260$[a]
Experiments planned (Mean/SD)	2.1 (2.4)	2.4 (2.7)	1.3 (1.4)	$F(1.6, 51.9)= 3.92$, $p= .034$, partial $\eta^2 = .109$[a]
Experiments completed (Mean/SD)	1.8 (2.1)	2.3 (2.6)	1.3 (1.8)	$F(2, 64)= 3.09$, $p= .053$

Notes. Total n = 33 (number of sudden gains in iCT). [a] Greenhouse-Geisser corrected.

Table 20 indicates that neither the proportions of participants making a virtual audience presentation, nor the proportions of participants viewing a previously recorded presentation were significantly different across the three timepoints. The proportions of participants working on the blueprint module showed a significant difference across these timepoints. A comparison of the pre-pregain week (n-1) with the pregain week (n) was not calculable, as no participants had worked on the blueprint module in the pre-pregain week. However, as the proportion was the same across pregain (n) and postgain (n+1) weeks, this suggests that the significant Cochran test was driven by a difference in proportions between pre-pregain and pregain weeks, though the raw numbers (0 and 4) were small. As the blueprint module is only given towards the end of therapy, this finding is likely to relate only to later-stage sudden gains.

To compare the number of messages that were sent and received by participants across pre-pregain, pregain, and postgain weeks, one-way repeated measures ANOVAS were conducted. No differences were found in the number of messages sent or received across these three timepoints. Repeated measures ANOVAs were also used to examine participants' use of the online behavioural experiment log around the period of the gain. The difference across the three timepoints in the number of experiments planned was significant, and post-hoc pairwise comparisons indicated that a greater mean number of experiments were planned in pregain (n) weeks (M = 2.4) compared to postgain (n+1) weeks (M = 1.3). While the mean scores showed a similar pattern for the number of experiments completed, the overall ANOVA was not significant. These findings are consistent with the view that behavioural experiments may be associated with gains in iCT, in that the experiments planned in the pregain week are generally implemented during the week where the gain occurs.

5.3.6 Pregain Session Content in CT

In CT, the session content summary table in therapists' session notes contains a record of which therapy techniques were used within each session. Initial inspection of these notes highlighted techniques that appeared to be more common in pregain (n) sessions compared to pre-pregain (n-1) sessions (see Table 21). Cochran's Q tests were used to compare the proportions of participants for whom these techniques were or were not used, across pre-pregain (n-1), pregain (n), and postgain (n+1) sessions. As the session content summary table was not completed for some sessions, the amount of missing data was greater compared to iCT.

Table 21

Activity in CT around the Period of the Sudden Gain.

	Sample size	Week			Test statistic
		n-1	n	n+1	
Video feedback	29	13	14	15	$\chi^2(2) = .32$, $p = .854$
Out of office experiment	29	7	10	13	$\chi^2(2) = 3.00$, $p = .223$
Engaged in a social situation	25	15	20	18	$\chi^2(2) = 2.38$, $p = .305$
Number of social episodes in session (Mean/SD)	23	1.3 (1.6)	1.6 (1.7)	1.1 (1.1)	$F(2, 44)= .62$, $p = .544$
Total duration of social episodes in minutes (Mean/SD)	22	11.6 (11.8)	16.8 (16.7)	13.2 (11.2)	$F(2, 42)= .92$, $p = .405$

Notes. Sample size indicates present data among the total number of sudden gains in CT (n = 44).

Table 21 indicates that no significant differences were found between the proportions of participants undertaking video feedback across the three sessions. These differences were also nonsignificant for the proportions of participants completing a behavioural experiment out of the office, and the proportions engaging in any form of situation they found difficult. Repeated measures ANOVAs were used to examine the number of times per session where participants engaged in a social situation they found difficult, and the total duration of these. No differences across the three timepoints were shown regarding the number of these episodes or their total duration.

5.4 Study 3b: Rating Videos of Sudden Gain Therapy Sessions

The findings from Study 3a suggested that while sudden gains were preceded by reductions in negative social cognitions and self-focused attention, these reductions also occurred in the previous intersession interval. Although there was some evidence that a greater number of behavioural experiments were planned prior to gains in iCT, wider exploration of the pregain period is required to examine whether other factors may be systematically present or emphasised in pregain sessions relative to other sessions.

Viewing and rating therapy session videotapes is an approach used in some studies of sudden gains to examine factors including cognitive change (Norton et al., 2010; Tang & DeRubeis, 1999; Tang et al., 2005), therapists' application of techniques (Tang & DeRubeis, 1999), therapeutic alliance (Lutz et al., 2013; Tang & DeRubeis, 1999), and shifts in understanding and insight (Goodridge & Hardy, 2009). Study 3b used this methodology to further explore the content of pregain sessions, to see whether other factors might be implicated in the occurrence of sudden gains, beyond those examined in Study 3a.

As part of the planning phase of this study, the author viewed a sample of six pregain (n) CT-SAD sessions along with their corresponding pre-pregain (n-1) sessions as a control. Therapy notes were also reviewed, and the sessions were discussed with the therapists involved. The comparison of pregain and control sessions within this sample led to a hypothesis that pregain sessions may be

associated with a greater amount of generalised learning in the session relative to controls. Study 3b therefore sought to formally test this hypothesis.

5.5 Method

Following generation of the hypothesis as described above, an original coding manual was developed in a similar format to a manual used for coding mental defeat (see Ehlers et al., 1998). The manual operationalised the concept of generalised learning i.e. new learning arising from any therapy activity that goes beyond a single interaction, and involves drawing a more general conclusion that may apply to a range of different social contexts (see Appendix B). Generalised learning (e.g. client statements such as "*Even when I feel anxious I come across well.*") was contrasted with specific and/or situational learning, where a client's learning relates to a particular interaction or social situation (e.g. "*People were interested in what I was saying*."). Therapy tapes of pregain and control sessions were viewed by the author (a clinical psychologist), and the manual used to make four ratings for each session. The first two scales rated the extent to which therapists asked questions aiming to elicit generalised (e.g. "*What does this say about the idea that you are unlikeable?*") and specific and/or situational (e.g. "*How did the other people respond?*") learning, using a 0-2 scale, where 0 indicated no questions, 1 indicated a limited number of questions, and 2 indicated numerous questions designed to elicit that form of learning from the activities completed in the session. The remaining two scales rated the extent to which clients' statements demonstrated the two forms of learning. These used 0-6 scales, with 0, 2, 4, and 6 indicating 'no evidence', 'some but limited evidence',

'moderate evidence', and 'extensive evidence' of that form of learning, respectively. 0-6 scales were chosen given the more nuanced range of how client statements may indicate learning compared to the extent of therapists' questions.

To ensure blind ratings, the therapy tapes to be rated were selected and ordered by an independent research assistant as follows. Firstly, the pregain and control sessions for each client experiencing a gain (n=32) were identified. In five cases where participants had sudden gains in two consecutive sessions, the later session was not selected due to the absence of an appropriate control session, and in remaining cases where participants had more than one sudden gain, the largest gain was selected. Where a pregain session tape was not available (n=7), this session and the corresponding control session were not included in the analysis, and where a control session tape was not available (n=5), the previous session (n-2) was used as a replacement.

This resulted in 25 tape pairs, where one tape in the pair was a pregain session, and the other a control session. An additional 13 pairs of sessions from participants who never experienced a sudden gain were added as foils (i.e. a ratio of 2:1). These pairs therefore contained no pregain sessions. The session numbers of these foil pairs were selected to match the frequency of session numbers in the sudden gains group. Tape pairs were viewed together, with the order counterbalanced so that pregain tapes were viewed first 50% of the time. The order of tape pairs was randomised with respect to whether the client had experienced a sudden gain or not. To assess the reliability of the coding manual,

a second rater (a clinical psychologist) independently scored a sample of eight tape pairs (21%). These ratings showed ICC(2,1) values between 0.76 and 0.85 indicating excellent agreement (Cicchetti, 1994) across the four rating scales.

5.6 Results

Paired t-tests were conducted to compare pregain and control sessions among those participants who experienced a sudden gain. An alpha correction was not applied given the exploratory nature of this analysis. Results indicated that the ratings of clients' generalised learning were significantly higher for pregain sessions (M = 3.68, SD = 1.73) compared to control sessions (M = 2.76, SD = 1.59): $t(24) = -2.554$, $p = .017$, $d_{\text{Cohen}} = 0.51$. Ratings of clients' specific learning were not significantly different, $t(24) = -1.979$, $p = .059$, though the difference in means was comparable to the generalised learning scores (see Figure 17). The equivalent comparisons for the therapist rating scales were nonsignificant: therapists' generalised learning questions, $t(24) = .527$, $p = .603$; therapists' specific learning questions, $t(24) = -.296$, $p = .770$.

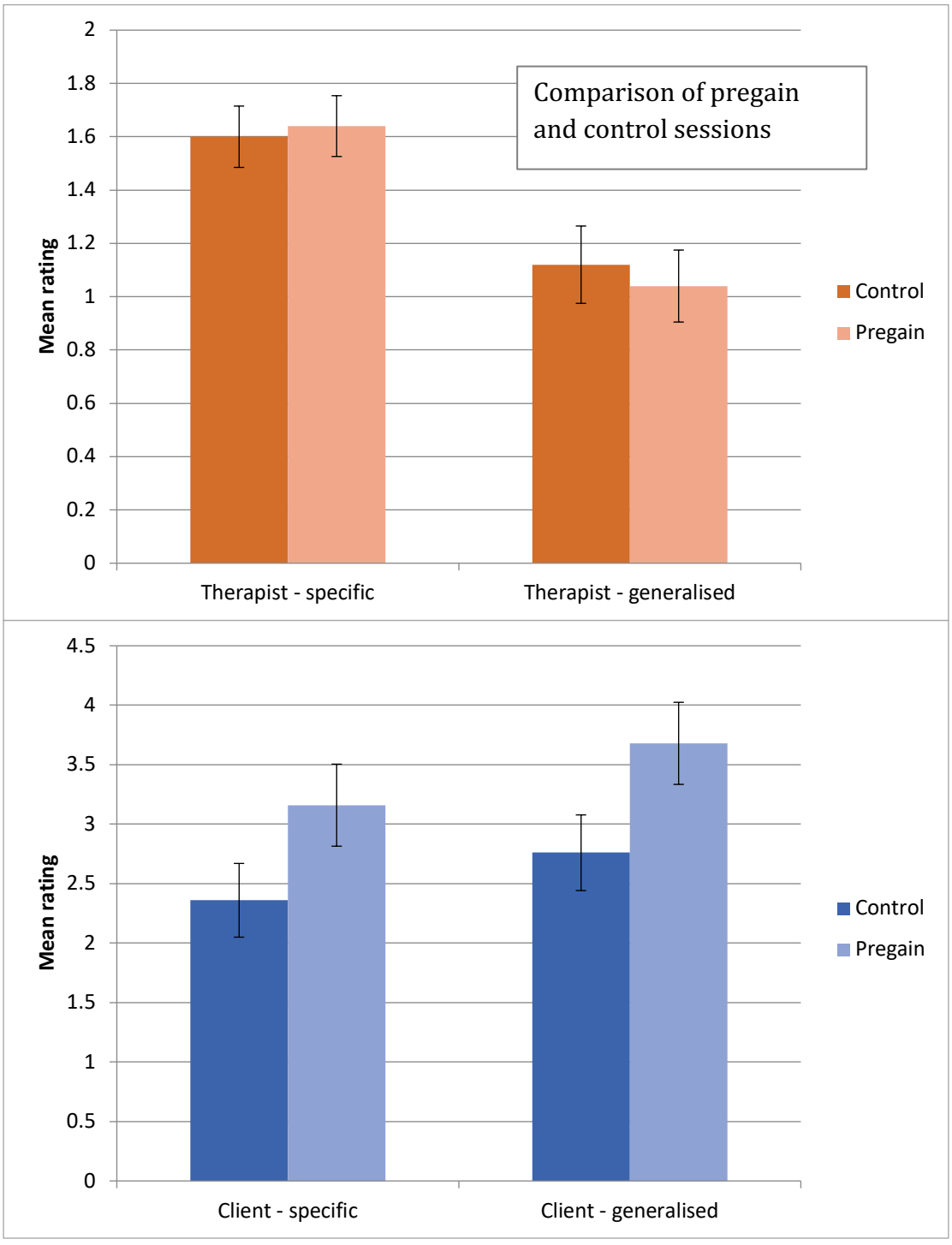


Figure 17

Mean ratings of the extent to which therapist questions aimed to elicit specific and generalised learning (top panel) and client statements reflected specific and generalised learning (bottom panel), across pregain and control sessions of those experiencing a sudden gain. Error bars represent +/-1SE.

To examine whether there were any systematic differences in the amount of learning between participants who did and did not experience a sudden gain, independent samples t-tests were used to compare the mean ratings for the control sessions of participants with a sudden gain, with the foil sessions of those without a sudden gain. No significant differences were found for any of the four rating scales: clients' generalised learning, $t(49) = -.976$, $p = .334$; clients' specific learning, $t(49) = -1.057$, $p = .296$; therapists' generalised learning questions, $t(49) = -.202$, $p = .841$; therapists' specific learning questions, $t(49) = -1.094$, $p = .279$ (see Figure 18).

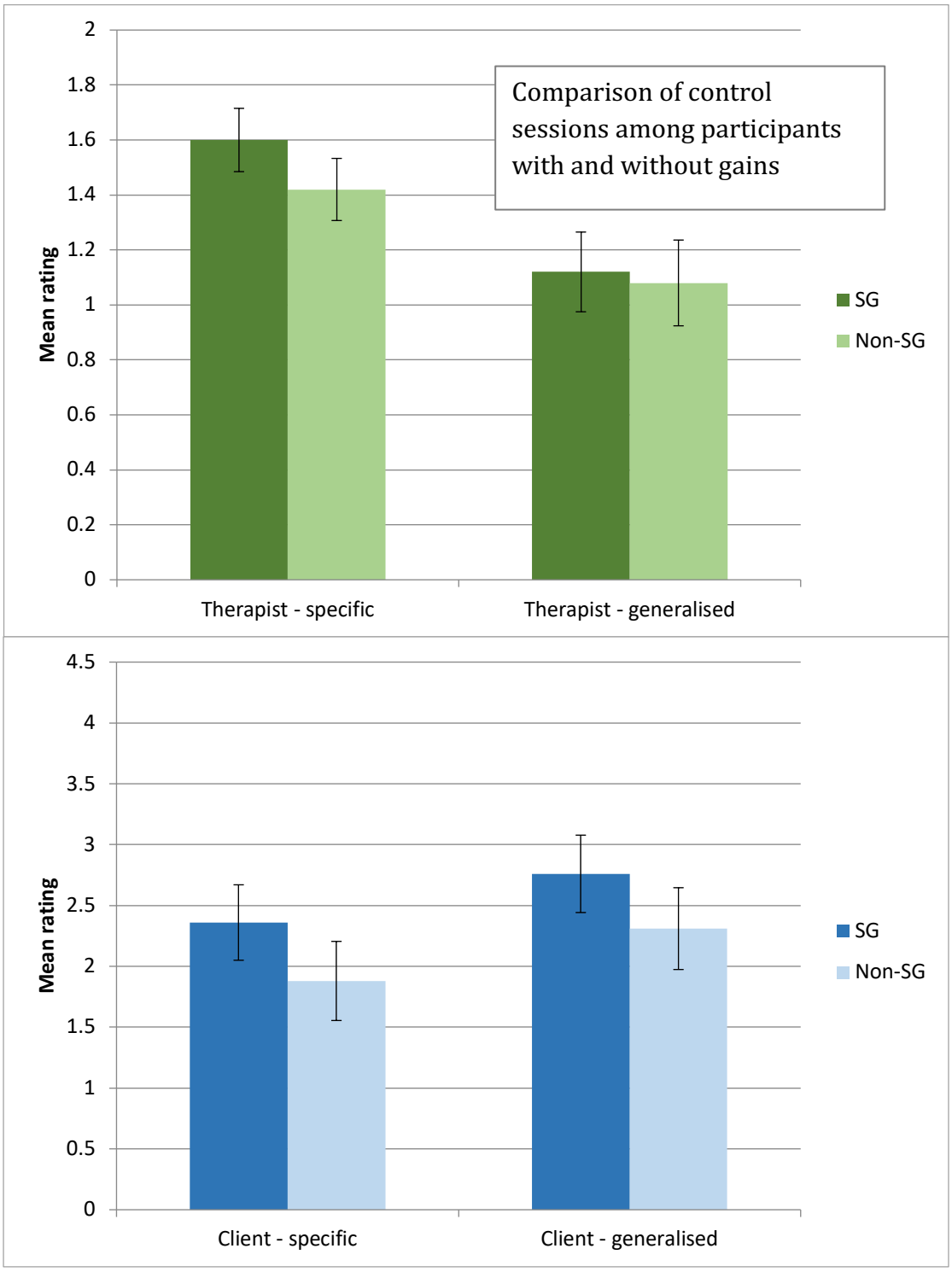


Figure 18

Mean ratings of the extent to which therapist questions aimed to elicit specific and generalised learning (top panel) and client statements reflected specific and generalised learning (bottom panel), across control sessions of participants experiencing a sudden gain (SG), and sessions of participants not experiencing a sudden gain (Non-SG). Error bars represent +/-1SE.

5.7 Study 3c: Rating Behavioural Experiment Record Sheets of Sudden Gain Therapy Sessions

Study 3b found that clients' idiosyncratic learning may be important in relation to sudden gains, with initial evidence indicating that the generalisation of this learning may be important. To explore this idea further, Study 3c sought to examine whether this effect is also demonstrated in participants' written work in therapy. Behavioural experiment record sheets are completed by participants both in and between CT-SAD sessions, and in iCT-SAD (see Figure 3 in section 2.2.5). As they contain a column specifically for participants to document their learning, Study 3c aimed to compare these written statements across pregain and control sessions.

5.8 Method

An addendum to the coding manual from Study 3b was written to operationalise the rating of clients' written statements such as those on behavioural experiment record sheets (see Appendix B). The concepts and definitions of specific and/or situational learning, and generalised learning remained identical, along with the rating scales.

5.8.1 CT Data

All behavioural experiment record sheets from pregain (n) and control (n-1) CT sessions were read by the author (a clinical psychologist), and the manual used to make ratings of client specific/situational learning, and client generalised

learning. To ensure blind ratings, the experiment sheets to be rated were selected and ordered by an independent research assistant similarly to Study 3b: Firstly, the pregain and control sessions for each client experiencing a gain (n=32) were identified as described in Study 3b. In five cases where participants had sudden gains in two consecutive sessions, the later session was not selected due to the absence of an appropriate control session, and in remaining cases where participants had more than one sudden gain, the largest gain was selected. Where a pregain session did not include any experiment sheets (n=12), this session and the corresponding control session were not included in the analysis. Where a control session did not include any experiment sheets (n=8), the previous session (n-2), and where necessary further previous sessions (n-3, n-4, etc.), were examined until a session containing an experiment sheet was found. If no experiment sheets were found to generate a suitable control, the pregain session was removed from the analysis (n=9). In cases where a participant had more than one sudden gain and the largest gain yielded no experiment sheets, the next largest gain was also examined, resulting in a further four participants being included in the analysis.

Data from 15 participants were therefore analysed (a total of 53 experiment sheets), which represented 47% of the participants in CT who had a sudden gain. Pregain and control experiment sheets were rated together, with the order counterbalanced so that pregain sheets were read first 50% of the time. The order of participants was randomised. As the total number of sheets per participant was variable (i.e. in some therapy sessions, multiple sheets are completed), the rater was therefore blind to the number of pregain or control

sheets per person. For sessions where more than one sheet was completed, the mean rating was taken. Interrater reliability was examined with a second rater (a clinical psychologist) independently scoring a sample of 14 sheets (26%). These ratings showed ICC(2,1) values of 0.81 for the specific/situational learning scale and 0.87 for the generalised learning scale, indicating excellent agreement between the raters (Cicchetti, 1994).

5.8.2 iCT Data

The online behavioural experiment logs for the 25 iCT participants who experienced a sudden gain were examined. Where participants had more than one sudden gain (n=9), the largest gain was selected. There were no participants with consecutive gain weeks. Pregain and control weeks were identified as described in Study 3b. Where a pregain week did not include any experiment sheets (n=6), this week and the corresponding control week were not included in the analysis. Where a control week did not include any experiment records (n=5), the previous week (n-2), and where necessary further previous weeks (n-3, n-4, etc.), were examined until a week containing an experiment record was found. If no experiment records were found to generate a suitable control, the pregain week was removed from the analysis (n=4). In cases where a participant had more than one sudden gain and the largest gain yielded no experiment records, the next largest gain was also examined resulting in one further participant being included in the analysis. Data from 16 participants were therefore analysed (a total of 107 experiment sheets), which represented 64% of the participants in iCT who had a sudden gain. Analysis followed the same procedure as the CT experiment sheets. The greater number of records in iCT

compared to CT was likely due to poorer retention of sheets in CT, given these may be kept by the participant, and not always copied into the session notes.

5.9 Results

A repeated measures ANOVA was performed, with the rating of generalised learning as the dependent variable, time period (Control vs. Pregain) as a within-subjects factor, and condition (CT vs. iCT) as a between-subjects factor. The main effect of time period, $F(1, 29) = .002$, $p=.962$, partial $\eta^2 = .000$, condition, $F(1, 29) = 1.55$, $p=.224$, partial $\eta^2 = .051$, and the time by condition interaction were nonsignificant, $F(1, 29) = .257$, $p=.616$, partial $\eta^2 = .009$. The same pattern of findings was shown when ratings of specific learning were examined as the dependent variable: main effect of time period, $F(1, 29) = .128$, $p=.723$, partial $\eta^2 = .004$; main effect of condition, $F(1, 29) = .455$, $p=.505$, partial $\eta^2 = .015$; time by condition interaction, $F(1, 29) = 2.14$, $p=.154$, partial $\eta^2 = .069$ (see Figure 19). These results indicate that the effect found in Study 3b based on the analysis of videotapes was not observed within the present sample of participants' written behavioural experiment records.

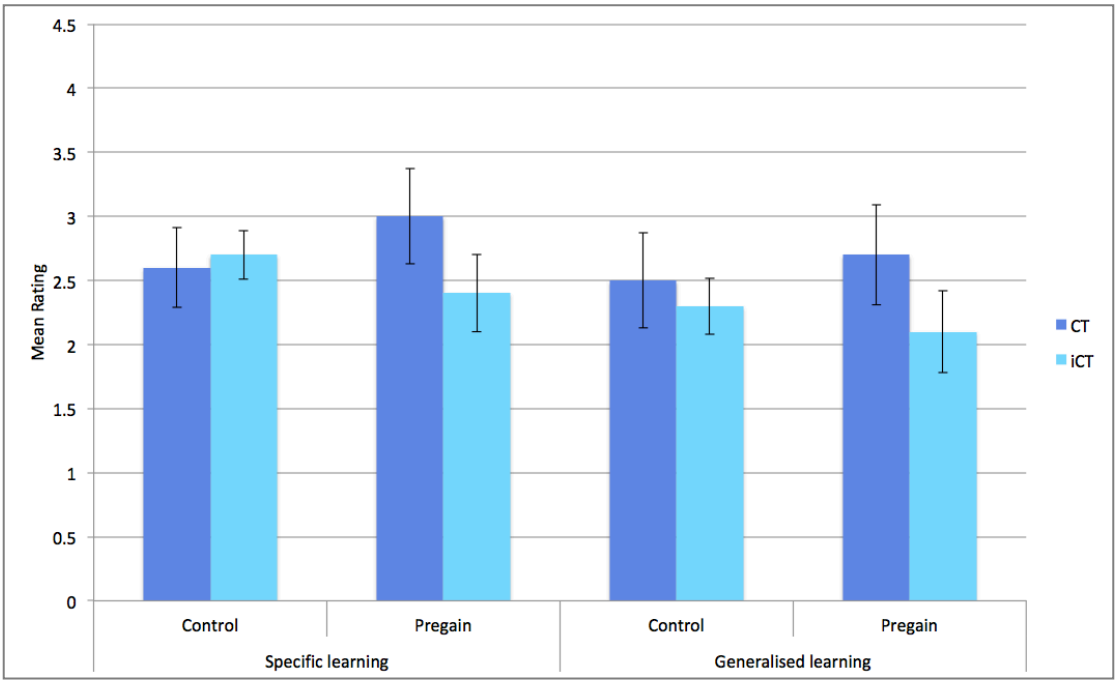


Figure 19

Mean ratings of the extent to which clients' written statements on behavioural record sheets reflected specific and generalised learning, across pregain and control sessions of those experiencing a sudden gain, in CT and iCT. Error bars represent +/-1SE.
CT = Cognitive Therapy; iCT = Internet-based Cognitive Therapy.

5.10 Discussion

Three studies were conducted to examine the occurrence of sudden gains in CT-SAD and iCT-SAD, aiming to explore whether there were differences between the two treatment formats, whether gains predicted clinical outcomes, how process measures changed around the period of the gain, and whether specific therapy content might be associated with their occurrence.

5.10.1 Presence and Frequency of Sudden Gains in CT and iCT

The present findings have shown that sudden gains were found in both the CT and iCT conditions. The frequencies of sudden gains observed (64% and 51% respectively) were larger than most of the studies included in the metaanalysis by Aderka and colleagues (2012)(range 17-52%), and markedly higher than the frequencies reported in the other three studies of sudden gains in SAD (Bohn et al., 2013; Hofmann et al., 2006; Thorisdottir et al., 2018)(22%, 19%, and 22% respectively). While this could be due to small differences in the criteria used to identify gains, this is unlikely to be the case given the present study used a cutoff of 11.6 points on the LSAS for the first sudden gain criterion (absolute magnitude), which is marginally more conservative than the 10-point cutoff used in the only previous study involving the LSAS (Hofmann et al., 2006). It is noted that the trial that the present participants took part in found very large effect sizes for both CT and iCT (Clark, Wild, et al., in preparation). This high efficacy may have led to, and/or resulted from, a greater number of sudden gains within the present sample.

The presence of sudden gains within iCT condition demonstrates these large symptom improvements can occur within online therapies, consistent with the findings of Hedman and colleagues (2014). This is the first study to compare sudden gains between equivalent face-to-face and internet-based treatments, and it is notable that in all analyses no differences between the two treatment formats were found. Results suggest that online sudden gains are comparable in frequency, magnitude, and clinical significance to those experienced in the face-to-face CT treatment. This suggests that the therapy content and its implementation appears to play a more significant role in determining participants' trajectories of change, compared to the medium through which the therapy is delivered.

5.10.2 Relationship Between Sudden Gains and Treatment Outcome

Consistent with the broader sudden gains literature, the presence of a sudden gain during therapy was associated with lower social anxiety scores at posttreatment, in both CT and iCT. Given that the baseline LSAS scores of participants who had a sudden gain did not differ from those without a sudden gain, the results support the view that sudden gains represent a meaningful and clinically significant shift, rather than anomalies of measurement. The association between having a sudden gain and improved outcome was maintained across the three-month and twelve-month follow-up assessments for both CT and iCT, similar to the results reported by Bohn and colleagues (2013). The presence of a sudden gain during treatment was not associated with improved stability of scores during the booster period, though the overall

number of participants showing deterioration in scores was low meaning limited variability in the outcome variable.

5.10.3 Comparison of Those With and Without Sudden Gains

This analysis compared the average trajectories of clinical improvement between those who did and did not experience a sudden gain. The findings suggested than when the sudden gain interval was removed, there was no evidence that the average reduction in scores from one session to the next differed between participants who did and did not experience sudden gains. This, coupled with the fact that nongainers did experience reductions in scores greater than the criterion one cutoff score (11.6), suggested that on average, the sudden gains found were less likely to be the result of random fluctuation away from an overall steeper gradient of improvement (see Thomas & Persons, 2013), and more likely to reflect a clinically meaningful change within therapy. This does not rule out the possibility that some individuals who had steeper gradients than average, experienced sudden gains that might be considered 'false positives'.

5.10.4 Changes on Process Measures Around the Gain

Analysis of scores on a measure of negative social cognitions demonstrated evidence for cognitive change both prior to and during sudden gains, and reflected a reduction in the frequency of negative social cognitions, and in the strength of belief in those cognitions, as measured by the SCQ. This is the first study of sudden gains in SAD to find evidence for cognitive change prior to gains, though the extent to which this change plays a causal role in the occurrence of

sudden gains is difficult to determine. The present analyses indicated that the cognitive change observed prior to the gain was not significantly larger than the change across the previous intersession interval (n-2 to n-1). While this could be explained via a cumulative effect, where cognitive change across both intervals builds up to result in the sudden gain, inspection of the graphs (Figure 16) suggests that the degree of cognitive change across consecutive sessions was relatively constant. This would suggest a more likely explanation is that negative social cognitions were decreasing steadily across the whole therapy period for most participants, and so while this was observed prior to gains, the amount of overall cognitive change here did not appear to be particularly exaggerated compared to other points in therapy. It is, however, possible that particular types of cognitive change, or other aspects of cognition not captured by the SCQ, may show closer associations to sudden gains, meaning a causal relationship between cognitive change and sudden gains cannot yet be ruled out. Standardised measures of cognitions such as the SCQ may not be sufficiently subtle to detect such an association.

Similarly, self-focused attention showed a significant reduction both prior to, and concurrently with, the sudden gain, but the prior change was not significantly larger than the previous intersession interval. It is possible that as self-focused attention was measured using two single-item 0-8 Likert scales from the SPWSS, the range of possible responses at each measurement point was not sufficiently nuanced to pick up more subtle changes in self-focused attention over time. The development of a scale to measure self-focused attention more comprehensively would be of benefit to assessing this more closely in future studies. Depressed

mood, as measured by the PHQ, showed a significant improvement simultaneously with the gain, but there was no evidence of preceding change, suggesting that sudden gains did not seem a consequence of prior improvements in mood.

5.10.5 Content of Pregain Sessions/Weeks

The content of pregain sessions/weeks was examined for the presence of therapeutic techniques, components, or processes that occurred reliably and more frequently relative to control sessions. There was evidence that a greater number of behavioural experiments were planned prior to sudden gains in iCT suggesting a possible association with the occurrence of gains. This is consistent with the view that behavioural experiments are a particularly powerful component of treatment. Additionally, the data suggested that working on the blueprint module in iCT might be associated with late sudden gains, though the frequencies were too small to permit post-hoc analysis. The therapy blueprint asks participants to reflect on their individual learning across therapy and how to take this forward. It therefore has parallels with the more idiosyncratic measures of learning examined in Studies 3b and 3c, and would merit further examination in a future study of iCT. No other consistent patterns of specific therapy content or techniques were observed more frequently in pregain sessions relative to control sessions.

The results from the videotape ratings in Study 3b showed that pregain sessions were associated with a greater degree of client generalised learning relative to matched control sessions. This was consistent with the study hypothesis, and

suggests an association between client generalised learning and the subsequent occurrence of a sudden gain. While the data did suggest the amount of specific learning was greater in pregain sessions compared to control sessions, the difference was nonsignificant. One interpretation is therefore that the generalisation is of particular importance, rather than the overall amount of learning. The amount of both types of learning did not differ between the control sessions of participants who had a sudden gain, and the sessions of those who did not have a sudden gain, which supports this view. It is conceptually plausible that in order for learning from an individual experiment, conversation, or activity in therapy to result in clinical improvement, it must become generalised so as to be applicable to other social situations, or to the client's self-perception more globally.

Taken in the context of the findings from Study 3a, the finding regarding generalised learning may suggest that although the overall extent of cognitive change was not larger in the pregain period compared to other timepoints, it could be the type of cognitive change that is of greater importance. A possible mechanism would be that the pregain (n) session facilitates new learning and/or consolidates previous learning of a more idiosyncratic nature that may not be fully captured by standardised measures. Session n would lead to the point where the client views this learning as generalisable, and this is then implemented and practised over the following week, leading to large symptom change at the postgain (n+1) assessment.

The processes of learning, and application of new knowledge to daily life are underresearched within therapy contexts. Work from educational psychology suggests that 'knowledge transfer' depends on noticing that the current situation is similar to one you have learned about previously, but that failing to recognise this similarity is extremely common (Day & Goldstone, 2012). Suggestions have been made to improve people's memory for therapy sessions (Harvey et al., 2014), and some initial benefits in outcome shown (Harvey et al., 2016), but to date, only one study has examined the impact of generalised learning on therapeutic outcomes (Gumport, Williams, & Harvey, 2015). This study showed that generalising, but not simply thinking about, nor applying the learning, was associated with improved outcomes one week later in CBT for depression. This form of learning therefore appears to show quite specific effects, and represents a promising line of research with the potential to enhance treatment outcomes.

An important clinical question to consider is therefore whether and how it might be possible to facilitate more generalised learning within therapy. Results indicated that the trial therapists were generally consistent across all sessions in how many questions they asked to elicit specific and generalised learning. This implies that the clinical improvement may be more influenced by the client's perception of how generalisable the learning is, than by the number or type of questions the therapist asks about it. However, it could be hypothesised that therapists placing a greater emphasis on questions designed to elicit more generalised learning (e.g. What does this say about you as a person? How do others respond to you generally? Do you think this might apply in other

situations?) may facilitate clients considering this, thus leading to greater therapeutic gains, and it would be important to examine this in future studies.

Study 3c aimed to examine whether the difference in generalised learning would also be observable within the behavioural experiment record sheets written by participants in CT and iCT. No differences were found in specific or generalised learning based on participants' written statements. There could be a number of reasons for this: 1) People may vary in the level to which they use sheets in therapy, and the detail they include. Sheet content was generally in the form of brief summaries, so these may not fully capture everything someone is taking away from an experiment; 2) The rater is required to make a judgement based on much less information compared to videotapes, meaning that scores may be less nuanced; 3) Experiment sheets tend not to be introduced until session 4 or 5 in CT, and around week 3 in iCT, so learning from the early part of therapy is not captured; 4) Therapists sometimes demonstrate and/or complete the experiment sheets if the participant needs support with this, meaning they have a stronger influence over what gets written. It could be that the participant has doubts but feels less able to disagree with the therapist; 5) As mean ratings were taken when there were multiple sheets for a given session, there may be an issue with regression to the mean, which may mask differences if they exist; 6) the limited number of experiment sheets, particularly in CT, meant that only around half of those with sudden gains could be included in the analysis, meaning reduced power.

5.10.6 Limitations

The following limitations should be considered in the interpretation of Studies 3a to 3c. First, as highlighted in Chapter 2, the standard criteria for the identification of sudden gains are open to criticism, in that they were somewhat arbitrary when first developed. Concerns have been raised about the likelihood of 'false positive' sudden gains and thus their clinical significance, and although the present findings suggest this is perhaps unlikely, it remains possible that some of the gains found in this sample occurred by chance variation. However, in the interest of consistency and comparability with other studies, we have retained the original criteria.

Second, as the weekly questionnaire measures were completed immediately prior to each CT therapy session, it is not possible to distinguish gains that occurred within a session from those that occurred during the rest of the week leading up to the next session. Repeated measurement before and after face-to-face therapy sessions may help to explore within-session changes more directly, though may be impractical within some study designs.

Third, seeking to understand the factors that lead to sudden gains is an important aim, but findings can be limited by issues of 'backward prediction' (Idan Aderka, personal communication). It is necessary to start by identifying the outcome (i.e. the sudden gain), and then working backwards to examine possible predictors. While a reliable predictor may be found this way, it may not be reliable when examined chronologically, that is whether changes in this predictor across the whole of therapy are always followed by sudden gains. As

such the present findings regarding generalised learning require prospective evaluation in future studies.

Lastly, the coding manual used in Studies 3b and 3c (see Appendix B) to evaluate generalised and specific/situational learning was developed specifically for this study, therefore has yet to be externally validated.

5.10.7 Conclusions

These studies have shown that sudden gains can occur in online therapies, and that these gains are similar in frequency, magnitude, and clinical significance to those seen in face-to-face CT. Sudden gains were common in both CT and iCT, and were more frequent compared to other studies of sudden gains in social anxiety. Having a sudden gain predicted better overall therapy outcomes. The results provided evidence of cognitive change prior to sudden gains, though not more so than the previous intersession interval, meaning the evidence for a causal link between the two is less clear. In iCT-SAD, planning behavioural experiments and working on the blueprint module showed evidence of an association with sudden gains. In CT-SAD, clients' statements in therapy indicated greater generalised learning in pregain compared to control sessions, suggesting an association between generalised learning and the occurrence of sudden gains. Taken together, the results support the view that sudden gains reflect clinically meaningful events in therapy, that the online therapy format does not diminish their likelihood, and that further investigation is warranted into how learning from therapy generalises and how this may influence outcome.

Clinically, the findings may have implications regarding the emphasis of different treatment components in these interventions (see Chapter 8).

6

iCT-SAD Therapist Training and Pilot Case Series in Hong Kong

6.1 Study 4: Delivery and Evaluation of iCT-SAD Therapist Training

Chapter 2 raised the point that one of the key steps in the successful dissemination of evidence-based psychological therapies is ensuring that the therapists delivering them are sufficiently trained. It has been suggested that one of the factors contributing to the 'dissemination gap' between research findings and clinical practice is a lack of understanding in how best to train therapists to deliver such interventions, and how to reliably assess competence (Shafran et al., 2009).

As internet interventions are still relatively new, many therapists will not yet have used them. Developing and evaluating training approaches in the delivery of online interventions is therefore particularly important, to help therapists develop their skills and confidence working online. Research into therapist competence and the effectiveness of therapist training programmes and methods is rare (Rakovshik & McManus, 2010). Some authors have suggested a need for multiple methods to examine both therapists' knowledge of a treatment, and their skills in applying this (Fairburn & Cooper, 2011), in order to evaluate

overall competence. In SAD, competence measures such as the Cognitive Therapy Competence Scale for Social Phobia (CTCS-SP; Clark et al., 2007; von Consbruch et al., 2012) have shown good psychometric properties, but equivalent tools to evaluate competence in delivering internet interventions have not yet been developed. Evaluating patient outcomes may provide an additional source of information regarding therapist competence given there is evidence that competence and outcome show an association (Brown et al., 2013; Ginzburg et al., 2012; Huppert et al., 2001; Kuyken & Tsivrikos, 2009; Trepka et al., 2004).

Chapter 2 also highlighted the need to examine whether internet interventions can be disseminated internationally, by analyzing whether they are feasible and efficacious in new cultural settings. To date, the extent of research on this is limited, and while the results are promising, a greater range of interventions and settings need studying to determine if such findings are generalisable.

This chapter describes the development and evaluation of a training procedure for qualified therapists learning the iCT-SAD programme. Evaluation used a combination of self-report methods, objective assessment, and patient outcomes. The training was implemented with three therapists from Hong Kong in preparation for their delivery of the treatment in a randomised controlled trial. This work therefore also provided an initial test of the feasibility and preliminary efficacy of iCT-SAD in a new cultural context. The principal research questions were:

- Is the programme of therapist training effective at improving therapists' skills and knowledge in delivering iCT-SAD?

- Is it feasible and acceptable for English-speaking patients with SAD in Hong Kong to undertake iCT-SAD?
- How effective is iCT-SAD among a pilot case series?
- What practical or cultural adaptations might be required prior to starting a randomised controlled trial?

6.2 Method

6.2.1 Therapist Training Procedure

The training consisted of three phases, outlined below:

6.2.1.1 Phase 1: Initial face-to-face cases under supervision.

As iCT-SAD is a direct adaptation of the face-to-face CT protocol, it is important that therapists are familiar with CT before learning iCT. This permits a greater understanding of the key points the online modules are aiming to convey.

Training for the present study therefore started with three Hong Kong therapists undertaking a phase of face-to-face CT-SAD. The therapists had been qualified as clinical psychologists for an average of 10.3 years. All spoke English as an additional language. While they were experienced in delivering cognitive-behavioural interventions for anxiety, including SAD, and two had previously attended a CT-SAD workshop with Professor David M Clark, none had used the full CT protocol previously. Therapists were sent the most recent version of the treatment manual (Leigh & Clark, 2016), which explains the CT-SAD protocol as applied to adults, as well as how treatment is adapted for adolescents. The three

therapists then implemented the treatment with a total of five cases between January and May 2017, with weekly group supervision from the author via Skype, which focused on learning and implementing the treatment protocol.

6.2.1.2 Phase 2: iCT-SAD training.

The second phase consisted of training in the iCT-SAD programme and treatment protocol. The iCT-SAD training was developed by the author specifically for this study. The content was informed by the results of interviews with the three iCT-SAD trial therapists from the recent UK trial (Clark, Wild, et al., in preparation), the author's own experience of learning and delivering iCT-SAD, and broader discussions within the team. The study team from Hong Kong visited Oxford for two weeks to undertake this training, with the training content totalling 7.5 days. The training was delivered by the author, with some sessions co-facilitated by Professor David M Clark and Dr Jennifer Wild. Each therapist was registered with an account on the iCT-SAD site, together with a 'test patient' account to allow them to view the site content from the patient perspective, and to practise using the site within the training sessions. The training was divided into the following sections:

Site navigation and functionality. Learning to navigate the site and use the site functions, such as releasing treatment modules, sending messages, and using the resource library.

Structure and timings. Learning how the iCT-SAD treatment protocol is implemented over the treatment period e.g. when each core module is released, and when to schedule phonecalls.

Module content. The majority of the training focused on reviewing the content and general aims of each module, to help the therapists know how to review and discuss modules with patients.

Therapist communication. Effective use of the iCT-SAD communication methods (messaging, SMS, phonecalls) were demonstrated, and practised by the therapists using role-play.

Implementing key techniques. As some of the key therapy techniques from CT, such as developing an individualised model, and the self-focused attention and safety behaviours experiment, are implemented slightly differently online, time was allocated to review and practise these specifically.

Behavioural experiments. The training included experiential practice of planning and completing behavioural experiments in real social situations. The aim was to support the therapists to generate ideas for appropriate experiments, and to provide them with first-hand experience to draw on when discussing experiments in iCT-SAD.

The role of the therapist in iCT-SAD. Training focused on understanding the role of the therapist in iCT-SAD as guide/facilitator and how this differs from face-to-face work.

Troubleshooting. Common problems, such as patients not logging into the site, low motivation, or avoidance of behavioural experiments, were discussed and possible solutions reviewed.

6.2.1.3 Phase 3: iCT-SAD pilot cases under supervision.

Phase 3 consisted of piloting the iCT-SAD treatment with a small number of cases under weekly group clinical supervision from the author via Skype. Each therapist treated two clients from a local clinical service in Hong Kong using the programme. Supervision focused on reinforcing learning from Phase 2, adherence to the treatment protocol, and further development of skills.

6.2.2 Training Evaluation

The training was evaluated using the following four methods:

6.2.2.1 Cognitive Therapy Competence Scale for Social Phobia.

The Cognitive Therapy Competence Scale for Social Phobia (CTCS-SP; Clark et al., 2007; von Consbruch et al., 2012) is a disorder-specific adaptation of the general Cognitive Therapy Scale – Revised (CTS-R; Blackburn et al., 2001), allowing the assessor to rate skills and techniques specific to the CT-SAD treatment protocol. The CTCS-SP contains 15 skill areas, each rated on a 0-6 scale, with higher scores indicating greater competence. A mean score of three (i.e. 50%) is considered the threshold to demonstrate competence in delivering the treatment, and a mean score of four (67%) would indicate competence appropriate for a randomised controlled trial (Clark, 2002). During Phase 1 (face-to-face CT training), the author rated one complete session from each therapist using a video of the session (in Cantonese) together with an English transcript of the conversation. Sessions were chosen by each therapist, but could not include first or last sessions, and were required to include at least one behavioural experiment.

Feedback from these assessments was provided in a subsequent supervision session.

6.2.2.2 Self-evaluation assessment.

This self-report assessment was developed specifically for this study. It asks respondents to rate their own knowledge and skills in relation to 34 internet therapy components and activities, including those applicable to most online interventions (e.g. "Developing and maintaining client engagement with the online programme"), and those more specific to iCT-SAD (e.g. "Suggesting strategies to overcome problems clients may experience with video feedback"). An initial item pool was generated through interviews with three UK iCT-SAD trial therapists and their supervisor, which was then reviewed and refined in consultation with these experts to ensure face validity. Respondents provide one rating for knowledge, i.e. how much they know about the item, and one for skills, i.e. how well they think they can currently implement it. Ratings are given on 0-8 Likert scales, where 0, 2, 4, 6, and 8 represent 'no', 'limited', 'some', 'good', and 'extensive' knowledge or skills, respectively. Scores for each subscale therefore range from 0-272 (see Appendix D). The therapists completed the assessment following each phase of training.

6.2.2.3 Skills assessment.

To obtain a more objective assessment of what the therapists had learned following Phase 2, an original skills assessment was developed, and completed by the therapists at this timepoint. This assessment consisted of brief

information about series of fictional patients undertaking iCT-SAD. For each, an extract of some completed work on the site is shown, and the respondent is asked questions about what the patient has written, and how they would proceed with the treatment. For example, questions might ask how they would help a patient to improve their individualised cognitive model, or to write a response to a message where the patient reports a drop in mood (see Table 22 for a list of the skills assessed, and Appendix E for the full assessment). Items were generated following the same iterative process of consultation with iCT-SAD experts as used for the self-evaluation assessment.

Respondents' answers are scored in relation to set of exemplar responses compiled by the author in collaboration with iCT-SAD trial therapists and other team members with experience of delivering the programme. Exemplar responses were divided into distinct components, with a point awarded for each one mentioned by the respondent. The maximum score was 55.

6.2.2.4 Patient outcomes.

The final method to evaluate the training effectiveness was to examine the outcomes of pilot patients being treated by the therapists using the programme. This work also provided an initial test of the iCT-SAD programme in Hong Kong, examining its feasibility, acceptability, and technical functioning, whilst also offering a tentative indication of efficacy and cultural applicability.

6.2.3 Pilot Case Series Participants

A cohort of six patients (three female, mean age 31.3, age range 18-49) was recruited from the New Life Psychiatric Rehabilitation Service, Hong Kong. The cohort represented a consecutive series of referrals for probable social anxiety. All met DSM-IV criteria for SAD, which was confirmed at assessment using the Anxiety Disorders Interview Schedule for DSM-IV (Brown, Barlow, & DiNardo, 1994). Four showed generalised social anxiety, while two experienced anxiety in a more restricted range of situations. The mean duration of social anxiety was 7.5 years (SD = 8.8). Comorbidities were assessed using the Structured Clinical Interview for DSM-5 (First, Williams, Karg, & Spitzer, 2015). While SAD was the primary diagnosis for all six patients, one met criteria for comorbid Generalised Anxiety Disorder (GAD), one for comorbid major depressive disorder, and one met criteria for comorbid GAD, Other specified Depressive Disorder, Panic Disorder, Agoraphobia, Specific Phobia, and Separation Anxiety. The remaining three only met criteria for SAD. Assessments were conducted by a trainee clinical psychologist under supervision. All patients were Chinese residents of Hong Kong, with nonnative but sufficient proficiency in English to undertake the treatment in its original language. All were in full-time employment or study. Two were married/cohabiting, and four were single.

6.2.4 Procedure

The iCT-SAD intervention was delivered in English according to the protocol, as described in Chapter 2. At the end of treatment, each patient was invited to complete a brief online survey about their experience of treatment and their suggestions for how it could be improved. Respondents were not asked to give

their name, and completed the survey outside of the treatment website meaning the therapists could not see their responses.

6.2.5 Measures

The primary outcome measure was the self-report version of the Liebowitz Social Anxiety Scale (LSAS; Baker et al., 2002)(see Chapter 3 for description). Secondary outcome measures were as follows (see also Appendix A):

Social Anxiety:

- Social Phobia Weekly Summary Scale (SPWSS; Clark, 1995) (see Chapter 3 for description).
- Social Phobia Inventory (SPIN; Connor et al., 2000) (see Chapter 4 for description).
- Fear of Negative Evaluation Scale (FNE; Watson & Friend, 1969). This is a 30-item measure of the anxiety related to the prospect of being judged negatively by others. Respondents indicate whether each statement is true or false. Higher scores indicate greater social anxiety, and the maximum score is 30.
- Social Phobia Scale (SPS) and Social Interaction Anxiety Scale (SIAS; Mattick & Clarke, 1998). These two scales outline a range of concerns and anxious responses in different social situations and interactions, with respondents rating the degree to which each is characteristic or true of them, using a 0 (not at all) to 4 (extremely) scale. Each scale contains 20 items and has a maximum score of 80.

Social Anxiety Process Measures:

- Social Cognitions Questionnaire (SCQ; Clark, 1995) (see Chapter 3 for description).
- Social Behaviour Questionnaire (SBQ; Clark, 1995). This measure lists 29 safety behaviours commonly used among those with social anxiety. Respondents indicate the frequency of their use of each strategy prior to or in social situations, as 'never', 'sometimes', 'often', or 'always'. Responses are scored from 0-3 respectively, meaning higher scores indicate greater use of safety behaviours (maximum score 87).
- Social Attitudes Questionnaire (SAQ; Clark, 1995). This scale lists a range of beliefs common to social anxiety (e.g. 'If someone doesn't like me it is my fault'), which the respondent rates as "Totally agree", "Agree very much", "Agree slightly", "Neutral", "Disagree slightly", "Disagree very much", or "Totally disagree". Responses are scored from 1-7, with higher scores allocated to greater endorsement of beliefs considered unhelpful in the maintenance of social anxiety. The scale contains 41 items, plus nine reverse-scored items that are not included in the total score (range is therefore 41-287).
- Social Participation (Alden & Taylor, 2011). A 13-item scale asking respondents to indicate how often they participated in different social situations during the past month, from 1 (not at all), through 4 (occasionally), to 7 (often). The maximum score is 91, with higher scores indicating greater social participation.
- Social Satisfaction (Alden & Taylor, 2011) A 5-item scale asking respondents to indicate how satisfied they felt in their relationships with

different types of people (e.g. acquaintances, friends etc.), from 1 (not at all satisfied), through 4 (somewhat satisfied), to 7 (very satisfied). The maximum score is 35, with higher scores indicating greater social satisfaction.

General Mood and Functioning Measures:

- Patient Health Questionnaire – 9-item version (PHQ; Kroencke et al., 2001) (see Chapter 3 for description).
- Generalised Anxiety Disorder Questionnaire – 7-item version (GAD; Spitzer et al., 2006). This is a commonly used and well-validated measure of anxiety severity. Each of the seven items is rated on a 0-3 scale with respect to the last two weeks. Total scores therefore range from 0-21, with scores 5-9, 10-14, and 15 or greater indicating mild, moderate, and severe anxiety, respectively.
- Work and Social Adjustment Scale (WSAS; Mundt et al., 2002). This five-item scale assesses the degree of functional impairment due to a particular problem (specified in the present study as social anxiety), and shows good psychometric properties. The response scale for each item ranges from 0 (not at all impaired) to 8 (very severely impaired). The PHQ, GAD, and WSAS form part of the IAPT minimum dataset (Clark, 2018).

6.2.6 Analysis of Clinical Data

Mean scores on each measure at pretreatment, posttreatment, and three-month follow-up were examined. Given the small sample size, these were evaluated

using effect size estimates and 95% confidence intervals rather than significance tests. Additionally, the reliability of each patient's change in scores was examined using the response and remission criteria outlined below. Effect sizes (d_{Cohen}) were calculated using the pooled standard deviation as the denominator, with interpretation following the rules of thumb outlined by Cohen (1988), with effect sizes of 0.2, 0.5, and 0.8 indicating small, medium, and large effects, respectively.

6.2.7 Response and Remission Criteria

For classifying patients as treatment responders and/or remitted social anxiety, we used the criteria described in Stott and colleagues' (2013) original iCT-SAD case series, which use both the reliable change formulae described in Jacobson and Truax (1991) and normative data from Fresco and colleagues (2001). Response to treatment was defined as an improvement greater than 31% on the LSAS between pretreatment and posttreatment. Remission was defined as a drop of at least 12 points on the LSAS between pretreatment and posttreatment, combined with a posttreatment score at or below the clinical threshold of 38 points.

We also examined reliable improvement and reliable recovery from social anxiety using the IAPT criteria, which consider change on both anxiety disorder-specific (SPIN), and depressed mood (PHQ) measures (National Collaborating Centre for Mental Health, 2018). Reliable improvement was defined as a decrease of 10 or more points on the SPIN, and/or 6 or more points on the PHQ, and no reliable deterioration (increases of 10 or more, or 6 or more,

respectively) on either measure. Reliable recovery was defined as reliable improvement combined with scores on both measures below the clinical threshold, i.e. a SPIN score of 18 or below, and a PHQ score of 9 or below.

6.3 Results

6.3.1 Cognitive Therapy Competence Scale for Social Phobia

Mean CTCS-SP scores across the 15 face-to-face CT skill areas were 3.9, 3.9, and 4.0 across the three therapists. These scores indicated that all three therapists achieved a level of competence in the delivery of the face-to-face treatment that would be expected of a high-intensity IAPT therapist (mean score > 3), and were close to that expected of a therapist in a clinical trial (mean score of at least 4).

6.3.2 Self-evaluation Assessment

Therapists' self-reported knowledge and skills ratings across the three timepoints are shown in Figure 20. This figure shows that at baseline, where therapists had been trained in the face-to-face CT protocol but not iCT, self-reported iCT knowledge and skills ratings were low. These mean scores increased following iCT training in Phase 2, and further increased following completion of pilot iCT cases under supervision in Phase 3.

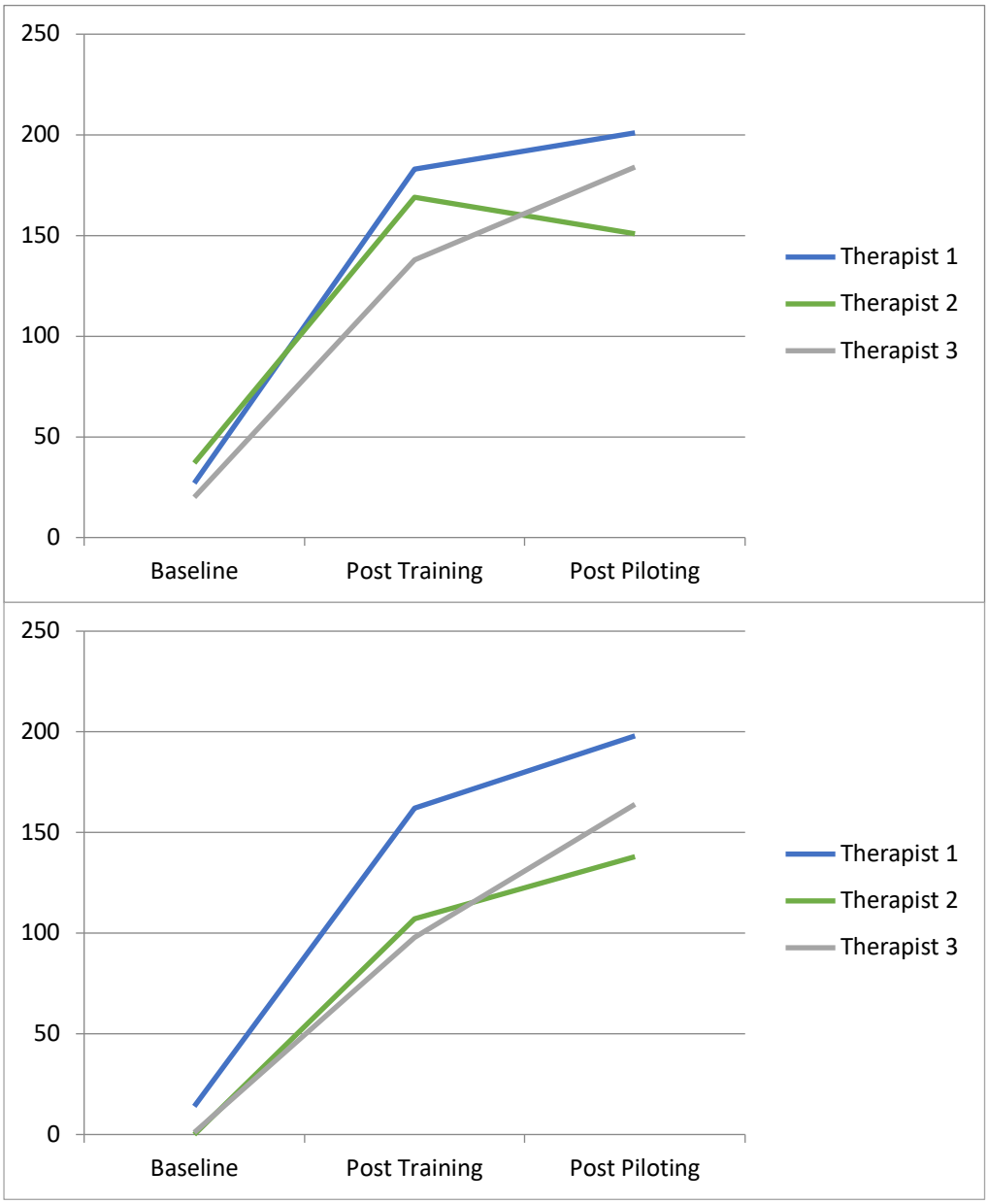


Figure 20

Therapists' self-reported iCT-SAD knowledge (top panel) and skills (bottom panel) ratings following each phase of training.

6.3.3 Skills Assessment

The three therapists' scores on the different components of the skills assessment are shown in Table 22. As this is an original instrument there are no established competency cutoffs, so results were examined in comparison to the thresholds used in the most widely-used competency measure, the Cognitive Therapy Scale

Revised (CTS-R; Blackburn et al., 2001). This scale is comprised of 12 skills, each of which is rated on a 0-6 Likert scale, with higher scores indicating greater competence. A score of 36 (50%) is suggested in the manual as a minimum competence standard. For therapists in randomised controlled trials, a higher threshold of 48 points (i.e. a mean score of 4 per item) has been used, corresponding to 67% of the maximum score.

On the present skills assessment, the three therapists achieved overall scores of 71%, 60%, and 64% respectively, indicating good proficiency in the skills assessed. Benchmarking against the CTS-R, these scores indicate a level of competency well above a 50% minimum standard and closer to or exceeding that of the 67% threshold for trial therapists. It should be noted that this assessment was completed following Phase 2 of the training, prior to the therapists' pilot cases, meaning they therefore had further opportunities to practise and consolidate their skills in Phase 3.

Table 22
Therapists' Scores on each Component of the Skills Assessment.

Skill assessed	Maximum score	Therapist 1	Therapist 2	Therapist 3
Interpreting client questionnaire responses and treatment planning	16	12	13	11
Reviewing patients' individualised cognitive models	9	6	4	4
Conducting the self-focused attention and safety behaviours experiment	3	3	2	3
Planning phonecalls	5	3	4	4
Reviewing patients' behavioural experiments	6	5	5	6
Reviewing patients' writing in modules	5	3	1	2
Responding to a patient message	7	4	2	3
Reviewing patients' therapy blueprints	4	3	2	2
Total	55	39 (71%)	33 (60%)	35 (64%)

6.3.4 Patient Outcomes

All six patients completed treatment, spending an average of 40.2 hours (*SD* = 26.4) using the website in the 14-week treatment period. Mean scores on all outcome measures are shown in Table 23. On the primary outcome measure, the LSAS, the mean drop across the weekly treatment period was 53.8 points (*SD* = 39.5). The within-group effect size (d_{Cohen}) was 2.06 (95%CI 0.66, 3.46), indicating an effect of medium to very large magnitude in the direction of reduced social anxiety. Effect size point estimates for the secondary outcome measures were also large, ranging from 0.92 to 1.89, with the lower limit of the confidence intervals falling in the small to medium range for most, though not all, measures. While highly tentative due to the sample size, these findings suggest the treatment was effective in reducing social anxiety, negative social cognitions,

safety behaviours, worry, and functional impairment, and increasing social participation, but did not show a reliable effect on depressed mood or social satisfaction.

Changes in scores from posttreatment to three-month follow-up were analysed to review the maintenance of treatment gains over this period. Patients retained access to the programme during this three-month phase, though therapist contact was reduced to just one brief phonecall at monthly intervals. As shown in Table 23, the effect size point estimates for most measures ranged between -0.20 and 0.20, meaning the threshold for a small effect in either direction was not reached. This suggested the improvements from treatment had been maintained over this period. There was some evidence of a small effect in the direction of further improvement on the LSAS, SPS, and Social Participation measures during this period. On the SBQ, SAQ, and PHQ, there was some evidence of a small effect indicating a deterioration. While this may indicate a lessening of some secondary treatment effects during the booster phase, these results may have been heavily influenced by the scores of one patient who did not respond to treatment and showed a decline on secondary outcome measures over the booster phase. Again the confidence intervals for these effect sizes were extremely wide due to sample size, so can only provide a preliminary indication of the maintenance of treatment gains.

Table 23

Means, Standard Deviations, and Within-group Effect Sizes at Pretreatment, Posttreatment and Three-Month Follow-up.

	Pretreatment		Posttreatment		3-month follow-up		d_{Cohen} [95%CI] (Pre-post)	d_{Cohen} [95%CI] (Pre-FU)	d_{Cohen} [95%CI] (Post-FU)
Measure	*M*	*SD*	*M*	*SD*	*M*	*SD*			
					Social Anxiety				
LSAS	75.8	30.4	22.0	21.0	17.8	17.2	2.06 [0.66, 3.46]	2.34 [0.88, 3.81]	0.22 [-0.92, 1.35]
SPWSS	31.7	11.0	14.0	8.1	14.0	8.9	1.83 [0.48, 3.18]	1.76 [0.43, 3.10]	0.00 [-1.13, 1.13]
SPIN	43.3	16.5	20.0	12.2	18.7	16.9	1.61 [0.31, 2.91]	1.48 [0.20, 2.75]	0.09 [-1.04, 1.22]
FNE	25.2	3.0	19.3	8.5	18.7	9.8	0.92 [-0.27, 2.10]	0.90 [-0.29, 2.09]	0.07 [-1.06, 1.20]
SPS	32.7	20.4	12.7	7.4	9.7	9.4	1.30 [0.06, 2.55]	1.45 [0.18, 2.72]	0.35 [-0.79, 1.49]
SIAS	53.3	16.2	28.7	10.1	27.3	12.2	1.82 [0.48, 3.17]	1.81 [0.46, 3.15]	0.12 [-1.01, 1.25]
					Social Anxiety Process Measures				
SCQ-f	3.1	1.1	1.5	0.6	1.5	0.8	1.89 [0.53, 3.25]	1.71 [0.39, 3.03]	-0.02 [-1.15, 1.11]
SCQ-b	47.7	20.5	15.6	13.5	14.5	20.3	1.85 [0.50, 3.20]	1.63 [0.32, 2.93]	0.06 [-1.07, 1.19]
SBQ	43.0	13.2	22.7	9.5	27.7	17.0	1.76 [0.43, 3.10]	1.01 [-0.19, 2.21]	-0.36 [-1.50, 0.78]
SAQ	214.5	44.1	146.3	39.2	159.7	73.8	1.63 [0.33, 2.94]	0.90 [-0.29, 2.09]	-0.23 [-1.36, 0.91]
Social Participation	37.2	5.8	53.5	14.9	60.3	18.5	1.45 [0.17, 2.72]	1.69 [0.37, 3.01]	0.41 [-0.74, 1.55]
Social Satisfaction	17.5	5.8	22.8	3.2	22.5	8.4	1.14 [-0.08, 2.36]	0.69 [-0.47, 1.86]	-0.05 [-1.18, 1.08]

(continued)

	Pretreatment		Posttreatment		3-month follow-up		d_{Cohen} [95%CI] (Pre-post)	d_{Cohen} [95%CI] (Pre-FU)	d_{Cohen} [95%CI] (Post-FU)
Measure	*M*	*SD*	*M*	*SD*	*M*	*SD*			
General Mood and Functioning									
PHQ	11.3	7.1	5.2	2.6	6.2	5.7	1.15 [-0.07, 2.37]	0.80 [-0.38, 1.98]	-0.22 [-1.36, 0.91]
GAD	13.2	4.5	6.3	3.3	6.8	5.9	1.72 [0.39, 3.04]	1.20 [-0.03, 2.43]	-0.10 [-1.24, 1.03]
WSAS	19.5	7.8	8.5	4.2	9.2	9.2	1.75 [0.42, 3.08]	1.21 [-0.02, 2.44]	-0.09 [-1.23, 1.04]

Note. N = 6. LSAS = Liebowitz Social Anxiety Scale; SPWSS = Social Phobia Weekly Summary Scale; SPIN = Social Phobia Inventory; FNE = Fear of Negative Evaluation Scale; SPS = Social Phobia Scale; SIAS = Social Interaction Anxiety Scale; SCQ-f = Social Cognitions Questionnaire (frequency; mean score); SCQ-b = Social Cognitions Questionnaire (belief; mean score); SBQ = Social Behaviour Questionnaire; SAQ = Social Attitudes Questionnaire; PHQ = Patient Health Questionnaire; GAD = Generalised Anxiety Disorder Questionnaire; WSAS = Work and Social Adjustment Scale.

Five of the six patients showed an improvement on the LSAS greater than 31% at the posttreatment assessment and were thus classified as treatment responders. All five were also classified as remitted from their social anxiety, showing a drop of at least 12 points and falling below the clinical cutoff at posttreatment. Individual LSAS scores over time are shown in Figure 21. Using the IAPT criteria based on SPIN and PHQ scores, four patients showed reliable improvement and three were classified as reliably recovered from SAD.

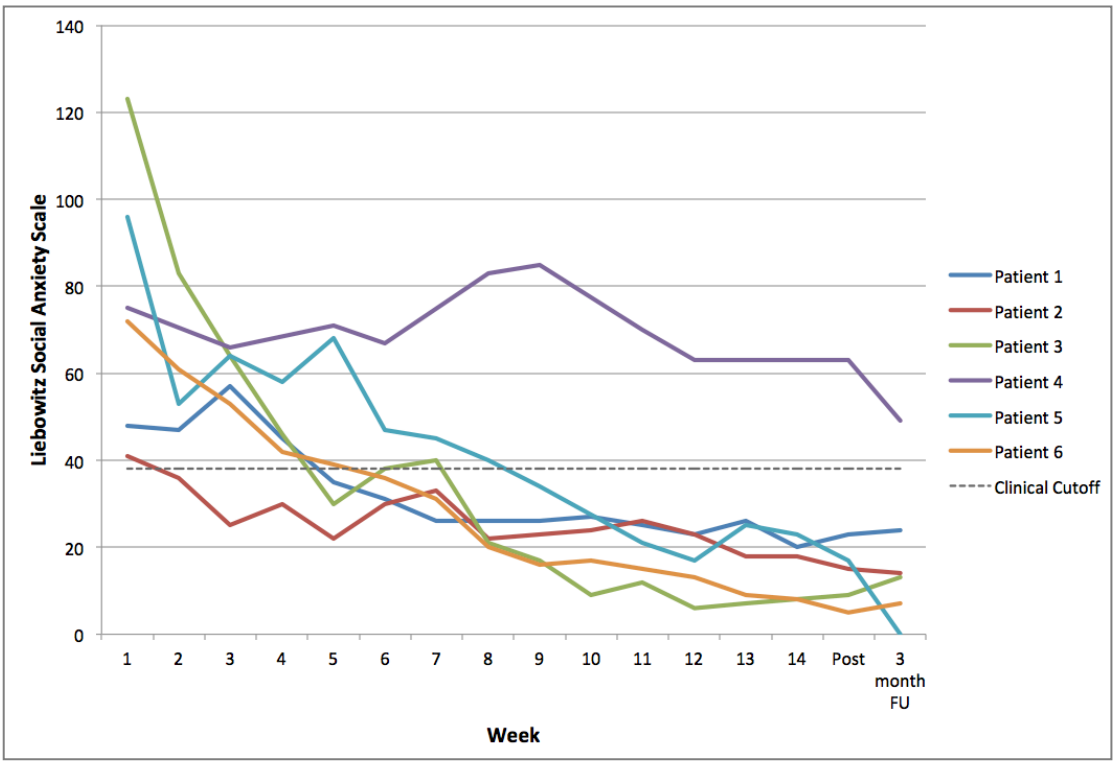


Figure 21

Weekly scores on the Liebowitz Social Anxiety Scale (self-report) across treatment for the six pilot patients. Week 15 represents the posttreatment assessment. The dotted line represents the clinical cutoff score of 38 points.

The one patient who did not show a reliable response to treatment within the weekly treatment phase experienced difficulties with depressed mood, which may have impacted their motivation to log in and work on the treatment website, and to complete behavioural experiments. Compared to some other

patients, they spent relatively little time on the website (12.5 hours total), and completed fewer behavioural experiments. Across the patient cohort, the amount of time spent on the website was positively correlated with percentage change on the LSAS (r = .584). It is also noted that the two patients with relatively lower baseline LSAS scores, due to more situation-specific forms of social anxiety, finished treatment with scores higher than some other patients whose baseline scores were more severe. The correlation between baseline LSAS score and percentage change on the LSAS was r = .443.

All six patients completed the anonymous feedback survey at the end of the booster period. Five of the patients felt that the programme was relatively easy to understand in English, though one experienced some difficulties expressing their ideas and feelings, and felt this could be a barrier for the therapy (Respondent 4). Patients reported various therapist behaviours that they found helpful, including sending a written summary following phonecalls, helping to generate new perspectives, identifying details of modules they may have missed, advising on behavioural experiments to try, and helping them to review their week. In terms of the treatment as a whole, respondents reported liking the phonecalls (described as "intensive but helpful" by Respondent 1), the practical nature of the contents, the effort, help, and professionalism of the therapist, the inclusion of both general and specific content, and the way the questionnaires allowed them to review their emotional state. Four patients did not report any dislikes about the treatment. One disliked having to enter an authentication code at each login (Respondent 1), and one felt it was sometimes hard to motivate themself to finish the tasks, and expressed a concern they may not have

understood their own anxiety very well (Respondent 4). All patients rated the programme as easy to use on a desktop/laptop computer, but two reported difficulty when using a tablet or mobile phone. In sum, responses indicated a good level of treatment satisfaction and acceptability, with some but relatively few technical or practical difficulties.

6.4 Discussion

The results indicated that the program of therapist training was effective in improving therapists' knowledge and skills in relation to the general CT treatment protocol and using the iCT-SAD programme to deliver this online. The three therapists achieved a good level of competence when objectively measured using the skills assessment following Phase 2 of training. They were then able to consolidate these skills in their work with pilot cases, as demonstrated by the positive outcomes achieved by this cohort.

The six patients showed good adherence to the iCT-SAD programme, completing treatment modules, phonecalls with the therapist, behavioural experiments, and weekly questionnaire measures. All patients completed the full weekly and booster phases of treatment, indicating a good level of treatment acceptability and feasibility in this setting, and sufficiently reliable functioning of the website. The therapists successfully implemented the treatment in line with the protocol and no significant deviations from this were required.

The mean pre-post change on the LSAS and associated effect size point estimate (d_{Cohen} = 2.06) were large, with values consistent with those observed in other larger studies of this treatment; the within-group pre-post effect size of the iCT-SAD pilot case series in the UK was 1.6, and 2.4 in the first UK RCT (Clark, Wild, et al., in preparation). As these UK studies have shown effect sizes larger than those of many other online treatments for SAD, it is promising that the present results indicate this high level of efficacy appears to have been maintained within a different cultural setting. These findings are of course preliminary given the present sample size, and a full RCT is required to establish the efficacy of the programme in Hong Kong more robustly.

While five of the six patients were classed as remitted from their social anxiety at the posttreatment assessment, one did not meet the threshold for a reliable response to treatment. It is hypothesised that depressed mood may have hindered this patient's engagement with the treatment programme, suggesting that further support may be required for people with comorbid mood difficulties. While the treatment does include an optional module focused on the management of depressed mood, this can obviously only be of benefit where someone feels sufficiently motivated to log in and work on the site. Our approach of the therapist delivering some mood management interventions by phone appeared to help in this instance, as evidenced by the patient's completion of treatment as opposed to early termination, and this may require further development to support those experiencing reduced motivation.

The training stages allowed the therapists and supervisors to identify aspects of the iCT-SAD programme that may prove difficult to understand when patients are working in a nonnative language. This included video and audio material where groups of people are chatting informally, perhaps talking at the same time or in incomplete sentences. Additionally, one of the attention training exercises in the programme asks patients to watch a video of someone reading a story to them, whilst they alternate their attention between focusing on themselves, and on the story content. Given the language demands of these materials we have now created a set of equivalent resources for these components of the programme in Chinese, along with English-subtitled versions of the site videos to assist with understanding.

Work with the present pilot cohort also permitted consideration of how cultural factors may have influenced the treatment. In general terms, the positive outcomes achieved by these patients suggest that the treatment in a largely unadapted form can show strong efficacy for English-speaking Chinese residents of Hong Kong. Again, a RCT would be required to establish this definitively, but the present findings do offer a proof of principle that the treatment can work effectively in this new cultural context, and that the influence of culture in this setting is not such that patients derive no benefit from the treatment. Of course this does not mean that cultural factors had no influence on the treatment, and adaptations may still confer additional benefits, but among this sample there did not appear to any major cultural barriers to understanding and implementing the treatment procedures. We note that relative to the UK, the present patients reported feeling less able to use their working time flexibly in order to take

phonecalls from their therapist (for example in a lunch break), and therefore it was more common for these calls, and for patients' work on the site to occur after office hours or at weekends. Whether this observation reflects a cultural pattern relating to a 'work-ethic' or workplace norms is presently unclear. The mean number of hours spent on the site (40.2) was similar to UK samples (34.9 hours in Stott et al., 2013), and there were no marked differences regarding which optional treatment modules were used, though the present sample was not large enough to examine this fully.

Limitations of this work include the small number of therapists trained, and the fact that the self-report and skills assessments were developed specifically for this study, and are therefore not standardised or externally validated. The training programme implemented here was intensive, and was not designed to be scalable at this stage. Future work will need to consider the best methods to provide such training more efficiently and to larger groups of therapists. As stated above, the small number of patients in this pilot study can only tentatively indicate treatment efficacy and linguistic/cultural considerations, and larger controlled studies are therefore required.

This work has described and evaluated a programme of therapist training in iCT-SAD, which was effective at increasing therapists' knowledge and skills, and resulted in positive clinical outcomes among a pilot case series of six patients, with initial evidence that these were sustained at three-month follow-up. The treatment appeared feasible and acceptable in this setting. A robust controlled examination of iCT-SAD efficacy in Hong Kong is now required, with the present

therapists delivering the treatment within a RCT design.

7

Dissemination of iCT-SAD to Hong Kong

7.1 Study 5: Internet-based Cognitive Therapy for Social Anxiety Disorder in Hong Kong – A Randomised Controlled Trial

As described in Chapter 2, one of the key benefits of online psychological interventions is their potential to be transported and delivered in locations where mental health services may be less well established, where demand is high, or in more rural or remote communities. However, the global reach of such interventions has yet to be fully realised, and research is required to assess their feasibility, acceptability, and efficacy when implemented in new contexts.

There are at present few studies that examine the efficacy of online interventions when transported internationally or interculturally (Gallego et al., 2011; Jakobsen et al., 2017; Kishimoto et al., 2016; Tulbure et al., 2015). These are described in Chapter 2, and have generally shown promising results. However, as internet interventions vary widely in terms of content, format, and the extent and nature of therapist guidance, it is important to examine a wider range of individual treatments before we can consider the general trends regarding international dissemination. iCT-SAD contains treatment components not found

in other internet SAD interventions, such as the self-focused attention and safety behaviours experiment, and video feedback via webcam, so it is not yet known whether interventions of this type can retain their high efficacy when implemented outside of the culture in which they were developed.

A second question is the level of adaptation required to the intervention when disseminating to a different culture. While psychologists are expected to adapt their face-to-face work to be culturally appropriate for the individual client (Health and Care Professions Council, 2015), there is an interesting question regarding the need and/or extent to which adaptations should be made to online interventions to suit a general population of another country, and again this may depend on how culturally-specific the content is to begin with. One approach is to begin by examining the performance of a largely unadapted treatment, and use this to provide evidence as to whether, how much, and where adaptation is required.

The results of a recent UK RCT (Clark, Wild, et al., in preparation) showed that iCT-SAD was superior to waitlist control in reducing social anxiety, and was as good as the traditional face-to-face format (CT-SAD). The aim of this study was to assess whether the iCT-SAD programme can retain the efficacy shown in UK studies when delivered in a different culture with minimal adaptation. Hong Kong was chosen due to the clear cultural contrast, yet sufficient English-speaking population to permit the treatment to be implemented without translation for this initial study. Online psychological therapy is rare in Hong Kong, though findings from a pilot case series of iCT-SAD demonstrated

promising initial evidence of feasibility and efficacy (see Chapter 6). The present study aimed to provide a more rigorous evaluation of the efficacy of iCT-SAD in this setting. A randomised controlled trial of iCT-SAD compared to a waitlist control group is described, with intervention results also benchmarked against UK efficacy. The principal research questions were therefore:

- Is iCT-SAD superior to a waitlist control group when implemented in Hong Kong?
- How does the efficacy of iCT-SAD in Hong Kong compare to the results of UK research trials?

7.2 Method

7.2.1 Design

The study followed a two-arm, parallel-group randomised controlled trial design, testing the hypothesis that iCT-SAD would be superior to a waitlist control group on the primary and secondary outcome measures used. Participants were randomly assigned to iCT-SAD or waitlist with an allocation ratio of 1:1. Randomisation was undertaken following a minimisation procedure by an independent research assistant in the UK, stratifying by baseline severity of social anxiety (Liebowitz Social Anxiety Scale – Self-Report score > 76, or ≤ 76, where the cutoff of 76 points represented the median severity score of iCT-SAD participants in the UK trial) and gender, which was an addition to the preregistered strategy. Randomisation was performed using Minim software (Evans, Royston, & Day, n.d.).

The principal assessment points were baseline, midtreatment/midwait (week 8), posttreatment/postwait (week 15), and three-month follow-up (NB. The follow-up data is still being collected and is therefore not included in this thesis), and all questionnaires were administered online. The trial was prospectively registered (ISRCTN11357117), and ethically approved by the Joint Chinese University of Hong Kong – New Territories East Cluster Clinical Research Ethics Committee (Ref: 2016.611-T), and the University of Oxford Tropical Research Ethics Committee (Ref: 531-17) (See Appendix C).

7.2.2 Participants

Participants were 44 English-speaking Chinese adults who met DSM-5 diagnostic criteria for SAD. Recruitment was undertaken via advertisements in social and print media between November 2017 and April 2018. These directed potential participants to a brief online screening questionnaire comprised of the social anxiety items of the Psychiatric Diagnostic Screening Questionnaire (Zimmerman & Mattia, 2001) and some brief eligibility questions. Where respondents' scores suggested they may meet criteria for SAD, they were invited to attend an assessment appointment with one of four trained research assistants to assess trial eligibility. After reviewing the assessment results, decisions regarding eligibility were made by the author in discussion with the assessor. Eligible participants were invited to meet with one of the study therapists to discuss the treatment and study procedures prior to randomisation. All participants provided written informed consent to take part. In the Hong Kong healthcare system, payment for a course of psychological therapy is made by the patient at the point of care. To align the present treatment with this model

we therefore asked participants to pay a deposit of 2000HKD (approx. 200GBP), which is comparable to the initial fee associated with face-to-face treatment in routine care. The deposit was waived in cases of financial difficulty. Deposits were returned following completion of treatment and the follow-up questionnaires, or following the end of the wait period in two instances where participants opted not to begin treatment.

Inclusion criteria were as follows: a) meets DSM-5 criteria for SAD (American Psychiatric Association, 2013), b) social anxiety problem has lasted at least six months, c) participant considers SAD to be their main problem, d) age 18-65 (inclusive), e) not currently taking psychotropic mediation, or on a stable dose for at least two months without improvement, and willing to remain at this dose throughout trial, f) participant agrees not to start any other forms of treatment during the trial, g) participant is a Chinese resident of Hong Kong, with sufficient proficiency in English to understand the treatment content, and h) regular access to an internet-connected computer or mobile device. Exclusion criteria were a) current or past psychosis, bipolar disorder, or borderline personality disorder, b) active suicidality, c) dependence on alcohol or substances, d) currently receiving psychological treatment, and e) having completed a course of CBT for social anxiety previously (defined as at least 5 sessions, and including an exposure component). All inclusion and exclusion criteria, with the exception of inclusion criterion g, were the same as those used in the UK trial (Clark, Wild, et al., in preparation).

The Anxiety and Related Disorders Interview Schedule for DSM-5 (ADIS; Brown & Barlow, 2014) was used to assess diagnostic status for SAD, and the Structured Clinical Interview for DSM-5 (First et al., 2015) for all other comorbid conditions. Reliability of the independent assessors' diagnostic decisions was evaluated using a sample of six audio-recordings of initial ADIS assessments. These included those with and without SAD as determined by the assessing research assistant in discussion with the author. Each recording was rated by the three assessors who had not conducted the interview. Full agreement between the assessors was obtained for five of the six recordings, with the remaining recording being a participant with social anxiety in the subthreshold range. Fleiss' kappa was 0.77, which is considered 'substantial agreement' (Landis & Koch, 1977).

7.2.3 Treatment

iCT-SAD (Clark, Wild, et al., in preparation; Stott et al., 2013)(see Chapter 2) is a therapist-guided modular online treatment based on the Clark and Wells (1995) cognitive model of social anxiety. It aims to replicate the content and procedures of the face-to-face cognitive therapy (CT-SAD) protocol (see Clark et al., 2006). The treatment and wait period were both 14 weeks in duration, following which the waitlist group began treatment. At the end of the 14-week treatment period, participants entered the booster phase of treatment, which lasted for a further three months. Participants retained access to the treatment website during the booster phase, and for a minimum of 12 months following the end of their participation in the trial.

In the iCT-SAD programme, therapists communicate with their client via an asynchronous messaging system, SMS messaging, and occasional video calls via webcam. In the first two weeks of therapy, two telephone calls are scheduled per week, followed by one weekly phonecall until the end of treatment. Up to three phonecalls are scheduled at monthly intervals in the booster phase. Each call lasts approximately 15-20 minutes, and is used to review the client's questionnaires, review their progress with treatment modules and behavioural experiments, and to plan for the coming week. The treatment protocol was identical to that of the previous UK trial. The treatment was conducted in English, with some additional audio/video resources available in Chinese that therapists could refer participants to where required.

7.2.4 Therapists

The treatment was delivered by three local clinical psychologists (Dr Mandy Chan, Dr Amy Kwok, and Dr Candice Ling Powell), all of whom had previous experience of CBT interventions for anxiety, with a mean of 10.3 years post-qualification experience. Each therapist treated practice social anxiety cases using the face-to-face CT-SAD protocol under supervision. Following this they received two weeks' training in iCT-SAD, and completed further practice cases using iCT-SAD prior to the trial (see Chapter 6). During this period and throughout the trial, the therapists received regular supervision from the author, which focused on treatment planning and ensured adherence to the therapy protocol. The author received regular 'supervision of supervision' from Dr Jennifer Wild, one of the trial therapists from the UK RCT, to ensure implementation was consistent with the UK study. Scores on weekly symptom

measures, and the process measures shown to be important in Studies 1-3 were also monitored to guide clinical intervention.

7.2.5 Measures

The primary outcome measure of the trial was the self-report version of the Liebowitz Social Anxiety Scale (LSAS; Baker et al., 2002) (see Chapter 3 for description). Cronbach's alpha in the present sample was 0.92 at baseline and 0.98 at posttreatment/postwait. The secondary outcome measures of the trial were as follows:

Social anxiety

- Anxiety and Related Disorders Interview Schedule for DSM-5 (ADIS-5; Brown & Barlow, 2014). A clinical diagnostic interview conducted by an independent assessor blind to treatment condition, at the posttreatment/postwait assessment point. Interview responses are used to determine whether or not the SAD diagnostic criteria are met.
- Social Phobia Weekly Summary Scale (SPWSS; Clark, 1995) (see Chapter 3 for description). Cronbach's alpha in the present sample was 0.68 at baseline and 0.92 at posttreatment/postwait.
- Social Phobia Inventory (SPIN; Connor et al., 2000) (see Chapter 4 for description). Cronbach's alpha in the present sample was 0.89 at baseline and 0.96 at posttreatment/postwait.
- Fear of Negative Evaluation Scale (FNE; Watson & Friend, 1969) (see Chapter 6 for description). Cronbach's alpha in the present sample was 0.81 at baseline and 0.89 at posttreatment/postwait.

- Social Phobia Scale (SPS) and Social Interaction Anxiety Scale (SIAS; Mattick & Clarke, 1998) (see Chapter 6 for description). Cronbach's alpha for the SPS was 0.92 at baseline and 0.94 at posttreatment/postwait, and for the SIAS was 0.87 at baseline and 0.94 at posttreatment/postwait.

Social anxiety process measures

- Social Cognitions Questionnaire (SCQ; Clark, 1995) (see Chapter 3 for description). Cronbach's alpha in the present sample was 0.80 (baseline) and 0.95 (posttreatment) for the frequency subscale and 0.89 (baseline) and 0.98 (posttreatment) for the belief subscale.
- Social Behaviour Questionnaire (SBQ; Clark, 1995) (see Chapter 6 for description). Cronbach's alpha in the present sample was 0.77 at baseline and 0.89 at posttreatment/postwait.
- Social Attitudes Questionnaire (SAQ; Clark, 1995) (see Chapter 6 for description). Cronbach's alpha in the present sample was 0.93 at baseline and 0.96 at posttreatment/postwait.
- Social Participation (Alden & Taylor, 2011) (see Chapter 6 for description). Cronbach's alpha in the present sample was 0.88 at baseline and 0.89 at posttreatment/postwait.
- Social Satisfaction (Alden & Taylor, 2011) (see Chapter 6 for description). Cronbach's alpha in the present sample was 0.81 at baseline and 0.82 at posttreatment/postwait.

Depression

- Patient Health Questionnaire – 9-item version (PHQ; Kroencke et al., 2001) (see Chapter 3 for description). Cronbach's alpha in the present sample was 0.86 at baseline and 0.92 at posttreatment/postwait.

Generalised Anxiety

- Generalised Anxiety Disorder Questionnaire – 7-item version (GAD; Spitzer et al., 2006) (see Chapter 6 for description). Cronbach's alpha in the present sample was 0.88 at baseline and 0.92 at posttreatment/postwait.

General functioning

- Work and Social Adjustment Scale (WSAS; Mundt et al., 2002) (see Chapter 6 for description). Cronbach's alpha in the present sample was 0.75 at baseline and 0.82 at posttreatment/postwait.

Generalised learning

- Generalised Learning Questionnaire (GLQ). This is an original, 5-item scale developed for the present study to examine longitudinal changes in generalised learning linked to social anxiety. An initial item pool was developed based on the findings from Study 3b, which was reviewed and refined on an iterative basis in conjunction with experts in the delivery and supervision of CT-SAD and iCT-SAD. Each item is rated on a 7-point Likert scale ("Totally agree", "Agree very much", "Agree slightly", "Neutral", "Disagree slightly", "Disagree very much", or "Totally

disagree"). Responses are scored from 0-6, with higher scores indicating greater generalised learning (see Appendix A). Cronbach's alpha in the present sample was 0.51 at baseline and 0.76 at posttreatment/postwait.

Therapeutic alliance and treatment credibility were also measured after two weeks of treatment, to examine their relationship with treatment outcome. The two-week timepoint ensured participants and therapists had undertaken sufficient treatment to provide alliance and/or credibility ratings, but not so much as for these to be affected by treatment outcome. The below measures were completed by participants in the iCT condition:

- Working Alliance Inventory – Short Form (Horvath & Greenberg, 1989; Tracey & Kokotovic, 1989). A 12-item scale, with both client and therapist versions, items assess perceived agreement on the goals and task of therapy, and the therapeutic bond. Items are rated on 1-7 Likert scales ("Never", "Rarely", "Occasionally", "Sometimes", "Often", "Very often", or "Always", respectively). The maximum score is therefore 84, with higher scores indicating a more positive perceived alliance. Participants and their therapists provided ratings at this timepoint. Cronbach's alpha in the present sample was 0.95 for the client version, and 0.85 for the therapist version.
- Credibility and expectancy of improvement scales (Borkovec & Nau, 1972). Three Likert scales (1-10) assess the extent to which the treatment is perceived as logical, the expectancy of a positive outcome, and confidence in recommending the treatment to a friend. For the present analysis, the mean of these items was taken, with higher scores indicating

greater perceived treatment credibility. Cronbach's alpha in the present sample was 0.86.

7.2.6 Sample Size

An a priori sample size calculation for the between-group comparison of LSAS scores from baseline to posttreatment was computed. As the controlled effect size (d_{Cohen}) for the iCT-SAD group reported in the UK RCT (Clark, Wild, et al., in preparation) was d = 2.25, a conservative estimated effect size of d = 1.1 was used given the different population and cultural setting for this study. This calculation (using β=0.9 and α=0.05) indicated a required sample of 13 participants per group. Given the further planned analyses of secondary outcome measures, and accounting for attrition, a total of 20 participants per group was sought.

7.2.7 Response, Remission, and Deterioration Criteria

Response to treatment and remission of social anxiety were defined using the same criteria as Stott and colleagues' (2013) iCT-SAD case series, which were based on both the reliable change formulae described in Jacobson and Truax (1991) and normative nonclinical data from Fresco and colleagues (2001). Response to treatment was defined as an improvement on the LSAS between pretreatment and posttreatment greater than 31%. This figure has been shown to equate to responder status using the Clinical Global Impression-Improvement scale, commonly used in medication trials (Bandelow, Baldwin, Dolberg, Andersen, & Stein, 2006). Remission was defined as a drop of at least 12 points on the LSAS combined with a posttreatment score of 38 or less (Clark et al.,

2006), i.e. a score in the nonclinical range defined by Fresco and colleagues (2001). As a lower remission threshold of 30 points or less has been used in some recent studies (Johansson et al., 2017; Leichsenring et al., 2014), remission was also examined in relation to this more stringent cutoff. Reliable deterioration was defined as an increase on the LSAS of at least 12 points. This was examined for the baseline-to-mid, baseline-to-post, and mid-to-post intervals.

For further comparability with UK samples, reliable improvement and reliable recovery were also examined according to the IAPT criteria, which consider change on both anxiety disorder-specific (SPIN), and depressed mood (PHQ) measures (National Collaborating Centre for Mental Health, 2018). Reliable improvement was defined as a decrease of 10 or more points on the SPIN, and/or 6 or more points on the PHQ, and no reliable deterioration (increases of 10 or more, or 6 or more, respectively) on either measure. Reliable recovery was defined as reliable improvement combined with scores on both measures below the clinical threshold, i.e. a SPIN score of 18 or below, and a PHQ score of 9 or below.

7.2.8 Analysis

Analyses were performed in R version 3.4.3 (R Core Team, 2017) using the 'tidyverse' (Wickham, 2017), 'nlme' (Pinheiro et al., 2018), 'jmv' (Selker, Love, & Dropmann, 2018) and 'psych' (Revelle, 2018) packages. All analyses were performed on the intention to treat sample unless specified. Statistical advice was provided by Alecia Nickless, Senior Trial Statistician at the Primary Care

Clinical Trials Unit, University of Oxford. Preliminary checks were performed to test whether the stratified randomisation was successful, examine the distribution of the data, and check for outliers. No transformations or exclusions were indicated. Descriptive statistics are reported for data regarding participant demographics, iCT participants' use of the site, and therapists' activity.

Linear mixed effect models were used for the analysis of continuous variables over time, given their ability to include all available data from all randomised participants, to account for the repeated-measures and multilevel nature of the data (timepoints nested within participants), and to account for data missing at random. Time (midwait/midtreatment, and postwait/posttreatment), condition (iCT, waitlist), and the time by condition interaction were specified as categorical fixed factors, with the stratification variables of baseline LSAS score and gender as fixed covariates, and participant as a random effect to account for between-person variation. For the analysis of secondary outcome measures, the baseline score of the measure being analysed was also included as a fixed covariate. All models used restricted maximum likelihood estimation. The normality of residuals assumption was checked using Q-Q plots, and met for all models. Results consistent with the hypothesis of superior treatment effects in the iCT group compared to waitlist would therefore be indicated by a significant time by condition interaction effect, with greater mean change in iCT.

Between-group effect sizes (d_{Cohen}) were calculated by dividing the adjusted group difference by the baseline standard deviation of the full study sample. Within-group effect sizes were calculated from linear mixed effects models that

incorporated the baseline score as a timepoint rather than as a covariate, to obtain within-group adjusted means in relation to baseline. These models used an unstructured covariance matrix. 95% confidence intervals for d_{Cohen} were calculated by dividing the upper and lower limits of the adjusted group difference by the baseline standard deviation of the full study sample. Following the rules of thumb outlined by Cohen (1988), effect sizes of 0.2, 0.5, and 0.8 indicated small, medium, and large effects, respectively.

Categorical outcomes (response, remission, deterioration, and diagnostic status) were analysed using logistic regression, with treatment condition as the independent variable, and baseline LSAS score and gender as covariates. To assess whether participant-rated treatment credibility, participant-rated therapeutic alliance, and therapist-rated therapeutic alliance predicted clinical outcome, these three variables were entered into a linear regression to predict LSAS residualised gain scores. Again, baseline LSAS score and gender were included as covariates. Benchmarking was performed through descriptive comparisons of the present results in relation to UK studies of iCT-SAD (Clark, Wild, et al., in preparation; Stott et al., 2013).

Lastly, a series of exploratory analyses were performed to examine candidate mediators of the relationship between randomisation (treatment condition) and post-treatment LSAS scores. As in Studies 1, 2a, and 2b, the candidate mediators were self-focused attention (the general self-focused attention item of the SPWSS), negative social cognitions (SCQ), and depressed mood (PHQ). Additionally, safety behaviours (SBQ) and rumination (the rumination item of

the SPWSS) were examined. Midwait/midtreatment scores were used as the mediator, and posttreatment LSAS scores as the outcome. Following the procedures used by Freeman and colleagues (2017), this analysis was similar to the Baron and Kenny (1986) approach but used linear mixed effects models for each step to account for the nested data structure. For each candidate mediator, three models are fitted: 1) the relationship between randomisation and outcome is estimated (path c); 2) the relationship between randomisation and mediator scores (path a); and 3) the relationship between randomisation and outcome, with mediator scores at midwait/midtreatment also included in the model (paths b and c'). The direct, indirect, and total effects, and percent mediation, can then be estimated, and the significance of the indirect effect tested using the Sobel test, where the standard error of the indirect effect (ab) is calculated using the below formula (see Baron & Kenny, 1986):

$$SE_{ab} = \sqrt{(b^2 \times SE_a^2) + (a^2 \times SE_b^2)}$$

Models reversing the mediator and outcome variable but maintaining the temporal lag were also performed. All models included baseline LSAS scores, gender, and baseline mediator scores as covariates.

7.3 Results

7.3.1 Participant Flow and Demographics

Of the 73 potential participants who were assessed, 44 were eligible for the trial and gave informed consent, and were therefore randomised. Demographic and clinical characteristics of the two groups are shown in Table 24. There were no significant differences between groups on the stratification variables of baseline

LSAS score: $t(42) = -0.523$, $p = .604$, or gender: $\chi^2(1) = 0.109$, $p = .741$, indicating randomisation was successful. Two participants in the iCT condition withdrew during the study; one withdrew prior to starting treatment, but provided questionnaire data at the posttreatment timepoint. The other withdrew during the second week of treatment, but provided questionnaire data at the mid- and posttreatment timepoints. In the wait condition, one participant could not be contacted following randomisation and was therefore assumed to have withdrawn. One participant in the iCT condition completed treatment but was subsequently uncontactable, so did not complete posttreatment questionnaires or the ADIS interview. As some of the posttreatment questionnaires were also administered weekly, scores from the final week of treatment were used as the posttreatment scores for this participant. Overall, complete data was provided by 21 participants (95%) in the wait group at the midwait and postwait timepoints, and by 21 participants in the iCT group at the midtreatment and posttreatment timepoints. The postwait/posttreatment ADIS interview was completed by 21 wait group participants (95%) and 19 iCT group participants (86%). The flow of participant recruitment and participation is shown in Figure 22.

Table 24
Participant Demographic and Clinical Characteristics.

	iCT (n = 22)	Waitlist (n = 22)	Total (n = 44)
% Female	68	73	70
Mean Age (SD)	34.5 (10.4)	31.7 (8.4)	33.1 (9.4)
Age Range	20-54	20-48	20-54
Marital Status *n* (%)			
Single/living alone	16 (73)	13 (59)	29 (66)
Married/living together	5 (23)	9 (41)	14 (32)
Divorced/Widowed/Separated	0	0	0
Other	1 (5)	0	1 (2)
Highest Educational Qualification *n* (%)			
No formal qualification/Primary school	0	0	0
Secondary school	1 (5)	0	1 (2)
Associate degree/high diploma	1 (5)	1 (5)	2 (5)
Bachelors degree	13 (59)	15 (68)	28 (64)
Masters degree	6 (27)	6 (27)	12 (27)
Doctoral degree	1 (5)	0	1 (2)
Other	0	0	0
Employment status *n* (%)			
Unemployed	1 (5)	1 (5)	2 (5)
Full time work	14 (64)	14 (64)	28 (64)
Part time work	0	1 (5)	1 (2)
Student	5 (23)	3 (14)	8 (18)
Homemaker	1 (5)	1 (5)	2 (5)
Retired	0	1 (5)	1 (2)
Sick leave	1 (5)	1 (5)	2 (2)
Mean age at SAD onset in years (SD)	16.3 (7.1)	16.9 (9.6)	16.6 (8.3)
Mean duration of SAD at assessment in years (SD)	18.7 (12.9)	14.8 (10.6)	16.8 (11.8)
% 'Performance Only' SAD subtype	0	0	0
Current psychotropic medication (%)	3 (14)	1 (5)	4 (9)
Previous psychological treatment (%)	9 (41)	6 (27)	15 (34)
Comorbidity (current) *n* (%)			
Major Depressive Episode	2 (9)	2 (9)	4 (9)
Generalised Anxiety Disorder	4 (18)	4 (18)	8 (18)
Panic Disorder	1 (5)	0	1 (2)
Specific Phobia	2 (9)	0	2 (5)
Somatic Symptom Disorder	0	1 (5)	1 (2)
Illness Anxiety Disorder	1 (5)	0	1 (2)
Alcohol Use Disorder (mild)	1 (5)	0	1 (2)
Body Dysmorphic Disorder	0	1 (5)	1 (2)
Avoidant Personality Disorder	12 (55)	8 (36)	20 (45)
Obsessive Compulsive Personality Disorder	1 (5)	2 (9)	3 (7)
Paranoid Personality Disorder	0	1 (5)	1 (2)
Any current comorbidity	14 (64)	12 (55)	26 (59)

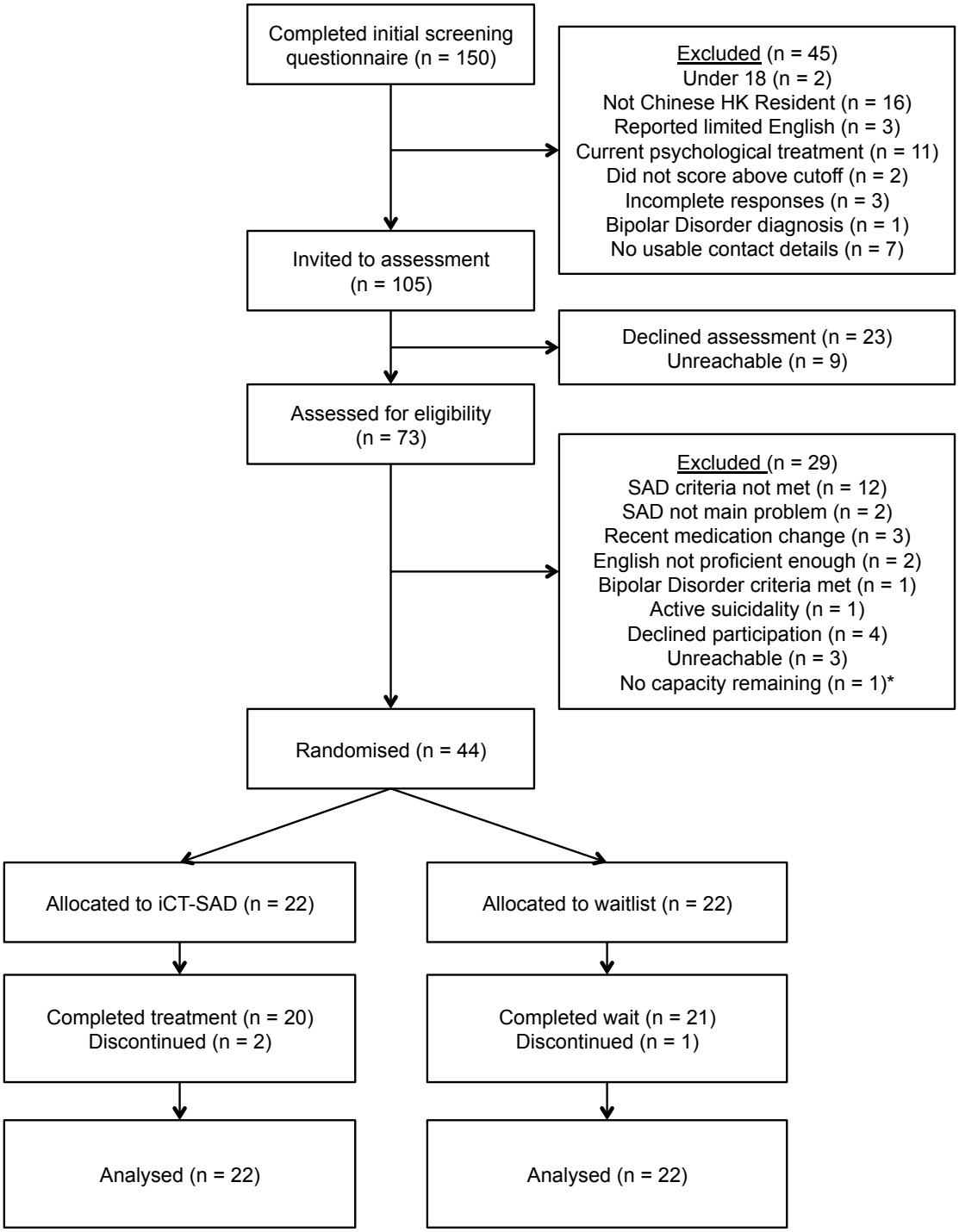


Figure 22

Participant flow through the trial. *One person, who was assessed at the end of the recruitment period, was eligible but could not be randomised due to a lack of capacity among the trial therapists. Alternative treatment arrangements were made.

7.3.2 Use of the iCT Programme

The participants allocated to iCT who completed treatment (n = 20) spent an average of 2611 minutes (43.5 hours) on the website across the 14-week programme (SD = 948, range 1094 – 4599). These participants all completed the 'core' treatment modules and at least six additional 'optional' modules focusing on their more specific concerns or difficulties. They planned a mean of 16.8 behavioural experiments on the site (SD = 11.1, range 5-42), and completed a mean of 15.2 (SD = 10.5, range 4-39). They sent a mean of 9.2 messages (SD = 14.4, range 0-60) to their therapist through the website, though it is noted that most participants preferred to message their therapist via WhatsApp. All participants who completed treatment used the webchat facility for the self-focused attention and safety behaviours experiment, where they recorded and watched videos of themselves engaging in social interactions.

7.3.3 Therapist Activity

As above, figures are reported in relation to the 20 iCT-group participants who completed treatment. Across the 14-week intervention, therapists made a mean of 15.3 phonecalls (SD = 1.1) to these participants, with a mean duration of 23.1 minutes (SD = 6.6), and thus a mean total time of 352 minutes per participant (SD = 101). They completed a mean of 1.5 webchats (SD = 0.5), with a total duration of 95.1 minutes (SD = 13.9), nearly all of which was used to complete the self-focused attention and safety behaviours experiment in week two. Overall, the mean time spent in direct communication with participants was 447 minutes (7.5 hours)(SD = 111). For comparison, the equivalent duration for iCT-

SAD in the UK was 232 minutes (3.9 hours)(Stott et al., 2013), and 1148 minutes (19.1 hours) in a course of the face-to-face CT protocol (Clark et al., 2006). Therapists sent a mean of 28.6 messages (SD = 11.8, range 15-55) through the website, and a mean of 89.3 text messages (SD = 67.7) to participants' mobile phones. The mean time spent reviewing participants' work on the site and sending messages was 208 minutes (3.5 hours)(SD = 82). In total, the mean time therapists spent supporting each participant was 655 minutes (10.9 hours)(SD = 161). It is difficult to be precise about how this compares to face-to-face therapy (e.g. Clark et al., 2006) given that the time spent reviewing, planning, and writing up session notes in CT-SAD was not counted, however, the present figures suggest that in this study iCT-SAD represented a saving in therapists' time of at least 43% compared to the face-to-face protocol.

7.3.4 Clinical Outcomes

7.3.4.1 Primary outcomes.

Mean scores on the LSAS for each group at the principal timepoints are shown in Figure 23. The linear mixed effect model indicated that the difference between groups in their change over time was significant at the mid and post timepoints, with iCT showing the superior treatment effect. The between-group effect size was 2.89 (d_{Cohen}; 95%CI: 2.32, 3.47), which is considered large. Table 25 reports the unadjusted means and standard deviations, adjusted group differences, and effect sizes for all continuous outcomes.

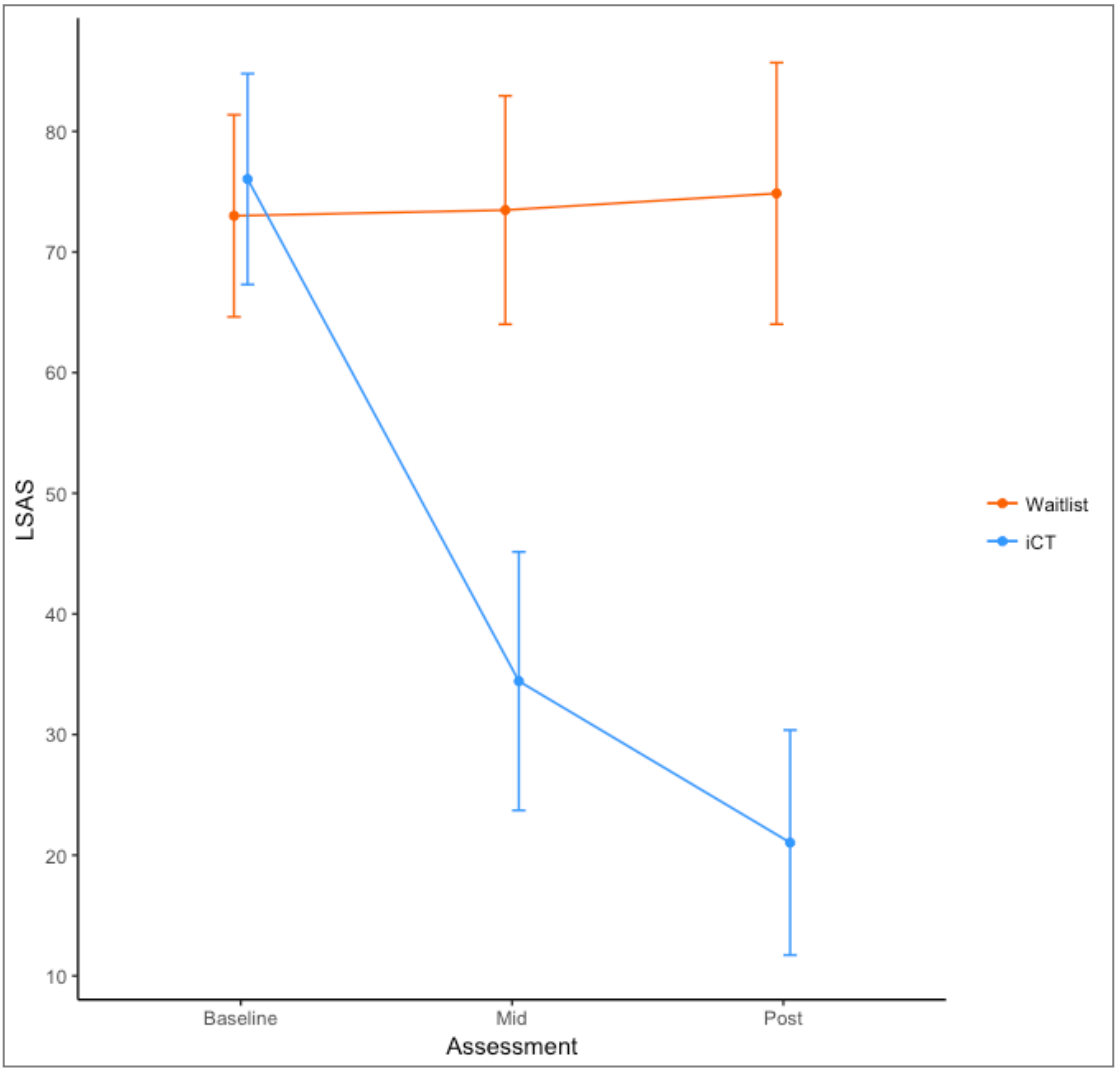


Figure 23

Mean scores on Liebowitz Social Anxiety Scale (self-report version; LSAS) at each assessment point. Error bars represent 95%CI.

Table 25

Unadjusted Means, Standard Deviations, Adjusted Differences, and Effect Sizes of the Primary and Secondary Outcome Measures for the Intention to Treat Sample.

Measure and condition	Unadjusted Mean (*SD*)			Adjusted difference (*SE*) [95%CI], *p* value		Effect size d_{Cohen} [95%CI]		
	Pre	Mid	Post	Mid	Post	Between-group at mid	Between-group at post	Within-group pre-post[a]
LSAS								
iCT	76.05 (19.72)	34.43 (23.53)	21.05 (21.03)	39.48 (5.50) [28.36, 50.60], <.001	55.36 (5.45) [44.34, 66.38], <.001	2.06 [1.48, 2.64]	2.89 [2.32, 3.47]	2.85 [2.30, 3.40]
Wait	73.00 (18.90)	73.48 (20.80)	74.86 (23.81)					0.07 [-0.34, 0.48]
SPWSS								
iCT	27.05 (4.99)	16.38 (9.15)	13.00 (6.89)	10.18 (2.02) [6.09, 14.27], <.001	14.16 (2.01) [10.09, 18.23], <.001	1.65 [0.98, 2.31]	2.29 [1.63, 2.95]	2.78 [2.01, 3.56]
Wait	27.55 (7.29)	27.00 (8.58)	27.43 (7.86)					0.02 [-0.36, 0.40]
SPIN								
iCT	42.09 (10.54)	21.38 (12.12)	15.67 (11.38)	17.81 (3.04) [11.66, 23.96], <.001	24.69 (3.04) [18.54, 30.84], <.001	1.53 [1.00, 2.06]	2.12 [1.59, 2.65]	2.38 [1.76, 3.00]
Wait	40.36 (12.84)	38.90 (12.55)	38.90 (12.18)					0.13 [-0.23, 0.49]
FNE								
iCT	26.41 (2.63)	22.43 (5.90)	20.90 (6.84)	4.58 (1.60) [1.34, 7.82], .004	5.82 (1.60) [2.58, 9.06], <.001	1.09 [0.32, 1.86]	1.38 [0.61, 2.15]	2.32 [1.21, 3.43]
Wait	23.68 (5.06)	25.10 (5.40)	24.29 (5.05)					0.08 [-0.33, 0.49]

(continued)

Measure and condition	Unadjusted Mean (*SD*)			Adjusted difference (*SE*) [95%CI], *p* value		Effect size d_{Cohen} [95%CI]		
	Pre	Mid	Post	Mid	Post	Between-group at mid	Between-group at post	Within-group pre-post[a]
SPS								
iCT	27.18	14.52	9.57	12.67 (2.99)	17.27 (2.99)	0.91	1.24	1.35
	(14.32)	(12.03)	(7.83)	[6.62, 18.72], <.001	[11.22, 23.32], <.001	[0.47, 1.34]	[0.80, 1.67]	[0.91, 1.79]
Wait	22.50	25.19	23.86					0.11
	(13.53)	(14.61)	(14.46)					[-0.22, 0.43]
SIAS								
iCT	44.50	29.86	25.67	14.29 (3.10)	19.98 (3.10)	1.20	1.68	1.39
	(12.81)	(14.15)	(10.71)	[8.01, 20.57], <.001	[13.70, 26.26], <.001	[0.67, 1.73]	[1.15, 2.21]	[0.95, 1.84]
Wait	48.91	47.43	47.57					0.11
	(10.75)	(14.35)	(12.56)					[-0.26, 0.49]
SCQ-frequency								
iCT	3.11	1.88	1.61	0.99 (0.21)	1.23 (0.21)	1.86	2.31	2.50
	(0.50)	(0.64)	(0.69)	[0.57, 1.41], <.001	[0.81, 1.64], <.001	[1.07, 2.65]	[1.52, 3.10]	[1.81, 3.18]
Wait	2.71	2.59	2.47					0.51
	(0.49)	(0.83)	(0.74)					[0.01, 1.01]
SCQ-belief								
iCT	59.38	25.78	16.36	34.51 (6.66)	40.22 (6.64)	2.09	2.44	2.88
	(14.89)	(19.43)	(17.46)	[21.03, 47.99], <.001	[26.78, 53.66], <.001	[1.27, 2.91]	[1.62, 3.25]	[2.21, 3.56]
Wait	42.71	48.57	42.75					0.01
	(13.82)	(23.20)	(25.25)					[-0.51, 0.53]
SBQ								
iCT	36.68	24.62	20.90	10.13 (2.33)	14.15 (2.33)	1.17	1.63	1.51
	(9.31)	(7.28)	(8.43)	[5.41, 14.85], <.001	[9.43, 18.87], <.001	[0.62, 1.71]	[1.09, 2.17]	[0.95, 2.06]
Wait	36.50	35.10	34.57					0.24
	(8.22)	(9.14)	(9.22)					[-0.21, 0.68]
SAQ								
iCT	201.68	160.00	148.14	41.34 (7.53)	53.04 (7.54)	1.46	1.87	2.03
	(27.53)	(39.45)	(32.30)	[26.10, 56.58], <.001	[37.78, 68.30], <.001	[0.92, 2.00]	[1.33, 2.41]	[1.54, 2.51]
Wait	185.77	189.76	186.43					0.03
	(27.41)	(23.26)	(24.96)					[-0.31, 0.38]

Measure and condition	Unadjusted Mean (*SD*)			Adjusted difference (*SE*) [95%CI], *p* value		Effect size d_{Cohen} [95%CI]		
	Pre	Mid	Post	Mid	Post	Between-group at mid	Between-group at post	Within-group pre-post[a]
Participation								
iCT	48.27	53.38	54.33	-8.96 (3.31)	-10.16 (3.32)	0.69	0.79	0.46
	(13.53)	(15.31)	(10.59)	[-15.66, -2.26], .007	[-16.88, -3.44], .002	[0.17, 1.21]	[0.27, 1.30]	[-0.09, 1.02]
Wait	40.82	40.24	40.33					0.03
	(11.43)	(10.08)	(9.77)					[-0.44, 0.49]
Satisfaction								
iCT	21.27	22.76	24.38	-2.95 (1.25)	-4.75 (1.25)	0.42	0.68	0.47
	(7.21)	(6.66)	(6.52)	[-5.48, -0.42], .018	[-7.28, -2.22], <.001	[0.06, 0.79]	[0.32, 1.05]	[0.09, 0.86]
Wait	17.95	17.71	17.90					0.01
	(6.45)	(4.86)	(4.74)					[-0.30, 0.31]
PHQ								
iCT	9.18	5.14	3.59	3.98 (1.17)	4.78 (1.16)	0.73	0.88	0.91
	(4.85)	(5.10)	(4.39)	[1.61, 6.35], .001	[2.43, 7.13], <.001	[0.30, 1.17]	[0.45, 1.31]	[0.44, 1.38]
Wait	10.41	9.71	8.90					0.20
	(6.01)	(6.16)	(6.38)					[-0.07, 0.47]
GAD								
iCT	8.41	4.48	3.59	3.55 (1.22)	4.82 (1.21)	0.75	1.02	0.93
	(5.00)	(4.74)	(3.42)	[1.08, 6.02], .004	[2.37, 7.27], <.001	[0.23, 1.28]	[0.50, 1.54]	[0.44, 1.43]
Wait	8.45	7.86	8.14					0.03
	(4.54)	(5.11)	(5.83)					[-0.36, 0.42]
WSAS								
iCT	14.36	8.33	5.73	6.75 (1.76)	9.09 (1.75)	0.87	1.17	0.99
	(8.44)	(7.44)	(5.78)	[3.19, 10.31], <.001	[5.55, 12.63], <.001	[0.41, 1.32]	[0.71, 1.62]	[0.55, 1.43]
Wait	15.52	15.50	15.17					0.04
	(7.24)	(8.26)	(7.18)					[-0.33, 0.41]
GLQ								
iCT	14.82	18.43	18.50	-2.79 (1.24)	-3.31 (1.23)	0.72	0.85	1.17
	(3.16)	(3.53)	(4.06)	[-5.30, -0.28], .024	[-5.80, -0.82], .007	[0.07, 1.36]	[0.21, 1.49]	[0.29, 2.06]
Wait	15.41	15.52	15.33					0.01
	(4.56)	(3.82)	(4.29)					[-0.43, 0.44]

Note. In the iCT group, 22 participants provided complete data at baseline, 21 at midtreatment, and 21 at posttreatment. In the wait group, 22 participants provided data at baseline, 21 at midtreatment, and 21 at posttreatment. All linear mixed effects models included baseline LSAS and gender as covariates, and a random effect of participant. LSAS = Liebowitz Social Anxiety Scale; SPWSS = Social Phobia Weekly Summary Scale; SPIN = Social Phobia Inventory; FNE = Fear of Negative Evaluation Scale; SPS = Social Phobia Scale; SIAS = Social Interaction Anxiety Scale; SCQ = Social Cognitions Questionnaire (mean scores); SBQ = Social Behaviour Questionnaire; SAQ = Social Attitudes Questionnaire; PHQ = Patient Health Questionnaire; GAD = Generalised Anxiety Disorder Questionnaire; WSAS = Work and Social Adjustment Scale; GLQ = Generalised Learning Questionnaire.

[a] Within-group effect sizes obtained from separate linear mixed effects models including baseline score as a timepoint (see method).

The weekly mean LSAS scores of the treatment group are shown in Figure 24. These data suggest that on average, participants receiving the treatment showed continued improvements in social anxiety across the treatment period, with a somewhat steeper rate during the first few weeks of treatment.

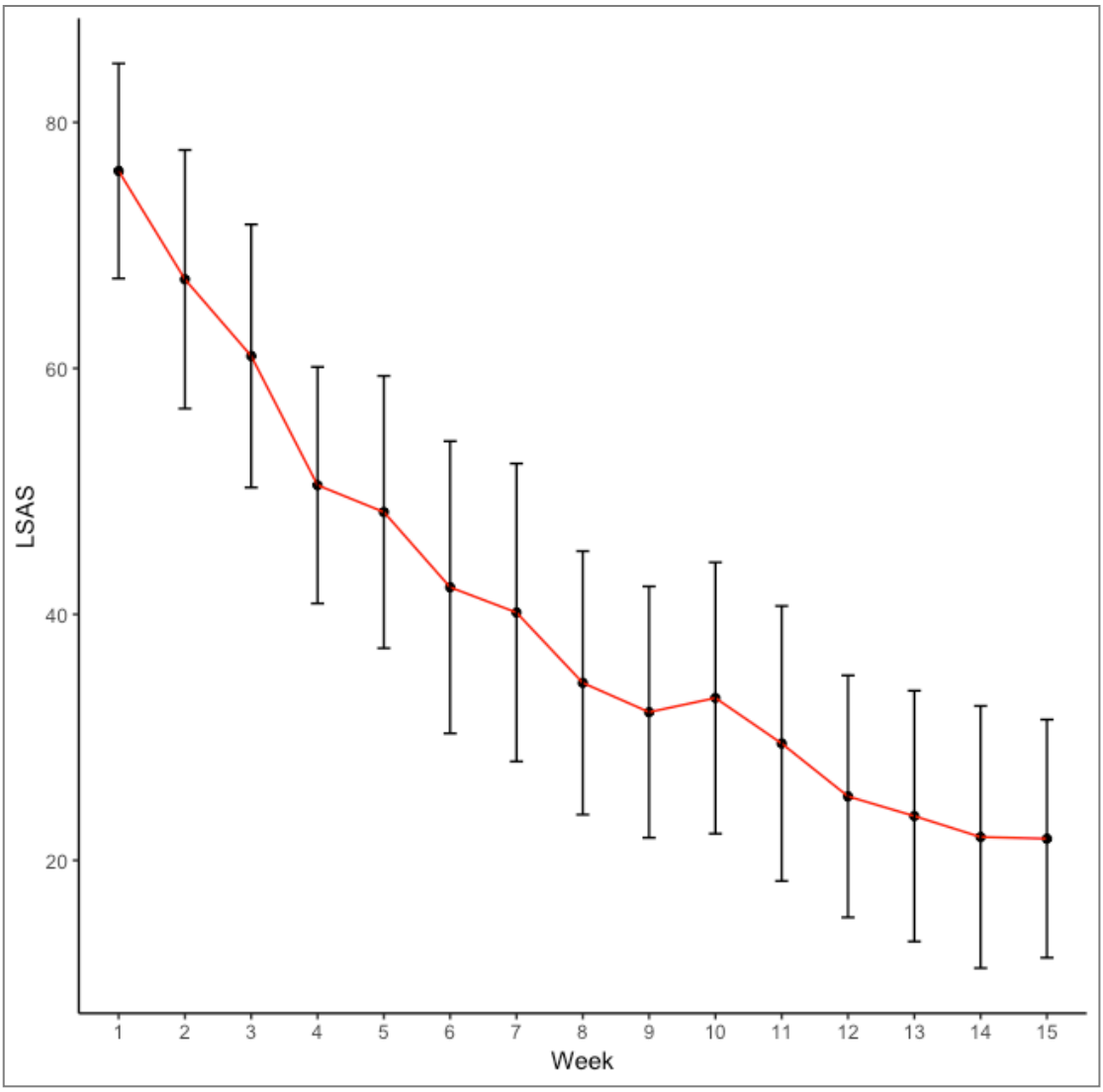


Figure 24

Mean Liebowitz Social Anxiety Scale (self-report version; LSAS) total scores at each week for the treatment group participants. Error bars = 95%CI.

Response and remission status was determined based on the demonstrated pre-post change in LSAS scores following the criteria specified in section 7.2.7. All participants were included in these analyses. Responder status was achieved by 21 participants (95%) in the iCT group, and 1 participant (5%) in the wait group. Remission status was achieved by 19 participants (86%) in the iCT group, and 1 participant (5%) in the wait group. Logistic regression analyses, including baseline LSAS score and gender as covariates, showed treatment condition was a significant predictor of response and remission (see Table 26). Using the lower remission threshold of 30 points or less on the LSAS, 17 iCT group participants (77%) and 1 wait group participant (5%) were classified as remitted from SAD. Using the IAPT criteria based on the combined SPIN and PHQ data, reliable improvement was demonstrated in 18 of the 22 participants in the treatment group (82%), and 8 of the 22 participants in the wait group (36%)[5]. Reliable recovery was demonstrated in 15 participants in the treatment group (68%), and 1 participant in the wait group (5%).

[5] Of these eight participants, three showed reliable improvement on the PHQ only, and five showed reliable improvement on the SPIN only.

Table 26

Logistic Regressions to Predict Response and Remission Status

Responder status				
	Estimate (*SE*)	*Z*	*p*	Odds ratio [95%CI]
Intercept	2.57 (3.22)	0.80	.426	13.01 [0.02, 7162.56]
Baseline LSAS	-0.09 (0.05)	-1.62	.106	0.92 [0.82, 1.02]
Gender	-0.82 (2.03)	-0.41	.684	0.44 [0.01, 23.27]
Condition	8.57 (3.05)	2.81	.005	5276.39 [13.44, 2070748.37]
Remitted status				
	Estimate (*SE*)	*Z*	*p*	Odds ratio [95%CI]
Intercept	0.53 (2.35)	0.22	.823	1.70 [0.02, 170.74]
Baseline LSAS	-0.06 (0.03)	-1.72	.085	0.94 [0.88, 1.01]
Gender	0.41 (1.41)	0.29	.769	1.51 [0.09, 24.21]
Condition	6.01 (1.63)	3.69	<.001	407.40 [16.76, 9904.83]

Notes. Overall model for responder status: χ^2 (3) = 48.5, p<.001, R^2 = .668 (Cox & Snell), .891 (Nagelkerke). Overall model for remitted status: χ^2 (3) = 39.2, p<.001, R^2 = .589 (Cox & Snell), .788 (Nagelkerke). LSAS = Liebowitz Social Anxiety Scale.

Reliable deterioration, considered an adverse event (Rozental et al., 2014), was examined for the baseline-to-post, baseline-to-mid, and mid-to-post intervals. Three participants showed reliable deterioration across the baseline-to-post interval, all of whom were in the waitlist group. Of these, two showed deterioration during the baseline-to-mid interval, and one in the mid-to-post interval. One further participant in the wait group deteriorated between baseline and midwait, though showed a subsequent improvement on the LSAS by the

postwait assessment, and two waitlist participants showed deterioration in the mid-to-post interval, prior to beginning treatment. One participant in the treatment group showed deterioration in the mid-to-post interval, though their score remained in the nonclinical range. No other adverse events or serious adverse events occurred during the study.

7.3.4.2 Secondary outcomes.

As shown in Table 25, significant group differences at postwait/posttreatment in favour of iCT were found for all secondary measures, with between-group effect sizes ranging between 0.68 and 2.44. The findings indicate that in comparison to waitlist, iCT-SAD led to significant reductions in social anxiety symptoms and related process measures (cognitions, attitudes and safety behaviours), depression, generalised anxiety, and general functioning. It also led to significant increases in social participation, social satisfaction and generalised learning.

Remission of SAD was also examined using the ADIS-5 (Brown & Barlow, 2014). A brief clinical interview was conducted by one of three independent assessors blind to treatment condition, at the posttreatment/postwait assessment point. One participant from the waitlist group, and three from the iCT group did not complete this interview, so change in diagnostic status could not be demonstrated. 16 of the 22 (73%) participants in the iCT group, and 2 of the 22 (9%) participants in the waitlist group demonstrated a change in diagnostic

status, and no longer met DSM-5 criteria for SAD[6]. A logistic regression to predict diagnostic status at posttreatment from treatment condition, with baseline LSAS and gender as covariates, indicated that treatment condition was a significant predictor, and that the odds of no longer meeting diagnostic criteria were over 56 times greater in the treatment group (see Table 27). At the postwait/posttreatment clinical interview (n = 40), one of the four participants who were taking psychotropic medication at baseline reported having stopped. No other participants had changed medication status since randomisation.

Table 27

Logistic Regression to Predict SAD Diagnostic Status at Postwait/Posttreatment

	Estimate (*SE*)	*Z*	*p*	Odds ratio [95%CI]
Intercept	-1.53 (2.00)	-0.77	.443	0.22 [<0.01, 10.91]
Baseline LSAS	-0.02 (0.02)	-1.01	.312	0.98 [0.93, 1.02]
Gender	1.96 (1.20)	1.64	.101	7.09 [0.68, 73.93]
Condition	4.04 (1.18)	3.42	<.001	56.60 [5.58, 573.69]

Notes. Overall model: χ^2 (3) = 26.1, p<.001, R^2 = .447 (Cox & Snell), .603 (Nagelkerke). LSAS = Liebowitz Social Anxiety Scale.

7.3.5 Therapeutic Alliance and Treatment Credibility

For those in the iCT group, ratings of therapeutic alliance (by participant and therapist), and treatment credibility (by participant) were given following two

[6] The posttreatment LSAS scores for the three participants in the treatment group who did not complete the ADIS interview were 6, 9, and 55, indicating that two of the three were classified as remitted from SAD, which would suggest they may have no longer met diagnostic criteria at interview. The third participant's score would suggest they may still have met diagnostic criteria.

weeks of treatment. Excluding the two iCT group participants who withdrew prior to this point (remaining n = 20), the mean participant-rated alliance score was 67.8 (SD = 9.8), which was similar to the mean therapist-rated alliance score of 66.4 (SD = 4.3). The mean participant-rated treatment credibility score was 7.4 (SD = 1.3). As the maximum mean score is ten, this indicates the treatment was generally perceived as credible, and likely to be of benefit. A linear regression to predict LSAS residualised gain scores from participant-rated treatment credibility, participant-rated therapeutic alliance, and therapist-rated therapeutic alliance, including baseline LSAS scores and gender as covariates, was not significant: $F(5, 14) = 0.394$, $p = .845$, $R^2 = 0.123$. Participant-rated treatment credibility (*beta* = −0.320, $p = .953$), participant-rated therapeutic alliance (*beta* = 0.196, $p = .826$), and therapist-rated therapeutic alliance (*beta* = −1.546, $p = .212$) did not significantly predict clinical improvement as measured by the LSAS.

7.3.6 Benchmarking Against UK Efficacy

A comparison of key outcomes from previous studies of iCT-SAD (Clark, Wild, et al., in preparation; Stott et al., 2013) and the present findings is shown in Table 28. The present findings indicate that the efficacy shown in UK studies was maintained when implementing the treatment in Hong Kong, and that participants in Hong Kong began treatment at a similar level of social anxiety severity to those in the UK.

Table 28

Summary of Findings Across iCT-SAD Studies (Intention-to-Treat)

	Stott et al (2013) Development case series	Clark et al (in prep) RCT (iCT-SAD group)	Present RCT (iCT-SAD group)
Location	UK	UK	Hong Kong
N	11	49	22
Mean LSAS at baseline (SD)	80.0 (24.6)	77.7 (17.7)	76.1 (19.7)
Mean LSAS at post (SD)	39.8 (30.1)	32.3 (19.4)	21.1 (21.0)
Within-group d_{Cohen} (pre-post)	1.64	2.56	2.85
Response rate (%)	82	100	95
Remission rate (%)	64	74	86

Notes. The criteria to define response and remission were the same across studies, and relate to the posttreatment assessment.

7.3.7 Mediation of Clinical Improvement

Exploratory analyses of candidate mediators were undertaken using linear mixed models as described in section 7.2.8. Results are shown in Table 29. Midwait/midtreatment scores on self-focused attention, negative social cognitions, depressed mood, safety behaviours, and rumination were all found to significantly mediate the relationship between randomisation (treatment condition) and postwait/posttreatment scores on the LSAS, with negative social cognitions (SCQ belief subscale) and safety behaviours showing the strongest

effect. Models reversing the mediator and outcome variables also showed significant mediation for all candidate mediators except the belief subscale for negative social cognitions, with generally larger percent mediation values. This may indicate a cyclical relationship between changes in process variables and changes in symptoms.

Table 29

Mediation of Postwait/Posttreatment Scores

Mediator (at mid)	Total Effect		Direct Effect		Indirect Effect		% Mediated
	Adjusted Difference [95%CI]	*p*	Adjusted Difference [95%CI]	*p*	Adjusted Difference [95%CI]	*p*	
			Outcome = LSAS at post				
SFA	-55.28 [-66.30, -44.26]	<.001	-49.09 [-60.47, -37.72]	<.001	-7.21 [-13.36, -1.06]	.022	13
SCQ-f	-61.30 [-72.61, -49.99]	<.001	-52.53 [-65.73, -39.33]	<.001	-8.82 [-16.68, -0.95]	.028	14
SCQ-b	-59.43 [-72.22, -46.64]	<.001	-47.77 [-63.40, -32.14]	<.001	-12.16 [-22.38, -1.95]	.020	20
PHQ	-55.09 [-66.29, -43.88]	<.001	-48.09 [-59.83, -36.34]	<.001	-7.99 [-14.95, -1.02]	.025	14
SBQ	-55.38 [-66.46, -44.29]	<.001	-44.85 [-58.09, -31.61]	<.001	-10.84[-19.69, -2.00]	.016	20
Rumination	-54.43 [-65.17, -43.68]	<.001	-48.59 [-59.56, -37.63]	<.001	-6.91 [-12.72, -1.10]	.020	13
			'Reversed' models: Mediator = LSAS at mid				
Outcome (at post)	Total Effect		Direct Effect		Indirect Effect		% Mediated
	Adjusted Difference [95%CI]	*p*	Adjusted Difference [95%CI]	*p*	Adjusted Difference [95%CI]	*p*	
SFA	-2.23 [-3.18, -1.27]	<.001	-0.86 [-2.18, 0.46]	.186	-1.41 [-2.41, -0.42]	.005	64
SCQ-f	-1.22 [-1.64, -0.81]	<.001	-0.66 [-1.20, -0.13]	.012	-0.63 [-1.06, -0.20]	.004	52
SCQ-b	-40.22 [-53.65, -26.78]	<.001	-31.42 [-50.19, -12.64]	.001	-10.65 [-24.07, 2.77]	.120	-
PHQ	-4.78 [-7.13, -2.43]	<.001	-1.08 [-4.16, 2.00]	.476	-3.90 [-6.31, -1.49]	.002	82
SBQ	-14.15 [-18.86, -9.43]	<.001	-9.13 [-15.32, -2.93]	.003	-5.96 [-10.59, -1.32]	.012	42
Rumination	-2.81 [-3.83, -1.80]	<.001	-1.32 [-2.67, 0.03]	.047	-1.53 [-2.53, -0.53]	.003	54

Notes. N = 44. Coefficients estimated using linear mixed effects models, with total, direct, and indirect effects calculated following Baron and Kenny (1986). All models included baseline scores on the mediator and outcome variables as fixed covariates, and a random effect of participant. LSAS = Liebowitz Social Anxiety

Scale (Self-Report); SFA = Self-focused attention (SPWSS); SCQ-f = Social Cognitions Questionnaire (frequency subscale); SCQ-b = Social Cognitions Questionnaire (belief subscale); PHQ = Patient Health Questionnaire; SBQ = Social Behaviour Questionnaire; Rumination = SPWSS rumination item.

7.4 Discussion

The aim of this study was to examine whether iCT-SAD was superior to a waitlist control condition when delivered in Hong Kong, a cultural context different to where the treatment was developed. We also aimed to benchmark the performance of iCT-SAD in Hong Kong against the results of UK studies. Analysis of the primary outcome measure (LSAS) indicated that the treatment group showed significantly greater reductions in social anxiety compared to waitlist, with between- and within-group effect sizes (d_{Cohen}) of 2.89 and 2.85 respectively. 95% of the treatment group were classified as treatment responders, and 86% as remitted from social anxiety at the posttreatment assessment, with the equivalent values in the waitlist group of 5% and 5%, respectively. As the treatment was completed by 20 out of 22 participants (91%), the present findings support those of Study 4 in suggesting that the treatment was feasible to implement and acceptable to participants in this setting.

Comparing the present results to UK studies of iCT-SAD (Clark, Wild, et al., in preparation; Stott et al., 2013), the participants showed a similar level of mean social anxiety severity at baseline. The large effect sizes observed were also comparable to the UK studies and larger than all studies of ICBT interventions for SAD included in the metaanalysis by Kampmann et al (2016), where the mean within-group pre-post effect size (Hedges g)[7] was 0.96. The present results

[7] For comparison, the present LSAS within-group d_{Cohen} value (2.85) converts to a Hedges g value of 2.75 (see Durlak, 2009).

are therefore consistent with the view that iCT-SAD represents one of the most efficacious internet interventions for social anxiety. They would also suggest that the treatment was transported to Hong Kong without substantial loss of efficacy, consistent with the results of other studies implementing online treatments in new cultural contexts (Gallego et al., 2011; Jakobsen et al., 2017; Kishimoto et al., 2016; Tulbure et al., 2015), and the results of the pilot case series (Chapter 6). This is the first study of this type to examine an untranslated and largely unadapted treatment, and feedback from the study therapists and participants did not highlight any major cultural barriers likely to have hindered engagement, understanding, or progress within treatment. It is noted that the therapist time per patient (mean duration of calls and webchats 7.5 hours) was greater than that in UK studies (Mean 3.9 hours), which may be due to the further clarifications and explanations required of the therapists when participants were working in a nonnative language, or that the present therapists had comparatively less experience using the programme. Requirements for translation will obviously depend on the settings involved, but where the influence of culture on treatment is unknown or uncertain, the present findings imply that testing treatments in their unadapted form may be appropriate, in that this can help to understand if and how adaptation should be performed, along with reducing or eliminating the time and resources required to achieve this.

The secondary outcome measures indicated that compared to waitlist, significantly greater change was observed in the treatment group on other measures of social anxiety symptoms, social anxiety process measures,

depression, generalised anxiety, general functioning, and generalised learning at the posttreatment assessment (between-group effect sizes 0.68 to 2.44). Diagnostic interviews by independent assessors blind to treatment condition at the posttreatment/postwait timepoint indicated that the percentage of participants who demonstrated no longer meeting DSM-5 criteria for SAD was 73% in the treatment group and 9% in the waitlist group[8]. The primary and secondary outcomes of the study were therefore largely in agreement, suggesting that treatment was associated with improvements specific to social anxiety, alongside more general improvements in mood and functioning. As this is one of the first trials of an internet intervention in Hong Kong, it demonstrates the potential of this treatment modality in the HKSAR, given the positive findings regarding feasibility, acceptability to participants, completion rates, and clinical outcomes.

While the UK trial of iCT-SAD (Clark, Wild, et al., in preparation) found that participant-rated alliance and treatment credibility (but not therapist-rated alliance) were predictive of clinical outcome, none of these variables predicted LSAS residualised gain scores in the present study. This would suggest that other treatment components were responsible for the clinical effects observed. Exploratory mediation models suggested that the observed posttreatment effect on the LSAS was mediated by prior scores on a range of process variables, namely self-focused attention, negative social cognitions (SCQ frequency and

[8] Note these values are based on the conservative 'demonstrated change' approach. Using posttreatment LSAS scores as an indicator of diagnostic status where data were missing, the percentage of the treatment group no longer meeting diagnostic criteria was 82%.

belief), depressed mood, safety behaviours, and rumination. Significant reverse mediation was also shown for all but one (SCQ belief) of these variables, and similar to findings from Studies 1 and 2a, strong mediation effects were observed in this direction, suggesting a cyclical relationship (see Chapter 8 for further discussion). Although baseline scores on the mediator and outcome variables were accounted for in these models, it is possible that the strength of the present mediation effects may be underestimated given that much of the overall change on these variables occurred prior to the midpoint assessment. Further examination of mediation effects at a week-to-week level is recommended.

7.4.1 Strengths and Limitations

Strengths of the present study include the use of randomisation, diagnostic assessment procedures, the use of qualified and fully trained therapists, ITT analysis, and blinded assessment of outcome. Possible limitations to be considered are recruitment from the community, which is positive in that people could self-refer and may have lessened issues of stigma regarding accessing mental health services, but may limit generalisability to clinic samples. It is noted however, that similar results were obtained in the pilot case series (Chapter 6), where recruitment was from clinical services, but further work in clinic settings is recommended. The requirement of English proficiency may have resulted in younger, more educated participants being overrepresented in the sample. Translation of the programme into Chinese for future studies may permit wider recruitment. The baseline internal consistency of the SPWSS was low in comparison to the other measures used, and for the GLQ this did not reach an

acceptable level, so results from these measures should be interpreted with caution. Lastly, the use of a waitlist control condition means more detailed examination of specific treatment effects was not possible. The waitlist condition was deemed appropriate given this was the first trial of this intervention in Hong Kong, and that waiting periods for psychological therapy are common, and therefore ecologically valid, in this setting. However, the use of active control conditions in future studies would allow more detailed research questions to be addressed.

7.4.2 Conclusion

The results indicate that the high efficacy of iCT-SAD observed in UK studies was maintained when the treatment was transported and implemented by local therapists in Hong Kong. This study therefore adds to the bodies of evidence that SAD can be treated successfully using internet cognitive-behavioural interventions, and that the transportation of these from one culture to another can be implemented without substantial loss of efficacy. Internet interventions such as iCT-SAD may therefore provide a promising route to increase the international dissemination of evidence-based psychological therapies.

8

General Discussion

This thesis aimed to examine two key issues in relation to evidence-based psychological therapies, using CT-SAD as an example. Firstly, that our understanding of how and why such treatments have their clinical effects is limited, and secondly, that at a global level, most people experiencing mental health problems are unable to access such treatments. This chapter aims to draw together the findings of this thesis in relation to these issues, and consider their implications for theory, research, and clinical practice.

8.1 Mechanisms of Change

Understanding how CT-SAD works requires examination of the mechanisms that may underpin clinical improvement at a week-to-week level. Studies 1, 2a, and 2b tested mediation hypotheses, using both RCT data, which has the advantage of tightly controlled treatment delivery, and data from routine practice, which benefits from larger samples. Studies 3a, 3b, and 3c examined mechanisms at the specific points in therapy where participants experienced sudden gains.

As noted in Chapter 4, the mediation studies were consistent in their support for changes in negative social cognitions as a mediator of subsequent changes in social anxiety. This is therefore in line with one of the key maintenance

processes of the Clark and Wells (1995) model that underpins the treatment, and suggests that one of the reasons why people experience less social anxiety as they progress through treatment is that they are experiencing fewer and less-convincing negative thoughts about social situations. For self-focused attention, another key anxiety-maintaining process in the cognitive model, the evidence was more mixed, with mediation supported in data from an RCT dataset but not one from routine clinical practice. As stated in Chapter 4, more research in routine care is needed, especially following more recent developments in clinical techniques to target self-focused attention in therapy. Depressed mood, included in the present studies as a control mediator, showed significant but weak mediation effects in Studies 1, 2a, and 5, and no effect in Study 2b. As depressed mood is not part of the cognitive model, the findings provide some support for the specificity of the significant effects found.

Significant 'reversed' mediation effects were also observed in most studies, which were often stronger than in the forward models. The difference in percent mediation between forward and reversed models was larger for self-focused attention (e.g. Studies 1, 2a, 2b, and 5) compared to negative social cognitions. There appear to be two factors contributing to this pattern of results: Firstly, the forward mediation effects for cognitions were stronger than for self-focused attention, and secondly, most of the studies (Studies 1, 2b, and 5) showed stronger reverse mediation for self-focused attention than negative social cognitions. The former may result from the fact that the social anxiety measures (LSAS and SPIN) emphasise avoidance; it could be argued that the behavioural experiments used to address negative social cognitions also help to reduce

avoidance, whereas reducing self-focused attention may not necessarily do this, meaning a less strong mediation effect for self-focused attention. As discussed in Chapter 4, an additional consideration for the present studies is that self-focused attention may have been emphasised less in treatment compared to cognitions. While a direct link between cognitions and behavioural experiments will have been made consistently across therapy and across studies, self-focused attention may have been less closely tied to experiments, particularly across later parts of therapy, which might account for a weaker mediated effect. The latter (stronger reverse mediation for self-focused attention than negative social cognitions) may be due to the fact that self-focused attention is more changeable moment-to-moment compared to belief in negative cognitions. If you are feeling less socially anxious in general, your overall level of self-focused attention is likely to be lower almost immediately and persist over the next week, whereas for some cognitions it may take longer to accumulate sufficient evidence to start to change the degree of belief.

The examination of sudden gains in Study 3a produced results that were relatively consistent with the mediation studies, with some evidence that negative social cognitions and self-focused attention, but not depressed mood, showed significant reductions immediately prior to sudden gains. Again, this supports the maintenance processes of the cognitive model, and the view that reductions in negative cognitions, and a shift towards a more external focus of attention are associated with subsequent clinical improvement.

However, it is important to recognise that demonstrating mediation or other associations statistically is not the same as demonstrating causality (Fiedler, Schott, & Meiser, 2011; Kraemer et al., 2002), and that making interpretations about causal mechanisms must consider theory, and the degree of convergent evidence from a number of sources. Kazdin (2007) outlined a framework for considering causality in relation to mechanisms of change research. He highlighted seven criteria that would be required when making causal inferences, using mediation as an example (see also Lemmens, Müller, Arntz, & Huibers, 2016). These are listed and discussed below with regard to the present findings:

Strong association – this requirement is that variables hypothesised to be mediators or part of a mechanism of change should be strongly associated with the intervention, and outcome. This was definitely the case for the present mediation studies, and was also true in the data from Hong Kong (Studies 4 and 5). For the study of sudden gains, an association between prior changes in negative cognitions, and the outcome (a sudden gain) was observed, and similarly for self-focused attention, but given these variables declined steadily throughout treatment, it is less clear whether these changes are causally linked to the occurrence of gains. It is possible that a sudden gain could represent a 'final common pathway' resulting from a heterogeneous set of causes, meaning that a range of process variables may show associations with sudden gains, and that specific effects are less likely.

Specificity – the hypothesised mechanism should show specific effects, e.g. observed in the intervention of interest but not others, and multiple mediators do not show the same effect. The present findings cannot rule out the possibility that other mediators or mechanisms may also contribute to clinical improvement in CT-SAD and iCT-SAD, but the inclusion of depressed mood as a control mediator, and its nonsignificant or weak associations with clinical improvement shown across the mediation and sudden gains studies, provides support for the specificity requirement.

Consistency – effects should occur consistently across studies. Negative social cognitions, and to a lesser degree self-focused attention, showed good consistency across studies as predictors of clinical improvement.

Experimental manipulation – direct manipulation of proposed mediators in an experimental design should show an influence on outcome. This was not incorporated into the present studies, however there is some experimental literature demonstrating that manipulating self-focused attention (McManus et al., 2009), and addressing negative beliefs about social performance using video feedback (Warnock-Parkes et al., 2016) can both reduce social anxiety.

Timeline – proposed mediators and variables within a hypothesised mechanism should temporally precede the outcome. Temporal precedence was a key feature of the mediation models used in Studies 1, 2a, 2b, and 5, and changes prior to sudden gains were examined in Studies 3a-3c. This requirement was therefore met, though it is noted that some of the 'reversed' mediation models showed

significant effects, suggesting a cyclical relationship, which may complicate causal inferences.

Gradient – greater activation or change in the mediator should be associated with greater change in outcome. This was examined directly in the latent change score models of Study 2b, and found to be the case for negative social cognitions. Similarly, as generalised learning could perhaps be conceptualised as a form of reduced negative cognition, the observed association between generalised learning and large changes in outcome (sudden gains) may also support this criterion.

Plausibility – hypothesised mechanisms should have a strong theoretical basis. The choice of mediators examined in the present studies was strongly guided by theory, which permits greater confidence in the findings.

Taking account of all the above, the present studies appear to meet most of the requirements, which perhaps gives reasonable grounds to have confidence that the observed results reflect underlying causal processes. However, further replication in other samples, and investigation of the possible cyclical mediation effects would be beneficial.

8.1.1 Comparison of CT-SAD and iCT-SAD

The present studies offer a number of opportunities to examine the similarity of change mechanisms between the face-to-face (CT-SAD) and internet-based (iCT-SAD) forms of the treatment. Using treatment type as a moderator in Study 1, no

moderated mediation effects were observed, suggesting the format of treatment did not affect the mediation effects shown. Consistent with this, the frequency and magnitude of sudden gains found in both treatments was similar, and both had gains that were reasonably broadly distributed across the therapy period. Having a sudden gain predicted better therapy outcomes, and again this effect did not differ by treatment type. Additionally, while Study 5 only examined iCT-SAD, the mediation results showed broad alignment with those of the iCT-SAD data in Study 1, and the CT-SAD data in Studies 2a and 2b. On balance, the results across the different studies presented here indicate that the mechanisms of clinical improvement appear to be operating similarly between CT-SAD and iCT-SAD. While different mediators have been observed between group and individual therapies for SAD (Hedman et al., 2013), the present studies are the first to examine mechanisms of change across two formats of the same treatment content, and this initial evidence would suggest that delivering a psychological intervention online does not significantly alter how the treatment works, assuming the content is the same.

8.1.2 Research Implications

The present findings may have a range of implications for future research into the mechanisms of change in psychotherapy. From a methodological perspective, the use of a 'control' candidate mediator, statistical methods such as multilevel SEM to account for repeated-measures data and therefore the between- and within-person variance, and the use of latent change score variables where possible, were strengths of the present work and should be considered for future work in this area. Reversed mediation models are also not implemented

consistently and this is therefore recommended. It is suggested that for the study of sudden gains, the use of methods to compare change trajectories between those who do and do not experience gains (see section 5.3.3) is helpful to understand their potential clinical significance. Where session tapes are being evaluated, the use of sessions from 'nongainers' as foils helped to ensure rater blindness and therefore may be appropriate for future research following a similar design.

As noted in previous chapters, the development and validation of a more comprehensive scale to measure self-focused attention rather than a single item would be helpful to examine in greater detail the role of this construct within processes of change. The Generalised Learning Questionnaire (GLQ), which was piloted for the first time in Study 5, showed some sensitivity to change over time, but poor internal consistency, so would benefit from further refinement. Further studies of cognitive change could also usefully consider a more idiosyncratic approach to measuring cognitions. The present sudden gains studies raise the possibility that these large symptom reductions may be more closely associated with idiosyncratic cognitions than they are with the standard set of common negative social cognitions used on the SCQ. It may therefore be that this type of standardised cognition measure, that is required for mediation studies, is less suitable to examine sudden gains or other patterns of individual change, and that alternatives should be explored. One option would be to assign greater weight to those cognitions that are more personally salient for the respondent e.g. those that cause greater distress, or those that are more closely tied to the respondent's self-concept or sense of self-worth. Finally with regard to

measurement, the present studies have used mostly self-report measures, and so one clear implication for further research would be to consider the extent to which behavioural or observational measures of the constructs examined here are possible, their psychometric properties, and their feasibility within treatment studies.

Perhaps one of the most important aims for future SAD mechanisms research should be to establish greater consistency in the investigation of mediators and interventions being examined. Most studies to date have used data from RCTs, which often use relatively small samples. While such studies can still produce valuable findings, we could have greater confidence to draw conclusions if studies used sufficiently similar approaches to permit metaanalysis. Where possible, examining larger datasets from routine practice would be beneficial, provided there is reasonable consistency in how the treatment is delivered, which can be more variable in these settings. While the present studies aimed for consistency regarding choice of mediators and intervention content, there remains a high degree of variability within the existing literature at present, which is likely to hinder attempts at synthesising findings. It may be that the further development and dissemination of iCT-SAD and other internet interventions will help in this respect, as online methods can ensure consistent delivery of treatment content, and more easily generate the larger and more complete datasets required to replicate and extend mechanisms research.

8.2 Treatment Dissemination

Addressing the global lack of access to evidence-based psychological therapies will of course require large-scale research and dissemination efforts beyond the scope of a single thesis. However, for this to occur, we need to develop our understanding of whether internet-based treatments, which are thought to be more easily disseminated internationally compared to face-to-face therapy, can be transported and implemented into new countries and cultures without substantial loss of efficacy. Studies 4 and 5 examined this question by transporting iCT-SAD to Hong Kong, training local therapists to deliver the programme, and evaluating efficacy in a RCT.

The high treatment completion rates and clinical efficacy shown in Studies 4 and 5 suggests that transporting iCT-SAD to Hong Kong was practical and feasible, and that participants in this cultural setting were able to benefit from the treatment just as much as participants in UK studies. The findings are therefore promising for the global potential of iCT-SAD and, given their alignment with similar studies, of internet interventions for SAD more broadly. As the present work was limited to English-speaking participants, evaluation of a Chinese translation of the treatment is required to further test transportability and cultural applicability. Equally, further examination of different interventions in a range of countries and cultures is required before broader conclusions about global dissemination can be drawn. It could be argued that while Hong Kong and the UK are culturally distinct, they share similar levels of technological

advancement, and mental healthcare provision. It may also be suggested that Hong Kong is one of the more 'westernised' settings in Asia. These factors may have facilitated the transportation of iCT-SAD, so an important direction for future research would be examining such treatments in low- and middle-income countries where internet use and mental health awareness may be lower. To date, there are examples of successful large-scale face-to-face initiatives in these settings (e.g. Patel et al., 2010) but work involving internet interventions is rare.

The use of an untranslated and largely unadapted treatment in Studies 4 and 5 is different from existing literature, where adaptations are usually made first and then the adapted treatment tested in a trial (e.g. Griner & Smith, 2006). Given such high efficacy was found, the results appear to indicate that extensive cultural adaptation was not required in this instance. Importantly, this does not suggest that culture had no influence on the treatment, just that the impact was not such that it prevented clinical improvement. While this approach will not be suitable in all circumstances, the present findings suggest this should be considered where this is practical, in that it offers a more structured empirical approach giving a baseline to work from, for use as a control condition or benchmark in subsequent studies. Given the time and expense that may be involved in the choice and implementation of adaptations, and the lack of clear evidence as to whether the adaptations themselves lead to improved outcomes, this stepwise, and perhaps more cautious, approach may prove more efficient.

There are various ways to take forward the development and dissemination of iCT-SAD, many of which are likely to apply to other internet interventions for

SAD and other clinical presentations. Firstly, as mentioned above, the present work in Hong Kong would usefully be progressed by translation into Chinese and further testing, both in community and routine care samples. Secondly, it would be important to examine potential methods to deliver the treatment more efficiently; one example would be to examine the efficacy of the treatment content without input from a clinical psychologist. By using trained 'coaches' to retain the same level of personal contact and encouragement, but without any clinical content, it could be seen whether similar clinical benefits could be observed in a more cost-effective, and therefore scalable, way. Thirdly, testing the treatment in other new cultural settings would provide more comprehensive information about how the same treatment performs internationally. Lastly, further investigation of the mechanisms of change in iCT-SAD would help to understand whether the treatment is operating similarly across cultural settings, and similarly to face-to-face therapy, which may be important in reassuring patients, therapists, and service managers who have reservations about the online format.

There is also significant scope to further develop the therapist training programme from Study 4. A principal question at this stage is whether the same quality of training and outcomes can be achieved when delivered more efficiently. Online therapist training would be a particularly scalable option, and has shown promise in training therapists to deliver face-to-face interventions (Cooper, Bailey-Straebler, et al., 2017; Fairburn et al., 2017). However, online training for online interventions has yet to be reported in the literature and is likely to require additional specific content (see section 8.3.5). Training larger

groups of therapists in less time is perhaps the next step to permit wider dissemination.

It should be noted that iCT-SAD, a direct adaptation of the face-to-face therapy protocol into a therapist-guided online format, designed for use within clinical services, represents just one approach to using the internet to facilitate treatment dissemination. One alternative is 'massive online open interventions/courses' (MOOIs/MOOCs), which are freely available programs that in mental health are mostly unguided and follow a bibliotherapy or self-help approach. Various combinations of the above two approaches above are also possible, such as the 'Joyable' intervention for SAD (Dryman, McTeague, Olino, & Heimberg, 2017), an open-access CBT-intervention with guidance from coaches, who are appropriately trained but not licensed mental health professionals. Open-access interventions such has this have the advantage of accessibility and can therefore reach large numbers of people, but as might be expected have much higher attrition rates; only 16% of people in Dryman and colleagues' study completed the intervention, and this was large compared to other similar interventions. However, as medium-to-large within-group effects (d_{Cohen} = 0.63 – 1.83) were observed for those who engaged with the program (n = 540), the clinical value is notable, and this may be a particularly suitable approach for those who are more able to work independently, for example where people are highly motivated, or have less severe difficulties. The MOOC approach could also be applied to therapist training in that this is highly scalable (Fairburn & Patel, 2017), so it seems that having a variety of approaches to online intervention

delivery may confer additional advantages in terms of patient choice and accessibility.

8.3 Clinical Implications

A number of possible clinical implications have arisen from the studies presented here, and are discussed below.

8.3.1 Working with Negative Social Cognitions

The association between changes in negative social cognitions and subsequent clinical improvement highlights the importance of identifying and addressing such cognitions in therapy. While working with negative cognitions is obviously a core feature of all cognitive behavioural therapies, it is possible that among therapists using CT-SAD or other CBT approaches, there is variation in the extent to which specific cognitions are focused on, the methods used to introduce alternative perspectives, and the degree to which cognitive work is maintained across the therapy period. The present findings would suggest that regular monitoring of common negative social cognitions (e.g. using the Social Cognitions Questionnaire), and the use of cognitive strategies to 'loosen' negative beliefs, combined with frequent behavioural experiments across all sessions to examine specific predictions, would be the recommended approach to maximise the chance of continued clinical improvement. It is noted that the routine monitoring of cognitions is not done consistently in many clinical services, or in some RCTs of CT-SAD (e.g. Leichsenring et al., 2014). It is possible this may be

one reason for the smaller amount of clinical improvement shown in such studies, when compared to trials that implement this aspect of the protocol.

8.3.2 Working with Self-focused Attention

Studies 1 (mediation), 3a (sudden gains), and 5 (Hong Kong RCT) have provided support for an association between reductions in self-focused attention and clinical improvement, which suggests that placing greater emphasis on addressing self-focused attention in therapy is likely to be of benefit. The CT-SAD and iCT-SAD approach uses a series of 'attention training' exercises in the early part of therapy. However, as highlighted in the data from routine clinical practice (Studies 2a and 2b), attention training sessions may not be used consistently with people with SAD, and the present findings suggest this is advisable. Two further strategies were emphasised during the Hong Kong studies that may have contributed to the positive outcomes observed: firstly, participants were encouraged to engage in continued practice of using an 'external focus', and in particular to apply this during behavioural experiments. Secondly, in situations where a client felt an experiment was especially uncomfortable, or following other social situations they found difficult, the therapist would encourage them to consider whether this may have been the result of an unintended shift towards being more self-focused. This was usually the case, and would therefore lead to discussion of how to manage this next time. It can be a challenge for both patients and therapists to sustain the emphasis on being externally focused, so establishing regular practice and reflecting on any difficulties may help to reinforce this learning from the early part of treatment.

8.3.3 Facilitating Clients to Generalise Their Learning

The present findings offer preliminary evidence that generalised learning significantly increases across the iCT-SAD intervention period (Study 5), and may be associated with sudden gains in CT-SAD (Study 3b). While these results are tentative given the study limitations and therefore require further examination, they may suggest more could be done clinically to promote new learning being generalised across situations. As suggested in Chapter 5, it may be beneficial for clinicians to elicit discussion about the broader application of new learning after experiments or other therapy tasks (E.g. "What does this say about you as a person?", "Do you think this would also apply in your conversations at work?"). Planning repetition of similar experiments across different situations (especially those directly relevant to the person) may help to examine generalisation more directly, and help clients develop confidence that their social fears are unlikely to happen and that interactions will be more positive than expected. It is possible that generalising work such as this may assist with the 'transfer-of-learning problem' (Harvey et al., 2014), where people may forget to apply their learning from therapy in different contexts, and this may merit further investigation.

8.3.4 Capitalising on Treatment Gains and Sudden Gains

The clinical question of how to respond when a client has made a suspected sudden gain is an interesting one. There is some evidence that gains may trigger improvements in therapeutic alliance and further cognitive change (Lutz et al., 2013; Tang & DeRubeis, 1999) but it is not clear whether the therapist's behaviour is part of this mechanism. The present studies did not examine the

postgain period directly, and further work on this, including experimental approaches, would be useful. The clinical approach taken with participants in the Hong Kong studies, which is also part of the CT-SAD protocol, was to discuss questionnaire responses every week, and where a large gain had occurred this was noted and reflected on; participants would be asked what they make of it and what they felt led to it. Having established what seemed to be helpful, the therapist can then encourage and facilitate further implementation of these strategies. It is noted that gains can only be identified when weekly outcome and process measures are being used, which may be variable across services and therapists, and is therefore encouraged.

8.3.5 Therapist Training for Online Treatments

The clinical implications above could all be readily integrated into training programmes for therapists learning to deliver iCT-SAD or similar online treatments. Although the therapist training presented here (Study 4) was not controlled, feedback from the therapists indicated that the training components described below, which are more unique to online therapy, were helpful and may have played an important part in developing their confidence and competence to deliver iCT-SAD, and should be considered for future training efforts:

Training in how to review completed modules – therapists are taught both a general framework for reviewing modules (e.g. checking components are complete, checking client's understanding based on their written responses, seeing if related behavioural experiments have been planned/completed), along

with specific guidance relating to particular modules (such as developing a model, or reviewing ratings before and after video feedback).

Training in therapist communication methods – therapists are given guidance on how to construct messages and organise phonecalls, and have opportunities to practise this in training. While communication in therapy needs to be flexible and tailored to the client, broad guidance such as this can offer some structure and help manage therapists' time.

Troubleshooting common problems – therapists are encouraged to consider the difficulties they will encounter most commonly (e.g. a client not logging in, incomplete modules, difficulty setting up experiments remotely etc.) and how to address these. Further strategies and suggestions are offered as required.

Understanding the role of the therapist – therapists are trained in how their clinical role in an online therapy is subtly different to face-to-face work, and are encouraged to think how to implement this in practice. In general, the main shift in approach is allowing the program to deliver the treatment content, providing an increased role of guide and supporter, but continuing to use clinical knowledge to help clients prioritise their work in treatment, and maximise and consolidate their learning.

8.4 Conclusion

The findings of this thesis offer incremental advances in our understanding of how evidence-based psychological therapies have their clinical effects, and whether they can be disseminated internationally without substantial loss of efficacy. The results have shown evidence to support the role of changing negative social cognitions, and to some degree self-focused attention, in determining subsequent clinical improvement in CT-SAD and iCT-SAD. This suggests that these therapies do appear to be having their clinical effects through the mechanisms stated in the cognitive model on which they are based, and that these mechanisms are similar across the two treatment formats. The generalisation of learning obtained in therapy has been raised as a further possible mechanism of therapeutic change, and merits further investigation. The Hong Kong studies have added to the currently small body of evidence that internet interventions for SAD can be transported to cultures outside of where they were developed, being learned and implemented by local therapists, and achieve comparable levels of efficacy. They have also indicated that extensive cultural adaptation is not necessarily required as a first step when transporting such interventions, and that testing the unadapted treatment may be beneficial. Further, this work is consistent with previous findings suggesting iCT-SAD represents one of the most efficacious SAD treatments to date, and therefore supports the view that large-scale dissemination efforts are justified. Priorities for future research include replication and greater consistency in the investigation of mechanisms of change, further international testing and

dissemination of iCT-SAD and other internet interventions, and the development of scalable therapist training methods for delivering therapies online.

9

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10.1 Appendix A: Measures

10.1.1 Liebowitz Social Anxiety Scale – Self-Report (LSAS-SR)

LIEBOWITZ SOCIAL ANXIETY SCALE (LSAS)

This questionnaire assesses the way that social phobia plays a role in your life across a variety of situations. Read each situation carefully and answer two questions about that situation. The first question asks how anxious or fearful you feel in the situation. The second question asks how often you avoid the situation.

If you come across a situation that you ordinarily do not experience, we ask that you imagine "what if you were faced with that situation," and then, rate the degree to which you would fear this hypothetical situation and how often you would tend to avoid it.

Please base your ratings on the way that the situations have affected you **in the last week.** Fill out the following scale with the most suitable answer provided below:

Fear or Anxiety	**Avoidance**
0 = None	0 = Never (0%)
1 = Mild	1 = Occasionally (1-33%)
2 = Moderate	2 = Often (34-67%)
3 = Severe	3 = Usually (68-100%)

	Fear or Anxiety	Avoidance
1. Telephoning in public.		
2. Participating in small groups.		
3. Eating in public places.		
4. Drinking with others in public places.		
5. Talking to people in authority.		
6. Acting, performing or giving a talk in front of an audience.		
7. Going to a party.		
8. Working while being observed.		
9. Writing while being observed.		
10. Calling someone you don't know very well.		
11. Talking with people you don't know very well.		
12. Meeting strangers.		
13. Urinating in public bathroom.		
14. Entering a room when others are already seated.		
15. Being the center of attention.		
16. Speaking up at a meeting.		
17. Taking an exam.		
18. Expressing a disagreement or disapproval to people you don't know very well.		
19. Looking at people you don't know very well in the eyes.		
20. Giving a report to a group.		
21. Trying to chat someone up.		
22. Returning goods to a shop.		
23. Giving a party.		
24. Resisting a high pressure sales person.		

10.1.2 Social Phobia Weekly Summary Scale (SPWSS)

SOCIAL SUMMARY RATING SCALE

a) Please circle a number from the scale below that best describes how severe your social anxiety has been in the last week:

0	1	2	3	4	5	6	7	8
Not at all disturbing and/or disabling		Slightly disturbing and/or disabling		Definitely disturbing and/or disabling		Markedly disturbing and/or disabling		Severely disturbing and/or disabling

b) Please circle a number from the scale below to show how often in the last week you have avoided difficult social situations or aspects of those situations.

0	1	2	3	4	5	6	7	8
Not at all		Rarely		Sometimes		Often		Always

c) For social situations *in general*, please choose a number from the scale below to show the extent to which your attention was focused on yourself or on the external situation in the last week.

0	1	2	3	4	5	6	7	8
Entirely externally focused				Both equally				Entirely self focused

d) For social situations *that you found difficult*, please choose a number from the scale below to show the extent to which your attention was focused on yourself or on the external situation in the last week.

0	1	2	3	4	5	6	7	8
Entirely externally focused				Both equally				Entirely self focused

e) Over the past week how often have you gone over in your mind things that you think might go wrong in a social situation *before* entering the situation.

0	1	2	3	4	5	6	7	8
Not at all		Rarely		Sometimes		Often		Always

f) Over the past week how often have you gone over social interactions in your mind *after* they have finished.

0	1	2	3	4	5	6	7	8
Not at all		Rarely		Sometimes		Often		Always

10.1.3 Social Cognitions Questionnaire (SCQ)

SOCIAL COGNITIONS QUESTIONNAIRE

Listed below are some thoughts that go through people's minds when they are nervous or frightened. Indicate, on the LEFT hand side of the form, how often **in the last week** each thought has occurred; rate each thought from 1-5 using the following scale:

1. Thought never occurs
2. Thought rarely occurs
3. Thought occurs during half of the times when I am nervous
4. Thought usually occurs
5. Thought always occurs when I am nervous

___	I will be unable to speak	___
___	I am unlikeable	___
___	I am going to tremble or shake uncontrollably	___
___	People will stare at me	___
___	I am foolish	___
___	People will reject me	___
___	I will be paralysed with fear	___
___	I will drop or spill things	___
___	I am going to be sick	___
___	I am inadequate	___
___	I will babble or talk funny	___
___	I am inferior	___
___	I will be unable to concentrate	___
___	I will be unable to write properly	___
___	People are not interested in me	___
___	People won't like me	___
___	I am vulnerable	___
___	I will sweat/perspire	___
___	I am going red	___
___	I am weird/different	___
___	People will see I am nervous	___
___	People think I am boring	___
Other thoughts not listed (please specify):		
_____		___
_____		___

When you feel anxious how much do you believe each thought to be true. Please rate each thought by choosing a number from the scale below, and put the number which applies on the dotted line on the **RIGHT** hand side of the form.

0 10 20 30 40 50 60 70 80 90 100

I do not believe this thought — I am completely convinced this thought is true

scq: Developed by Adrian Wells, Lucia Stopa and David M Clark (1993)

10.1.4 Social Phobia Inventory (SPIN)

Social Phobia Inventory

Please check how much the following problems have bothered you during the past week. Mark only one box for each problem, and be sure to answer all items.

	Not at all	A little bit	Somewhat	Very much	Extremely
1. I am afraid of people in authority.	0	1	2	3	4
2. I am bothered by blushing in front of people.	0	1	2	3	4
3. Parties and social events scare me.	0	1	2	3	4
4. I avoid talking to people I don't know.	0	1	2	3	4
5. Being criticized scares me a lot.	0	1	2	3	4
6. Fear of embarrassment causes me to avoid doing things or speaking to people.	0	1	2	3	4
7. Sweating in front of people causes me distress.	0	1	2	3	4
8. I avoid going to parties.	0	1	2	3	4
9. I avoid activities in which I am the centre of attention.	0	1	2	3	4
10. Talking to strangers scares me.	0	1	2	3	4
11. I avoid having to give speeches.	0	1	2	3	4
12. I would do anything to avoid being criticized.	0	1	2	3	4
13. Heart palpitations bother me when I am around people.	0	1	2	3	4
14. I am afraid of doing things when people might be watching.	0	1	2	3	4
15. Being embarrassed or looking stupid are my worst fears.	0	1	2	3	4
16. I avoid speaking to anyone in authority.	0	1	2	3	4
17. Trembling or shaking in front of others is distressing to me.	0	1	2	3	4

10.1.5 Patient Health Questionnaire (PHQ-9)

PHQ-9

Over the last 2 weeks, how often have you been bothered by any of the following problems?		Not at all	Several days	More than half the days	Nearly every day
1	Little interest or pleasure in doing things	0	1	2	3
2	Feeling down, depressed, or hopeless	0	1	2	3
3	Trouble falling or staying asleep, or sleeping too much	0	1	2	3
4	Feeling tired or having little energy	0	1	2	3
5	Poor appetite or overeating	0	1	2	3
6	Feeling bad about yourself — or that you are a failure or have let yourself or your family down	0	1	2	3
7	Trouble concentrating on things, such as reading the newspaper or watching television	0	1	2	3
8	Moving or speaking so slowly that other people could have noticed? Or the opposite — being so fidgety or restless that you have been moving around a lot more than usual	0	1	2	3
9	Thoughts that you would be better off dead or of hurting yourself in some way	0	1	2	3
		A11 – PHQ9 total score			☐

10.1.6 Generalised Anxiety Disorder Questionnaire (GAD-7)

GAD-7

Over the last 2 weeks, how often have you been bothered by any of the following problems?		Not at all	Several days	More than half the days	Nearly every day
1	Feeling nervous, anxious or on edge	0	1	2	3
2	Not being able to stop or control worrying	0	1	2	3
3	Worrying too much about different things	0	1	2	3
4	Trouble relaxing	0	1	2	3
5	Being so restless that it is hard to sit still	0	1	2	3
6	Becoming easily annoyed or irritable	0	1	2	3
7	Feeling afraid as if something awful might happen	0	1	2	3
		A12 – GAD7 total score			☐

10.1.7 Work and Social Adjustment Scale (WSAS)

Work and Social Adjustment

People's problems sometimes affect their ability to do certain day-to-day tasks in their lives. To rate your problems look at each section and determine on the scale provided how much your problem impairs your ability to carry out the activity.

1. **WORK** - if you are retired or choose not to have a job for reasons unrelated to your problem, please tick N/A (not applicable)

0	1	2	3	4	5	6	7	8	N/A
Not at all		Slightly		Definitely		Markedly	Very severely, I cannot work		☐

2. **HOME MANAGEMENT** – Cleaning, tidying, shopping, cooking, looking after home/children, paying bills etc

0	1	2	3	4	5	6	7	8
Not at all		Slightly		Definitely		Markedly	Very severely	

3. **SOCIAL LEISURE ACTIVITIES -** With other people, e.g. parties, pubs, outings, entertaining etc.

0	1	2	3	4	5	6	7	8
Not at all		Slightly		Definitely		Markedly	Very severely	

4. **PRIVATE LEISURE ACTIVITIES –** Done alone, e.g. reading, gardening, sewing, hobbies, walking etc.

0	1	2	3	4	5	6	7	8
Not at all		Slightly		Definitely		Markedly	Very severely	

5. **FAMILY AND RELATIONSHIPS –** Form and maintain close relationships with others including the people that I live with

0	1	2	3	4	5	6	7	8
Not at all		Slightly		Definitely		Markedly	Very severely	

A13 – W&SAS total score ☐

10.1.8 Social Behaviours Questionnaire (SBQ)

SOCIAL BEHAVIOUR QUESTIONNAIRE

Please circle the word which best describes how often you do the following things when you are anxious in or before a social situation.

Use alcohol to manage anxiety	Always	Often	Sometimes	Never
Try not to attract attention	Never	Sometimes	Often	Always
Make an effort to get your words right	Never	Sometimes	Often	Always
Check that you are coming across well	Always	Often	Sometimes	Never
Avoid eye contact	Never	Sometimes	Often	Always
Talk less	Always	Often	Sometimes	Never
Avoid asking questions	Always	Often	Sometimes	Never
Try to picture how you appear to others	Never	Sometimes	Often	Always
Grip cups or glasses tightly	Never	Sometimes	Often	Always
Position yourself so as not to be noticed	Always	Often	Sometimes	Never
Try to control shaking	Always	Often	Sometimes	Never
Choose clothes that will prevent or conceal sweating	Never	Sometimes	Often	Always
Wear clothes or makeup to hide blushing	Never	Sometimes	Often	Always
Rehearse sentences in your mind	Always	Often	Sometimes	Never
Censor what you are going to say	Always	Often	Sometimes	Never
Blank out or switch off mentally	Never	Sometimes	Often	Always
Avoid talking about yourself	Never	Sometimes	Often	Always
Keep still	Always	Often	Sometimes	Never
Ask lots of questions	Always	Often	Sometimes	Never
Think positive	Never	Sometimes	Often	Always
Stay on the edge of groups	Never	Sometimes	Often	Always
Avoid pauses in speech	Always	Often	Sometimes	Never
Hide your face	Never	Sometimes	Often	Always
Try to think about other things	Always	Often	Sometimes	Never
Talk more	Always	Often	Sometimes	Never
Try to act normal	Always	Often	Sometimes	Never
Try to keep tight control of your behaviour	Never	Sometimes	Often	Always
Make an effort to come across well	Always	Often	Sometimes	Never
Planning topics to talk about in advance of a conversation	Never	Sometimes	Often	Always

10.1.9 Social Attitudes Questionnaire (SAQ)

SOCIAL ATTITUDES QUESTIONNAIRE (REVISED)

This questionnaire lists different attitudes or beliefs which people sometimes hold. Reach EACH statement carefully and decide how much you agree or disagree with each statement.

For each of the attitudes, show your answer by putting a circle round the words which BEST DESCRIBE HOW YOU THINK. Be sure to choose only one answer for each attitude. Because people are different, there is no right or wrong answer to these statements.

To decide whether a given attitude is typical of your way of looking at things, simply keep in mind what you are like MOST OF THE TIME.

I don't need everyone's approval

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

I must not show signs of weakness to others

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

If I make a mistake in a social situation people will reject me

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

Everyone will stare at me and think I'm strange if I don't act normally

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

I'm unlikeable

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

Other people are more anxious than I am

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

I'm different

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

Other people are better at getting it right socially than me

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

I must appear intelligent and witty

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

I look as anxious as I feel

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

If other people think I'm inferior, then I am

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

I'm unacceptable

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

Anxiety is not a sign of weakness

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

Other people are more competent than I am

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

Others are more acceptable and likeable than me

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

My anxiety is obvious to other people

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

If someone doesn't like me, it is my fault

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

To be worthwhile, I don't need approval from other people

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

I must not let anyone see I am anxious

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

People think I am uninteresting

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

If others really get to know me, they won't like me

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

Unless I appear calm, cool and collected, people will reject me

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

I'm inferior

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

I'm vulnerable

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

Other people are less anxious than I am

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

People can see right through me, and see my weakness

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

I don't need to be liked by everyone

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

I'm a weird person

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

If people see I'm anxious, they will humiliate, ridicule and discount me

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

If I disagree with someone, they will think I am stupid or will reject me

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

I'm odd/peculiar

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

I'm important to other people

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

People see anxiety as a sign of weakness

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

I have to do things right to be accepted

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

Unless I am witty and interesting, people won't like me

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

If I keep up appearances, I might scrape by

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

My opinions mean nothing

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

When people see that I'm anxious, they see the real, inferior me

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

I'm attractive

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

If people notice I am anxious they will think I am odd

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

People are intolerant of signs of weakness

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

If someone thought that I was inferior to them, I couldn't stand it

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

If I am quiet, people will think I'm boring

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

I'm inadequate

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

If people see that I'm anxious, they will think I am weak or inferior

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

I'm interesting

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

If people look at me, it means they are thinking negative things about me

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

I'm a boring person

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

Even if people see my anxiety, it doesn't mean that I am inferior to them

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

I must always live up to other people's expectations

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

10.1.10 Fear of Negative Evaluation Scale (FNE)

FNE

		True	False
1.	I rarely worry about seeming foolish to others	.....	.....
2.	I worry about what people think of me even when I know it doesn't make any difference	.....	.....
3.	I become tense and jittery if I know someone is sizing me up	.....	.....
4.	I am unconcerned even if I know people are forming an unfavourable impression of me	.....	.....
5.	I feel very upset when I commit some social error	.....	.....
6.	The opinions that important people have of me cause me little concern	.....	.....
7.	I am often afraid that I may look ridiculous or make a fool of myself	.....	.....
8.	I react very little when other people disapprove of me	.....	.....
9.	I am frequently afraid of other people noticing my short-comings	.....	.....
10.	The disapproval of others would have little effect on me	.....	.....
11.	If someone is evaluating me I tend to expect the worst	.....	.....
12.	I rarely worry about what kind of impression I am making on someone	.....	.....
13.	I am afraid that others will not approve of me	.....	.....
14.	I am afraid that people will find fault with me	.....	.....
15.	Other people's opinions of me do not bother me	.....	.....
16.	I am not necessarily upset if I do not please someone	.....	.....
17.	When I am talking to someone, I worry about what they may be thinking about me	.....	.....
18.	I feel that you can't help making social errors sometimes, so why worry about it	.....	.....
19.	I am usually worried about what kind of impression I make	.....	.....
20.	I worry a lot about what my superiors think of me	.....	.....
21.	If I know someone is judging me, it has little effect on me	.....	.....
22.	I worry that others will think I am not worthwhile	.....	.....
23.	I worry very little about what others think of me	.....	.....
24.	Sometime I think I am too concerned with what other people think of me	.....	.....
25.	I often worry that I will say or do the wrong things	.....	.....
26.	I am often indifferent to the opinions others have of me	.....	.....
27.	I am usually confident that others will have a favourable impression of me	.....	.....
28.	I often worry that people who are important to me won't think very much of me	.....	.....
29.	I brood about the opinions my friends have about me	.....	.....
30.	I become tense and jittery if I know I am being judged by my superiors	.....	.....

10.1.11 Social Phobia Scale (SPS)

Mattick - SPS

For each question, please circle a number to indicate the degree to which you feel the statement is characteristic or true of you. The rating scale is as follows:

0 = Not at all characteristic or true of me
1 = Slightly characteristic or true of me
2 = Moderately characteristic or true of me
3 = Very characteristic or true of me
4 = Extremely characteristic or true of me

	Not at all	Slightly	Moderately	Very	Extremely
1. I become anxious if I have to write in front of other people	0	1	2	3	4
2. I become self conscious when using public toilets	0	1	2	3	4
3. I can suddenly become aware of my own voice and of others listening to me	0	1	2	3	4
4. I get nervous that people are staring at me as I walk down the street	0	1	2	3	4
5. I fear I may blush when I am with others	0	1	2	3	4
6. I feel self conscious if I have to enter a room where others are already seated	0	1	2	3	4
7. I worry about shaking or trembling when I'm watched by other people	0	1	2	3	4
8. I would get tense if I had to sit facing other people on a bus or a train	0	1	2	3	4
9. I get panicky that others might see me faint, or be sick or ill	0	1	2	3	4
10. I would find it difficult to drink something if in a group of people	0	1	2	3	4
11. It would make me feel self conscious to eat in front of a stranger at a restaurant	0	1	2	3	4
12. I am worried people will think my behaviour odd	0	1	2	3	4
13. I would get tense if I had to carry a tray across a crowded cafeteria	0	1	2	3	4
14. I worry I'll lose control of myself in front of other people	0	1	2	3	4
15. I worry I might do something to attract the attention of other people	0	1	2	3	4
16. When in an elevator, I am tense if people look at me	0	1	2	3	4
17. I can feel conspicuous standing in a line	0	1	2	3	4
18. I can get tense when I speak in front of other people	0	1	2	3	4
19. I worry my head will shake or nod in front of others	0	1	2	3	4
20. I feel awkward and tense if I know people are watching me	0	1	2	3	4

10.1.12 Social Interaction Anxiety Scale (SIAS)

Mattick - SIAS

For each question, please circle a number to indicate the degree to which you feel the statement is characteristic or true of you. The rating scale is as follows:

0 = Not at all characteristic or true of me
1 = Slightly characteristic or true of me
2 = Moderately characteristic or true of me
3 = Very characteristic or true of me
4 = Extremely characteristic or true of me

	Not at all	Slightly	Moderately	Very	Extremely
1. I get nervous if I have to speak with someone in authority	0	1	2	3	4
2. I have difficulty making eye contact with others	0	1	2	3	4
3. I become tense if I have to talk about myself or my feelings	0	1	2	3	4
4. I find difficulty mixing comfortably with the people I work with	0	1	2	3	4
5. I find it easy to make friends of my own age	0	1	2	3	4
6. I tense up if I meet an acquaintance in the street	0	1	2	3	4
7. When mixing socially, I am uncomfortable	0	1	2	3	4
8. I feel tense if I am alone with just one person	0	1	2	3	4
9. I am at ease meeting people at parties, etc	0	1	2	3	4
10. I have difficulty talking with other people	0	1	2	3	4
11. I find it easy to think of things to talk about	0	1	2	3	4
12. I worry about expressing myself in case I appear awkward	0	1	2	3	4
13. I find it difficult to disagree with another's point of view	0	1	2	3	4
14. I have difficulty talking to an attractive person of the opposite sex	0	1	2	3	4
15. I find myself worrying that I won't know what to say in social situations	0	1	2	3	4
16. I am nervous mixing with people I don't know well	0	1	2	3	4
17. I feel I'll say something embarrassing when talking	0	1	2	3	4
18. When mixing in a group, I find myself worrying I will be ignored	0	1	2	3	4
19. I am tense mixing in a group	0	1	2	3	4
20. I am unsure whether to greet someone I know only slightly	0	1	2	3	4

10.1.13 Social Participation Scale

Please answer the following questions about your participation in social activities **during the past month.**

Over the past month, how often did you…	Not at all			Occasionally			Often
1. socialize with friends?	1	2	3	4	5	6	7
2. attend work- or school-related social events?	1	2	3	4	5	6	7
3. have a friendly conversation with co-workers or classmates?	1	2	3	4	5	6	7
4. speak up in group situations?	1	2	3	4	5	6	7
5. invite someone else to get together for lunch, coffee, or drinks?	1	2	3	4	5	6	7
6. ask others for help or information?	1	2	3	4	5	6	7
7. initiate a social conversation?	1	2	3	4	5	6	7
8. make small talk with people you didn't know well?	1	2	3	4	5	6	7
9. talk about a meaningful personal experience with others?	1	2	3	4	5	6	7
10. attend a social gathering?	1	2	3	4	5	6	7
11. accept an invitation to do something socially?	1	2	3	4	5	6	7
12. share your opinions and ideas with others?	1	2	3	4	5	6	7
13. approach others in a social setting?	1	2	3	4	5	6	7

10.1.14 Social Satisfaction Scale

How *satisfied* are you with your relationships with the following types of people…

	Not at all satisfied			Somewhat satisfied			Very satisfied
14. Acquaintances	1	2	3	4	5	6	7
15. Co-workers/schoolmates	1	2	3	4	5	6	7
16. Friends	1	2	3	4	5	6	7
17. Close friends	1	2	3	4	5	6	7
18. Romantic partners	1	2	3	4	5	6	7

10.1.15 Generalised Learning Questionnaire (GLQ)

Please indicate how much you agree with each statement:

1. If one person I speak to finds me friendly and interesting, it is likely other people will too.

Totally agree	Agree very much	Agree slightly	Neutral	Disagree slightly	Disagree very much	Totally disagree

2. When people respond positively to me it is because I am a likeable person.

Totally agree	Agree very much	Agree slightly	Neutral	Disagree slightly	Disagree very much	Totally disagree

3. When people are looking at me, it is unlikely they are judging me negatively.

Totally agree	Agree very much	Agree slightly	Neutral	Disagree slightly	Disagree very much	Totally disagree

4. If people notice I am anxious, they are unlikely to think any less of me as a person.

Totally agree	Agree very much	Agree slightly	Neutral	Disagree slightly	Disagree very much	Totally disagree

5. When I am nervous, it is unlikely that I look as nervous as I feel.

Totally agree	Agree very much	Agree slightly	Neutral	Disagree slightly	Disagree very much	Totally disagree

10.1.16 Beck Depression Inventory (BDI)

BDI

On this questionnaire are groups of statements. Please read each group of statements carefully. Then pick out the one statement in each group which best describes the way you have been feeling the **PAST WEEK**, INCLUDING TODAY! Circle the number beside the statement you picked. If several statements in the group seem to apply equally well, circle each one. **Be sure to read all the statements in each group before making your choice.**

1
0 I do not feel sad.
1 I feel sad.
2 I am sad all the time and I can't snap out of it.
3 I am so sad or unhappy I can't stand it.

2
0 I am not particularly discouraged about the future.
1 I feel discouraged about the future.
2 I feel I have nothing to look forward to.
3 I feel that the future is hopeless and that things Cannot improve.

3
0 I do not feel like a failure.
1 I feel I have failed more than the average person.
2 As I look back on my life, all I can see is a lot of Failures.
3 I feel I am a complete failure as a person.

4
0 I get as much satisfaction out of things as I used to.
1 I don't enjoy things the way I used to.
2 I don't get real satisfaction out of anything anymore.
3 I am dissatisfied or bored with everything.

5
0 I don't feel particularly guilty.
1 I feel guilty a good part of the time.
2 I feel quite guilty most of the time.
3 I feel guilty all of the time.

6
0 I don't feel I am being punished.
1 I feel I may be punished.
2 I expect to be punished.
3 I feel I am being punished.

7
0 I don't feel disappointed in myself.
1 I am disappointed in myself.
2 I am disgusted with myself.
3 I hate myself.

8
0 I don't feel I am any worse than anybody else.
1 I am critical of myself for my weaknesses or Mistakes.
2 I blame myself all the time for my faults.
3 I blame myself for everything bad that happens.

9
0 I don't have any thoughts of killing myself.
1 I have thoughts of killing myself, but I would not Carry them out.
2 I would like to kill myself.
3 I would kill myself if I had the chance.

10
0 I don't cry any more than usual.
1 I cry more now than I used to.
2 I cry all the time now.
3 I used to be able to cry, but now I can't cry even Though I want to.

11
0 I am no more irritated now than I ever am.
1 I get annoyed or irritated more easily than I used to.
2 I feel irritated all the time now.
3 I don't get irritated at all by the things that used to Irritate me.

12
0 I have not lost interest in other people.
1 I am less interested in other people than I used to be.
2 I have lost most of my interest in other people.
3 I have lost all of my interest in other people.

13
0 I make decisions about as well as I ever could.
1 I put off making decisions more than I used to.
2 I have greater difficulty in making decisions than before.
3 I can't make decisions at all anymore.

14
0 I don't feel I look any worse than I used to.
1 I am worried that I am looking old or unattractive.
2 I feel that there are permanent changes in my appearance that make me look unattractive.
3 I believe that I look ugly.

15
0 I can work about as well as before.
1 It takes an extra effort to get started at doing something.
2 I have to push myself very hard to do anything.
3 I can't do any work at all.

16
0 I can sleep as well as usual.
1 I don't sleep as well as I used to.
2 I wake up 1-2 hours earlier than usual and find it hard to get back to sleep.
3 I wake up several hours earlier than I used to and cannot get back to sleep.

17
0 I don't get more tired than usual.
1 I get tired more easily than I used to.
2 I get tired from doing almost anything.
3 I am too tired to do anything.

18
0 My appetite is no worse than usual.
1 My appetite is not as good as it used to be.
2 My appetite is much worse now.
3 I have no appetite at all anymore.

19
0 I haven't lost much weight, if any, lately.
1 I have lost more than 5 pounds. I am purposely trying to lose
2 I have lost more than 10 pounds. weight by eating less.
3 I have lost more than 15 pounds. Yes__ No___

20
0 I am no more worried about my health than usual.
1 I am worried about physical problems such as aches and pains; or upset stomach; or constipation.
2 I am very worried about physical problems and it's hard to think of much else.
3 I am so worried about my physical problems that I cannot think about anything else.

21
0 I have not noticed any recent changes in my interest in sex.
1 I am less interested in sex than I used to be.
2 I am much less interested in sex now.
3 I have lost interest in sex completely.

10.1.17 Credibility Scale

C - SCALE

The questions below are regularly put to the people who receive psychological treatment. The purpose of the questions is not to obtain a rating of your therapist. Instead it is your views on the treatment method that you are about to receive that I am interested in. You don't have to worry that your answers will be known to any other persons.

CODE: _____ Date: _____

1. How logical do you consider this type of treatment to be?

1	2	3	4	5	6	7	8	9	10
Not at all logical									completely logical

2. How certain are you that this method will be successful in the treatment of your anxiety problems?

1	2	3	4	5	6	7	8	9	10
Not at all certain									completely certain

3. With what degree of confidence would you recommend this treatment to a friend with the same type of anxiety problems as you have?

1	2	3	4	5	6	7	8	9	10
Not at all confident									completely confident

10.1.18 Working Alliance Inventory (Short Form)

Client Version:

Listed below there are sentences that describe some of the different ways a person might think or feel about his or her **cognitive therapist**. As you read the sentences, mentally insert the name of your therapist in the place of _____ in the text. Below each statement there is a seven-point scale. If a statement describes the way you ALWAYS (consistently) feel (or think), then circle the number 7; if it NEVER applies to you, then circle the number 1. Use the numbers in between to describe the variations between those extremes. This questionnaire is **confidential**; your therapist will not see your answers. Work fast. Your first impressions are the ones we would like to see.

1. _____ and I agree about the steps to be taken to improve my situation.

1	2	3	4	5	6	7
Never	Rarely	Occasionally	Sometimes	Often	Very often	Always

2. What I am doing in therapy gives me new ways of looking at my problem.

1	2	3	4	5	6	7
Never	Rarely	Occasionally	Sometimes	Often	Very often	Always

3. I believe _____ likes me.

1	2	3	4	5	6	7
Never	Rarely	Occasionally	Sometimes	Often	Very often	Always

4. _____ understands what I am trying to accomplish in therapy.

1	2	3	4	5	6	7
Never	Rarely	Occasionally	Sometimes	Often	Very often	Always

5. I am confident in _____ 's ability to help me.

1	2	3	4	5	6	7
Never	Rarely	Occasionally	Sometimes	Often	Very often	Always

6. _____ and I are working towards mutually agreed upon goals.

1	2	3	4	5	6	7
Never	Rarely	Occasionally	Sometimes	Often	Very often	Always

7. I feel that _____ appreciates me.

1	2	3	4	5	6	7
Never	Rarely	Occasionally	Sometimes	Often	Very often	Always

8. We agree on what is important for me to work on.

1	2	3	4	5	6	7
Never	Rarely	Occasionally	Sometimes	Often	Very often	Always

9. _____ and I trust one another.

1	2	3	4	5	6	7
Never	Rarely	Occasionally	Sometimes	Often	Very often	Always

10. _____ and I have the same ideas on what my problems are.

1	2	3	4	5	6	7
Never	Rarely	Occasionally	Sometimes	Often	Very often	Always

11. We have established a good understanding of the kind of changes that would be good for me.

1	2	3	4	5	6	7
Never	Rarely	Occasionally	Sometimes	Often	Very often	Always

12. I believe the way we are working with my problem is correct.

1	2	3	4	5	6	7
Never	Rarely	Occasionally	Sometimes	Often	Very often	Always

Therapist Version:

Listed below there are sentences that describe some of the different ways a therapist might think or feel about his or her patient. As you read the sentences, mentally insert the name of your patient in the place of _____ in the text. Below each statement there is a seven-point scale. If a statement describes the way you ALWAYS (consistently) feel (or think), then circle the number 7; if it NEVER applies to you, then circle the number 1. Use the numbers in between to describe the variations between those extremes. This questionnaire is **confidential**; your patient will not see your answers. Work fast. Your first impressions are the ones we would like to see.

1. _____ and I agree about the steps to be taken to improve his/her situation.

1	2	3	4	5	6	7
Never	Rarely	Occasionally	Sometimes	Often	Very often	Always

2. My patient and I both feel confident about the usefulness of our current activity in therapy.

1	2	3	4	5	6	7
Never	Rarely	Occasionally	Sometimes	Often	Very often	Always

3. I believe _____ likes me.

1	2	3	4	5	6	7
Never	Rarely	Occasionally	Sometimes	Often	Very often	Always

4. I am certain about what we are trying to accomplish in therapy.

1	2	3	4	5	6	7
Never	Rarely	Occasionally	Sometimes	Often	Very often	Always

5. I am confident in my ability to help _____.

1	2	3	4	5	6	7
Never	Rarely	Occasionally	Sometimes	Often	Very often	Always

6. We are working towards mutually agreed upon goals.

1	2	3	4	5	6	7
Never	Rarely	Occasionally	Sometimes	Often	Very often	Always

7. I appreciate _____ as a person.

1	2	3	4	5	6	7
Never	Rarely	Occasionally	Sometimes	Often	Very often	Always

8. We agree on what is important for _____ to work on.

1	2	3	4	5	6	7
Never	Rarely	Occasionally	Sometimes	Often	Very often	Always

9. _____ and I have built a mutual trust.

1	2	3	4	5	6	7
Never	Rarely	Occasionally	Sometimes	Often	Very often	Always

10. _____ and I have the same ideas on what his/her real problems are.

1	2	3	4	5	6	7
Never	Rarely	Occasionally	Sometimes	Often	Very often	Always

11. We have established a good understanding of the kind of changes that would be good for _____ .

1	2	3	4	5	6	7
Never	Rarely	Occasionally	Sometimes	Often	Very often	Always

12. _____ believes the way we are working with his/her problem is correct.

1	2	3	4	5	6	7
Never	Rarely	Occasionally	Sometimes	Often	Very often	Always

10.2 Appendix B: Generalised and Specific Learning Coding Manual

(Studies 3b and 3c)

Cognitive Therapy for Social Anxiety Disorder: Generalisation of Learning

Graham Thew Dec 2016

Clients undertaking CT for SAD complete a number of behavioural experiments and other therapeutic activities that aim to facilitate new learning about themselves and how they come across in social situations.

There are two categories of learning which may distinguish the extent to which people respond to treatment sessions. The first concerns learning that is confined to specific situations discussed or experienced in therapy sessions. The second concerns learning that is more generalised. These categories are defined below.

1. Specific and/or situational learning vs. Generalised learning

1.1 General description of concept

The degree to which learning is generalised is thought to be a continuum, with the above two opposing constructs at each end. By definition, generalised learning must be generalised from something specific, so cannot be present in isolation. In contrast, specific and/or situational learning can occur without the presence of generalised learning. The constructs are defined as follows:

Specific and/or situational learning refers to learning that arises from any therapy activity (for example, discussion of homework, deriving a model, behavioural experiments, surveys, videofeedback, reviewing beliefs/rules, memory rescripting, attention training, addressing anticipatory worry or post-event rumination) that is limited to a particular event i.e. a certain conversation or interaction. This learning can be about the self (e.g. 'I didn't look as anxious as I felt in that conversation'), how others respond (e.g. 'that person seemed interested in what I was saying'), and/or about the social situation (e.g. 'The conversation was easier when I was externally focused'). However, in any of these instances the learning is restricted to drawing conclusions about what happened in that event.

Generalised learning refers to learning that arises from any therapy activity (for example, discussion of homework, deriving a model, behavioural experiments,

surveys, videofeedback, reviewing beliefs/rules, memory rescripting, attention training, addressing anticipatory worry or post-event rumination) that goes beyond a particular event, and involves drawing a more general conclusion that may apply to a range of different social contexts (e.g. I can make helpful contributions in group discussions). It may also relate to global beliefs about the self (e.g. I am acceptable), which would also apply to a range of social situations. Generalised learning is often an extension of specific learning; an individual may demonstrate that they have learned a point in relation to a specific situation, but also that this learning will generalise to a range of other situations.

Rating the extent to which these forms of learning occur within a therapy session requires the consideration of two components: 1) the degree to which the therapist asks questions in order to elicit these forms of learning; 2) the degree to which statements made by the client reflect these forms of learning.

1.2 Evidence for Specific and/or situational learning

1.2.1 Therapist behaviours

Evidence that the therapist is attempting to elicit specific and/or situational learning will be taken primarily from the questions they ask, but may also be taken from other behaviours such as using a behavioural experiment record sheet, where learning is recorded.

Questions:

At any point within a session, the therapist may ask questions related to a completed component of therapy (for example a piece of completed homework, a conversation, or behavioural experiment). These questions will relate specifically to the completed activity, and most often are quite specific and closed.

E.g. *How much did that person [the client] look shaky on the video?*
E.g*. How much did you sweat, 0-100?*
E.g. *Were your predictions correct?*
E.g. *How did the other people respond?*
E.g. *What was the difference between your prediction and what actually happened?*
E.g. *What effect did dropping your safety behaviours have on the conversation?*
E.g. *Did that person respond in a way that suggested you were unlikeable?*

Do not count general questions about how they found/experienced the activity.
Do not count questions about extending/repeating the activity.

1.2.2 Client statements

Evidence of specific/situational learning on the part of the client will be drawn from the statements they make at any point in a therapy session. They may be prompted by a question from the therapist, or may be given spontaneously.

Statements in direct relation to the activity

E.g. *I don't/didn't look as red as I thought.*
E.g. *No-one was staring even though it felt like it.*
E.g. *When I focused more on the conversation it flowed better.*
E.g. *People didn't notice/weren't bothered when I said something boring.*
E.g. *People were interested in what I was saying.*

1.3 Evidence for Generalised learning

1.3.1 Therapist behaviours

Evidence that the therapist is attempting to elicit generalised learning will be taken primarily from the questions they ask, but may also be taken from other behaviours such as using a behavioural experiment record sheet, where learning is recorded.

Questions:

The therapist may ask questions related to the previous therapy activity (for example a piece of completed homework, a conversation, or behavioural experiment). These questions will make reference to the completed activity, but will aim to elicit broader learning. Both open and closed questions may be used.

E.g. *Do you think this might be true in other social situations?*
E.g. *What does this say about you more generally?*
E.g. *What does this tell you about how you come across to other people?*
E.g. *What does this say about how reliable our feelings are as a way to judge how we come across?*
E.g. *What does this say about the idea that you are unlikeable?*
E.g. *What effect do these safety behaviours have on how self-conscious you feel?*

Do not count questions about extending/repeating the activity.

1.3.2 Client statements

Evidence of generalised learning on the part of the client will be drawn from the statements they make at any point during a session. They may be prompted by a question from the therapist, or may be given spontaneously.

Statements about the self:
E.g. *Even when I feel anxious I come across well.*
E.g. *I am able to speak to people I don't know very well.*

E.g. *I am acceptable to others.*

Statements about others and social situations:
E.g. *Conversations go better when I'm out of my head.*
E.g. *Other people are interested in what I have to say.*
E.g. *I don't have to be witty/intelligent in every conversation.*
E.g. *If I stumble over my words at work, people probably won't notice/care.*
E.g. *People have accepted me much more than I realised.*
E.g. *My feelings are private, and not visible to others.*
E.g. *Focusing on myself makes the negative thoughts seem worse.*

Evidence against generalised learning would include statements that indicate doubt about whether the learning would generalise:

E.g. *I think that person was just being nice.*
E.g. *I'm not sure people would be like that where I work.*
E.g. *I think I'd need to try it out again somewhere else.*
E.g. *That safety behaviour is probably unhelpful.*

Do not count generalised statements that are accompanied by an expression of doubt (e.g. *People are happy to help when I ask a question…though that might be different in London*)

Where a generalised statement is proposed or 'offered' by the therapist, clear evidence of the client's agreement with this is required to be considered evidence for generalised learning. Raters should consider whether the client's response to the statement indicates they are convinced and in agreement.

1.4 Procedure

YOUR TASK AS A RATER IS TO IDENTIFY SESSION CONTENT THAT COULD REPRESENT EVIDENCE FOR SPECIFIC AND/OR SITUATIONAL LEARNING AND GENERALISED LEARNING ON THE PART OF THE CLIENT, AND THERAPIST BEHAVIOURS DESIGNED TO ELICIT THIS.

1. When viewing the session tape, summarise the evidence for specific and/or situational learning AND generalised learning separately based on the instructions given above. This summary should distinguish between therapist behaviours, and client statements.

2. After viewing the entire session review the evidence you have collated, and then with reference to the scales below, give four overall ratings as described below.

3. Rate the extent to which therapist behaviours eliciting specific and/or situational learning are present in the session. Ratings of therapist behaviours should be made independently of how the client responds i.e. the therapist's

question should be considered regardless of whether or how it is responded to.

Rating:

0 Therapist does not ask questions to elicit specific/situational learning from the activities completed in the session

1 Therapist asks a limited number of questions to elicit specific/situational learning from the activities completed in the session

2 Therapist asks numerous questions to elicit specific/situational learning from the activities completed in the session

4. Rate the extent to which therapist behaviours eliciting generalised learning are present in the session.

Rating:

0 Therapist does not ask questions to elicit generalised learning from the activities completed in the session

1 Therapist asks a limited number of questions to elicit generalised learning from the activities completed in the session

2 Therapist asks numerous questions to elicit generalised learning from the activities completed in the session

5. Rate the extent to which the client demonstrates specific and/or situational learning in the session.

Rating:

0 No evidence of specific and/or situational learning

1

2 Some, but limited evidence of specific and/or situational learning

3

4 Moderate evidence of specific and/or situational learning

5

6 Extensive evidence of specific and/or situational learning

6. Rate the extent to which the client demonstrates generalised learning in the session.

Rating:

0 No evidence of generalised learning

1

2 Some, but limited evidence of generalised learning

3

4 Moderate evidence of generalised learning

5

6 Extensive evidence of generalised learning

NOTE: The four rating scales are independent, and not mutually exclusive. For example, a session may have high scores for both client specific and/or situational learning and client generalised learning, high scores for one but not the other, or low scores for both. Equally, the therapist may ask few questions designed to elicit learning in a session thus receiving low scores, but the client's statements in that session may receive high scores on one or both scales if the relevant learning is indicated.

Addendum: Coding of Clients' Written Material

This coding manual may also be used for coding specific/situational and general learning in clients' written material, such as behavioural experiment record sheets, diaries, or other narratives of therapy processes where learning is described. In these instances, only the rating scales relating to the client are used.

Specific/situational learning would be indicated by written statements that indicate learning related to a specific situation, experiment, or therapy activity.

E.g. *I don't/didn't look as red as I thought.*
E.g. *No-one was staring even though it felt like it.*
E.g. *When I focused more on the conversation it flowed better.*
E.g. *People didn't notice/weren't bothered when I said something boring.*
E.g. *People were interested in what I was saying.*

Generalised learning would be indicated by written statements that indicate learning that goes beyond a particular event, and involves drawing a more general conclusion that may apply to a range of different social contexts, or about the self generally.

<u>Statements about the self:</u>
E.g. *Even when I feel anxious I come across well.*
E.g. *I am able to speak to people I don't know very well.*
E.g. *I am acceptable to others.*

<u>Statements about others and social situations:</u>
E.g. *Conversations go better when I'm out of my head.*
E.g. *Other people are interested in what I have to say.*
E.g. *I don't have to be witty/intelligent in every conversation.*
E.g. *If I stumble over my words at work, people probably won't notice/care.*
E.g. *People have accepted me much more than I realised.*
E.g. *My feelings are private, and not visible to others.*
E.g. *Focusing on myself makes the negative thoughts seem worse.*

As outlined in the main manual, evidence against generalised learning would include statements that indicate doubt about whether the learning would generalise:

E.g. *I think that person was just being nice.*
E.g. *I'm not sure people would be like that where I work.*
E.g. *I think I'd need to try it out again somewhere else.*
E.g. *That safety behaviour is probably unhelpful.*

On a behavioural experiment record sheet, such statements are most likely to appear in the 'outcome' and/or 'learning' columns, where the findings of the experiment are described. Do not count statements that only describe factual/descriptive details (e.g. "I focused on the conversation"). Where it is unclear whether a comment is purely

descriptive, or whether it represents learning (e.g. “the conversation flowed well”), this should be considered in light of their prior predictions (e.g. “there will be awkward pauses”).

10.3 Appendix C: Ethics Approval Letters for Study 5

香港中文大學醫學院
Faculty Of Medicine
The Chinese University Of Hong Kong

醫院管理局
新界東醫院聯網
Hospital Authority
New Territories East Cluster

Joint Chinese University of Hong Kong-New Territories East Cluster Clinical Research Ethics Committee
香港中文大學-新界東醫院聯網 臨床研究倫理 聯席委員會

8/F, Lui Che Woo Clinical Sciences Building, Prince of Wales Hospital, Shatin, HK
Tel : (852) 2632 3935 / 2144 5926 Fax : (852) 2646 6653 Website : http://www.crec.cuhk.edu.hk

The Joint CUHK-NTEC CREC is an independent committee established by CUHK/NTEC and authorized to perform ethics and scientific review and oversight of clinical studies within the jurisdiction of CUHK/NTEC in accordance with its standard operating procedure and the principles of the Declaration of Helsinki and ICH Good Clinical Practice.

21 FEB '17

CREC Ref. No.: 2016.611-T

To: Prof. Patrick Wing Leung LEUNG
Dept. of Psychology
The Chinese University of Hong Kong

This notice is issued by the Joint CUHK-NTEC CREC with respect to the application/submission by you, being the principal investigator of the following study at your study site:

- **Study Protocol Title:** Internet-based cognitive-behavioural therapy for social anxiety disorder in the Chinese population: a randomised controlled trial.
- **Investigator(s):** Patrick Wing Leung LEUNG

In accordance with our standard operating procedure, we have duly performed ethics and scientific review of your application/submission as detailed below:

- **Nature of Your Application/Submission:** ☒ Initial application ☐ Amendments/changes ☐ Others: ☐ Renewal
- **Mode of Review:** ☒ Full review ☐ Expedited review
- **Date of Initial/Renewal Approval:** 08 February 2017
- **Document(s) Reviewed:** See Schedule 1
- **Reviewer(s):** See Schedule 2

After due review by our reviewer(s), we hereby write to inform you of our decision on your application/submission as follows:

- **Decision:**
  - ☒ Application/Submission approved
  - ☐ Application/Submission approved with condition(s) (see condition(s) below)
  - ☐ Application/Submission approved with remark(s) (see remark(s) below)
  - ☐ Application/Submission approved with condition(s) and remark(s) (see condition(s) and remark(s) below)
- **Regular Progress Report(s) Required:** Every 12 months from the date of initial/renewal approval and during the period of the study if required

香港中文大學醫學院
Faculty Of Medicine
The Chinese University Of Hong Kong

醫院管理局
新界東醫院聯網
Hospital Authority
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Tel : (852) 2632 3935 / 2144 5926 Fax : (852) 2646 6653 Website : http://www.crec.cuhk.edu.hk

21 FEB '17

You, being the principal investigator of the study at your study site, are reminded to comply with our requirements and to maintain communication with us during the period of the study by undertaking the principal investigator's responsibilities including (but not limited to):

- if the study is an industry-sponsored clinical study, submitting to us a copy of the fully executed indemnity agreement satisfying the Hospital Authority's requirement prior to commencement of the study (if it has not been submitted yet);
- observing and complying with all applicable requirements under our standard operating procedure ("IRB/REC SOP"), the Declaration of Helsinki and the ICH GCP (if applicable);
- submitting regular progress report(s) at the required intervals (as specified above) in accordance with the requirements in the IRB/REC SOP;
- not implementing any amendment/change to any approved study document/material without our written approval, except where necessary to eliminate any immediate hazard to the subjects or if an amendment/change is only of an administrative or logistical nature;
- notifying us of any new information that may adversely affect the rights, safety or well-being of the subjects or the proper conduct of the study;
- reporting any deviation from the study protocol or compliance incident that has occurred during the study and may adversely affect the rights, safety or well-being of any subject in accordance with the requirements in the IRB/REC SOP;
- submitting safety reports on all SAEs observed at your study site or SUSARs reported from outside your study site in accordance with the requirements in the IRB/REC SOP; and
- submitting a final report in accordance with the requirements in the IRB/REC SOP upon completion or termination of the study at your study site.

In addition to the above, you are also reminded to observe and comply with other applicable regulatory and management requirements including (but not limited to):

- if required by Hong Kong laws or regulations, obtaining a certificate for clinical trial through the Hong Kong Department of Health and complying with the associated requirements;
- obtaining the necessary consent from the management of your institution/department in accordance with the requirements of your institution/department;
- if required by local laws or regulations at conducting site out of IRB/REC's jurisdiction, obtaining an approval and complying with associated requirements;
- not representing to any third party or in any way likely to mislead any third party forming the view that the approval from the IRB/REC has any extraterritorial effect; and
- with due diligence ensuring your teams, staff, agents or whosoever connected with you to comply with the preceding requirements.

Yours sincerely,

Envy Lee (Secretary)
for and on behalf of
The Joint CUHK-NTEC CREC

EL/ ci

Oxford Tropical Research Ethics Committee

University of Oxford
Research Services, University Offices
Wellington Square, Oxford OX1 2JD
Tel. +44 (0)1865 (2)82106
E-mail: oxtrec@admin.ox.ac.uk

Dr Graham Thew
Oxford Centre for Anxiety Disorders and Trauma
The Old Rectory
Paradise Square
Oxford OX1 1TW

31 August 2017

Dear Dr Thew

Full Title of Study: Internet-based cognitive-behavioural therapy for social anxiety disorder in the Chinese population: a randomised controlled trial

OxTREC Reference: 531-17

Thank you for your email of the 22 June 2017, and for your minimal risk application form.

I am pleased to confirm that approval has now been granted for this study. This is valid for the first five years and is subject to receiving the local ethical approval (if this approval has not yet been received).

The documents approved for this study are as follows:

Documents:	Version:	Date:
Protocol	1	15/11/16
ICF	1	15/11/16

Any subsequent changes to the application must be submitted to the Committee as an Amendment. This should include a letter to give the reasons for the proposed modifications and all revised documents with changes tracked.

Please ensure that you submit a completed Annual Report form on every anniversary of this approval and a final End of Study Report. The relevant forms can be found on the OxTREC website: https://researchsupport.admin.ox.ac.uk/governance/ethics/apply/oxtrec.

Finally, as referenced in section 25 of the Clinical Research Ethics Review Application Form approved for this study by the Joint Chinese University of Hong Kong-New Territories East Cluster Clinical Research Ethics Committee, the Department of Psychology at the Chinese University of Hong Kong is the institution responsible for this study and the Chinese University of Hong Kong will therefore be responsible for indemnifying this study.

Yours sincerely

Dr Rebecca Bryant, Research Ethics Manager, OxTREC

Tel: +44 (0)1865 (2)82106
Email: oxtrec@admin.ox.ac.uk
Web: https://researchsupport.admin.ox.ac.uk/governance/ethics

10.4 Appendix D: Self-Evaluation for Internet-based Cognitive Therapy

Graham Thew April 2017

This scale is designed to help therapists consider their understanding and implementation of a range of techniques used in online cognitive therapy treatments. It aims to help therapists reflect on their knowledge and skills in using these programmes, and to help supervisors and trainers identify the best ways to help therapists develop further.

Please answer the following:

Name:		
Job Title:		
CBT qualification(s):	None Diploma Masters DClinPsy or equivalent Other (please specify)	☐ ☐ ☐ ☐ ☐
Number of Years in Qualified Practice:		
Number of years practising CBT:		
Number of clients treated using guided online CBT treatments:		
Number of clients treated using iCT-SAD:		

For each of the therapy skills listed below, please provide two ratings:

Knowledge: Currently, how much do you know about the skill or technique?

0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
No knowledge		Limited knowledge		Some knowledge		Good knowledge		Extensive knowledge

Skills: Currently, how well do you think you can apply the skill or technique?

0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
No skills		Limited skills		Some skills		Good skills		Extensive skills

Part 1: General Online Skills

	Knowledge (0-8)	**Skills (0-8)**
Developing and maintaining client engagement with the online programme		

Developing and maintaining a supportive online therapeutic relationship with the client		
Reviewing clients' work on the site in detail		
Identifying and addressing potential barriers to progress using the online programme		
Supporting clients to extract the key messages and learning from therapy activities		
Contacting clients with appropriate frequency and regularity		
Writing messages that effectively support and guide clients through the programme		
Managing situations where clients are not completing work on the site, and/or not responding to messages		
Maintaining clear and detailed therapy notes for online clients		
Using supervision effectively in relation to online clients		
Helping clients navigate and use the site content and technical features		

Part 2: iCT-SAD Specific Skills

Phone calls	**Knowledge (0-8)**	**Skills (0-8)**
Scheduling phone calls appropriately based on the treatment protocol		
Setting an appropriate agenda for each call, prioritising the most important content		
Making reference back to appropriate module content		
Agreeing appropriate homework/action points, with associated timescales		
Keeping phone calls to their allotted duration (15-20 minutes)		
Following a call, using appropriate strategies to summarise and remind clients about agreed homework		

Therapy Components	**Knowledge (0-8)**	**Skills (0-8)**
Identifying and clarifying clients' goals online, including their timescale in relation to treatment		
Supporting clients to formulate an appropriate and detailed individualised cognitive model online, and using this as a guide throughout treatment		
Conducting the 'self-focused attention and safety behaviours experiment' via webcam		

Suggesting a third condition in the self-focused attention and safety behaviours experiment when appropriate		
Supporting clients to undertake videofeedback online		
Suggesting strategies to overcome problems clients may experience with videofeedback		
Supporting clients with attention training online, including ongoing practice		
Helping clients to plan and schedule behavioural experiments relevant to their concerns		
Supporting clients in implementing behavioural experiments, including those that are more challenging (e.g. decatastrophising experiments)		
Helping clients to extract maximal learning from behavioural experiments, and making suggestions to develop experiments further		
Selecting optional treatment modules in order to individualise the treatment plan		
Supporting clients to use the virtual audiences feature of the site to record and view presentations		
Supporting clients to use discrimination training and imagery rescripting to address problematic images and memories		
Reviewing the client's blueprint constructively		
Preparing a detailed plan with clients for the follow-up period		
Understanding the methods to monitor clients' activity using the online programme and maintaining a detailed understanding of their clinical progress		
Understanding and implementing the iCT-SAD programme according to the treatment protocol		

10.5 Appendix E: iCT-SAD Skills Assessment

Graham Thew May 2017

Please read the below information and imagine you are working with the clients described using the iCT-SAD programme.

Client 1: Anna, 37

Anna has just started treatment. Some of her assessment questionnaires are shown below:

Liebowitz Social Anxiety Scale (LSAS)

Fear or Anxiety	Avoidance
0 = None	0 = Never (0%)
1 = Mild	1 = Occasionally (1-33%)
2 = Moderate	2 = Often (34-67%)
3 = Severe	3 = Usually (68-100%)

		Fear and Anxiety	Avoidance
1.	Telephoning in public.	2	2
2.	Participating in small groups.	3	2
3.	Eating in public places.	1	1
4.	Drinking with others in public places.	1	1
5.	Talking to people in authority.	2	2
6.	Acting, performing or giving a talk in front of an audience.	3	3
7.	Going to a party.	3	2
8.	Working while being observed.	1	1
9.	Writing while being observed.	1	1
10.	Calling someone you don't know very well.	2	2

11.	Talking with people you don't know very well.	2	2
12.	Meeting strangers.	2	3
13.	Urinating in public bathroom.	0	0
14.	Entering a room when others are already seated.	2	1
15.	Being the center of attention.	3	3
16.	Speaking up at a meeting.	2	2
17.	Taking an exam.	1	0
18.	Expressing a disagreement or disapproval to people you don't know very well.	2	2
19.	Looking at people you don't know very well in the eyes.	2	2
20.	Giving a report to a group.	3	2
21.	Trying to chat someone up.	2	2
22.	Returning goods to a shop.	2	2
23.	Giving a party.	3	2
24.	Resisting a high pressure sales person.	2	2

Social Cognitions Questionnaire (SCQ)

1. Thought never occurs
2. Thought rarely occurs
3. Thought occurs during half of the times when I am nervous
4. Thought usually occurs
5. Thought always occurs when I am nervous

How often		Belief
2	I will be unable to speak	20
3	I am unlikeable	40
4	I am going to tremble or shake uncontrollably	90
5	People will stare at me	80
3	I am foolish	60
4	People will reject me	70
2	I will be paralysed with fear	30
4	I will drop or spill things	70
1	I am going to be sick	0
3	I am inadequate	60
2	I will babble or talk funny	50
4	I am inferior	80
2	I will be unable to concentrate	40
2	I will be unable to write properly	20

3	People are not interested in me	50
3	People won't like me	50
3	I am vulnerable	50
2	I will sweat/perspire	30
3	I am going red	60
4	I am weird/different	70
5	People will see I am nervous	90
3	People think I am boring	60
Select	Other thoughts not listed (please specify)	Select

When you **feel anxious** how much do you believe each thought to be true? Please rate each thought by choosing a number from the scale below, and put the number which applies on the dotted line on the **RIGHT** hand side of the form.

0 10 20 30 40 50 60 70 80 90 100

I do not believe this thought

I am completed convinced this thought it true

Social Summary Rating Scale

a) Please choose a number from the scale below that best describes how severe your social anxiety has been **in the last week**:

0 ○	1 ○	2 ○	3 ○	4 ○	5 ○	6 ○	7 ●	8 ○
Not at all disturbing and/or disabling		Slightly disturbing and/or disabling		Definitely disturbing and/or disabling		Markedly disturbing and/or disabling		Severely disturbing and/or disabling

b) Please choose a number from the scale below to show how often **in the last week** you have avoided difficult social situations or aspects of those situations.

0 ○	1 ○	2 ○	3 ○	4 ○	5 ○	6 ●	7 ○	8 ○
Not at all		Rarely		Sometimes		Often		Always

c) For social situations in general, please choose a number from the scale below to show the extent to which your attention was focused on yourself or on the external situation **in the last week**.

0 ○	1 ○	2 ○	3 ○	4 ○	5 ●	6 ○	7 ○	8 ○
Entirely externally focused				Both equally				Entirely self focused

d) For social situations that you found difficult, please choose a number from the scale below to show the extent to which your attention was focused on yourself or on the external situation **in the last week.**

0 ○	1 ○	2 ○	3 ○	4 ○	5 ○	6 ●	7 ○	8 ○
Entirely externally focused				Both equally				Entirely self focused

e) Over **the past week** how often have you gone over in your mind things that you think might go wrong in a social situation before entering the situation?

0 ○	1 ○	2 ○	3 ○	4 ●	5 ○	6 ○	7 ○	8 ○
Not at all		Rarely		Sometimes		Often		Always

f) Over **the past week** how often have you gone over social interactions in your mind after they have finished?

0 ○	1 ○	2 ○	3 ○	4 ○	5 ○	6 ○	7 ●	8 ○
Not at all		Rarely		Sometimes		Often		Always

Social Behaviours Questionnaire (SBQ)

Please choose the word which best describes how often you do the following things when you are anxious in or before a social situation.

1.	Use alcohol to manage anxiety	Always ○	Often ○	Sometimes ◉	Never ○
2.	Try not to attract attention	Never ○	Sometimes ○	Often ○	Always ◉
3.	Make an effort to get your words right	Never ○	Sometimes ○	Often ◉	Always ○
4.	Check that you are coming across well	Always ○	Often ◉	Sometimes ○	Never ○
5.	Avoid eye contact	Never ○	Sometimes ○	Often ○	Always ◉
6.	Talk less	Always ◉	Often ○	Sometimes ○	Never ○
7.	Avoid asking questions	Always ○	Often ◉	Sometimes ○	Never ○
8.	Try to picture how you appear to others	Never ○	Sometimes ◉	Often ○	Always ○
9.	Grip cups or glasses tightly	Never ○	Sometimes ○	Often ◉	Always ○
10.	Position yourself so as not to be noticed	Always ◉	Often ○	Sometimes ○	Never ○
11.	Try to control shaking	Always ◉	Often ○	Sometimes ○	Never ○
12.	Choose clothes that will prevent or conceal sweating	Never ○	Sometimes ◉	Often ○	Always ○
13.	Wear clothes or makeup to hide blushing	Never ○	Sometimes ○	Often ◉	Always ○
14.	Rehearse sentences in your mind	Always ○	Often ○	Sometimes ◉	Never ○
15.	Censor what you are going to say	Always ○	Often ◉	Sometimes ○	Never ○

16.	Blank out or switch off mentally	Never ○	Sometimes ◉	Often ○	Always ○
17.	Avoid talking about yourself	Never ○	Sometimes ○	Often ◉	Always ○
18.	Keep still	Always ○	Often ◉	Sometimes ○	Never ○
19.	Ask lots of questions	Always ○	Often ○	Sometimes ○	Never ◉
20.	Think positive	Never ○	Sometimes ◉	Often ○	Always ○
21.	Stay on the edge of groups	Never ○	Sometimes ○	Often ◉	Always ○
22.	Avoid pauses in speech	Always ○	Often ◉	Sometimes ○	Never ○
23.	Hide your face	Never ○	Sometimes ◉	Often ○	Always ○
24.	Try to think about other things	Always ○	Often ○	Sometimes ◉	Never ○
25.	Talk more	Always ○	Often ○	Sometimes ○	Never ◉
26.	Try to act normal	Always ◉	Often ○	Sometimes ○	Never ○
27.	Try to keep tight control of your behaviour	Never ○	Sometimes ○	Often ◉	Always ○
28.	Make an effort to come across well	Always ○	Often ◉	Sometimes ○	Never ○
29.	Planning topics to talk about in advance of a conversation	Never ○	Sometimes ◉	Often ○	Always ○

Patient Health Questionnaire (PHQ-9)

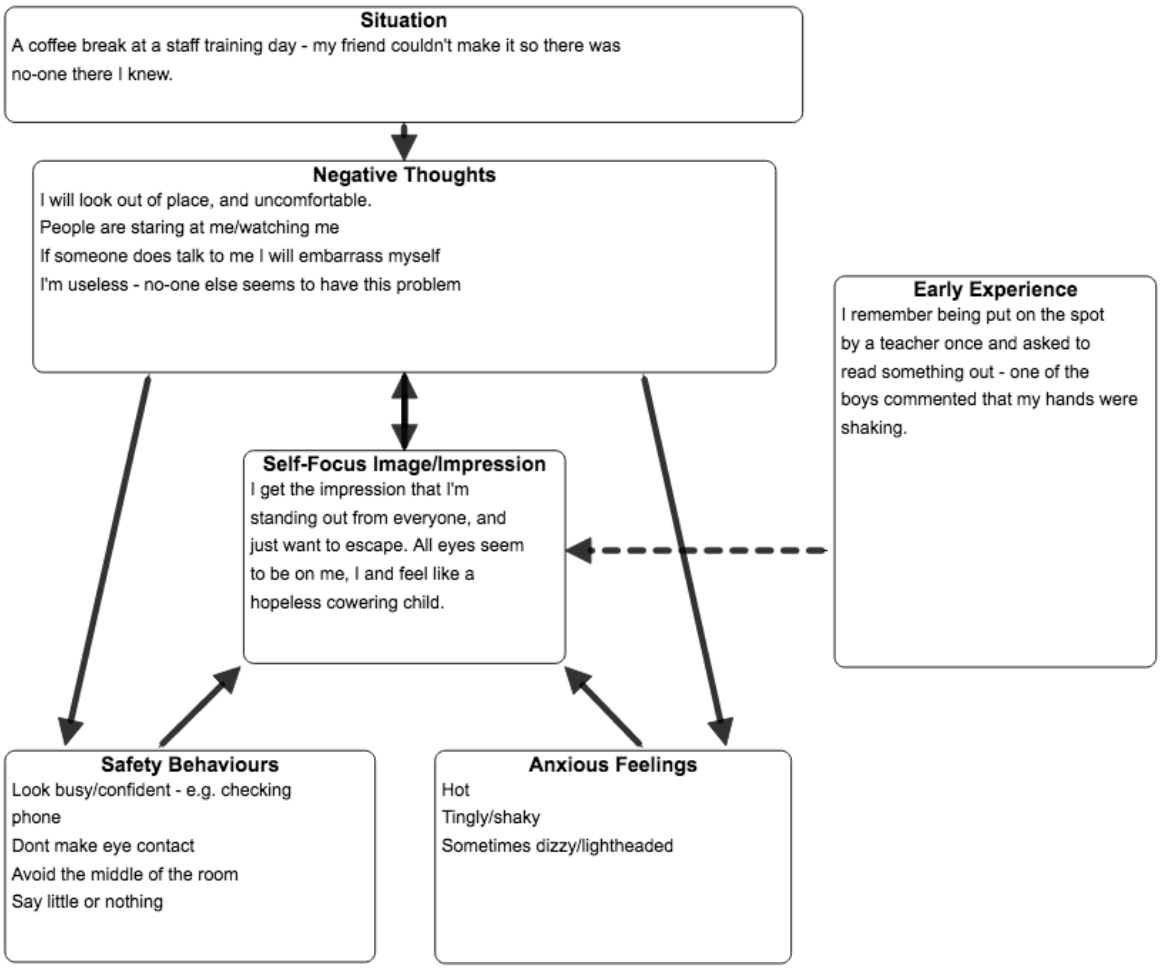
Over the **last 2 weeks**, how often have you been bothered by any of the following problems?

		Not at all	Several days	More than half the days	Nearly every day
1.	Little interest or pleasure in doing things	0 ○	1 ○	2 ○	3 ●
2.	Feeling down, depressed, or hopeless	0 ○	1 ○	2 ●	3 ○
3.	Trouble falling or staying asleep, or sleeping too much	0 ○	1 ○	2 ○	3 ●
4.	Feeling tired or having little energy	0 ○	1 ○	2 ●	3 ○
5.	Poor appetite or overeating	0 ○	1 ●	2 ○	3 ○
6.	Feeling bad about yourself - or that you are a failure or have let yourself or your family down	0 ○	1 ○	2 ○	3 ●
7.	Trouble concentrating on things, such as reading the newspaper or watching television	0 ○	1 ○	2 ●	3 ○
8.	Moving or speaking so slowly that other people could have noticed? Or the opposite - being so fidgety or restless that you have been moving around a lot more than usual	0 ○	1 ●	2 ○	3 ○
9.	Thoughts that you would be better off dead or of hurting yourself in some way	0 ●	1 ○	2 ○	3 ○

****

Looking through these questionnaires, which of the <u>optional</u> treatment modules would be most helpful for Anna across her treatment? Please say why you have chosen each one.

The model that Anna has completed in the 'Getting Started' module is shown below:



****

Please write brief notes on what you would want to discuss about the model with Anna in your next call. Is there anything you would want further information on, or that seems to be missing?

Client 2: Olivia, 33

Olivia is in week 2 of treatment, and you are completing the 'My Attention and Safety Behaviour Experiment' module with her via webcam. The comparison of her scores for conversations 1 and 2 is shown below:

Comparison of Ratings	Conversation 1 (self-focus with safety behaviours)	Conversation 2 (external focus without safety behaviours)
How self-conscious did you feel? (0-100%)	80	70
How anxious did you feel? (0-100%)	80	80
How self-focused were you? (0-100%)	80	80
How externally focused were you? (0-100%)	10	20
How anxious do you think you looked? (0-100%)	90	80
How well do you think you performed overall? (0-100%)	5	5

Below is a table summarising the ratings you gave for each of your fears following each conversation.
Remember: In your first conversation you were asked to **do** your safety behaviours and be **self-focused**, and in the second conversation to **drop** your safety behaviours and be **externally focused**.
Please take a moment to compare your ratings.

Fears and Concerns	Conversation 1 (self-focus with safety behaviours)	Conversation 2 (external focus without safety behaviours)
I'll look anxious and pathetic	80	90
I'll not have enough to say	90	90
They will think I'm weird (look at me strangely, or not be that keen to talk to me)	90	80

****

What appears to be the problem here, and how would you continue the webchat with Olivia at this point?

Client 3: Marcus, 24

Marcus is in week 3 of treatment, and you have a phonecall scheduled this afternoon. He was due to be completing the 'Behavioural Experiments' and 'Getting out of your head and into the world' modules. However, you can see from the site that he has not logged in during the past week, and although you have sent messages and SMS reminders you have not heard from him since your previous call.

****

Please write an agenda for today's phonecall below, with brief notes about what you would want to discuss:

Client 4: Anisha, 29

Anisha is in week 5 of treatment, and you have been helping her to plan and implement some behavioural experiments. Below are the most recent experiments from her behavioural experiment log:

Situation	Prediction	Experiment	Outcome	Learning
Chat to colleague at lunch	I wont know what to say (80) She will look bored (60) She will find an excuse to leave (50) I will be uncomfortable/awkward (80)	Chat with Sandra at lunch. Try not to monitor what I say, or ask lots of questions	Started off ok, conversation flowed fairly well and I could focus on what she was saying. A few awkward pauses, and I started getting more uncomfortable - Sandra wasnt looking bored but I thought she might be thinking I'm not that interesting. She didnt make an excuse to leave, but the conversation did dry up a bit.	She didnt seem to show any signs that I was boring her. I am able to do these one-to-one conversations but I think it's easy for me to lose confidence halfway through. Not doing my safety behaviour of asking questions was easier than I expected.
Ask a question in a meeting	People wont understand my question (70%) I wont explain myself clearly (80%) People will make a comment, or think what I ask is irrelevant (50%)	Ask a question in the next team strategy meeting. Focus externally, dont prepare what to say in advance.	Complete	Complete

****

How would you respond to Anisha? Please write brief notes on the points you would raise with her:

Client 5: Connor, 19

Connor has recently completed the 'Feeling Boring' module. His responses to part of this module are shown below:

Exercise:

It may be helpful for you to try this exercise.

Looking back over the past week, think about the different social situations you experienced, and the various interactions you may have had.

- What evidence from last week supports the belief that you are boring?
- Has anyone said or done anything to suggest they thought you were boring?
- Remember that your own feelings at the time do not count as valid evidence.
- Did anyone say or do anything to suggest they thought of you as boring?

Use the column below marked "Evidence For" to note down your ideas.

Now lets think about the Evidence Against.

- Did anything happen over the last week to suggest you are not boring or that others did not think of you as boring?
- Were there any times that you felt interested and others expressed some interest?
- Are there any alternative ways of looking at some of things you noted down in the "Evidence For" column?

Use the column marked "Evidence Against" to note down your ideas.

Evidence for:	Evidence against:
People at work had a long conversation about films that I couldn't contribute to	My friend was asking me about my weekend and seemed interested

What did you learn from this exercise?

****

What would you want to ask or discuss with Connor to help him with this exercise? What would you be hoping to achieve?

Client 6: Julie, 54

Julie is in week 10 of treatment. She has made steady progress and is currently working on the 'Leaving the Past Behind' module. She has sent you the following message:

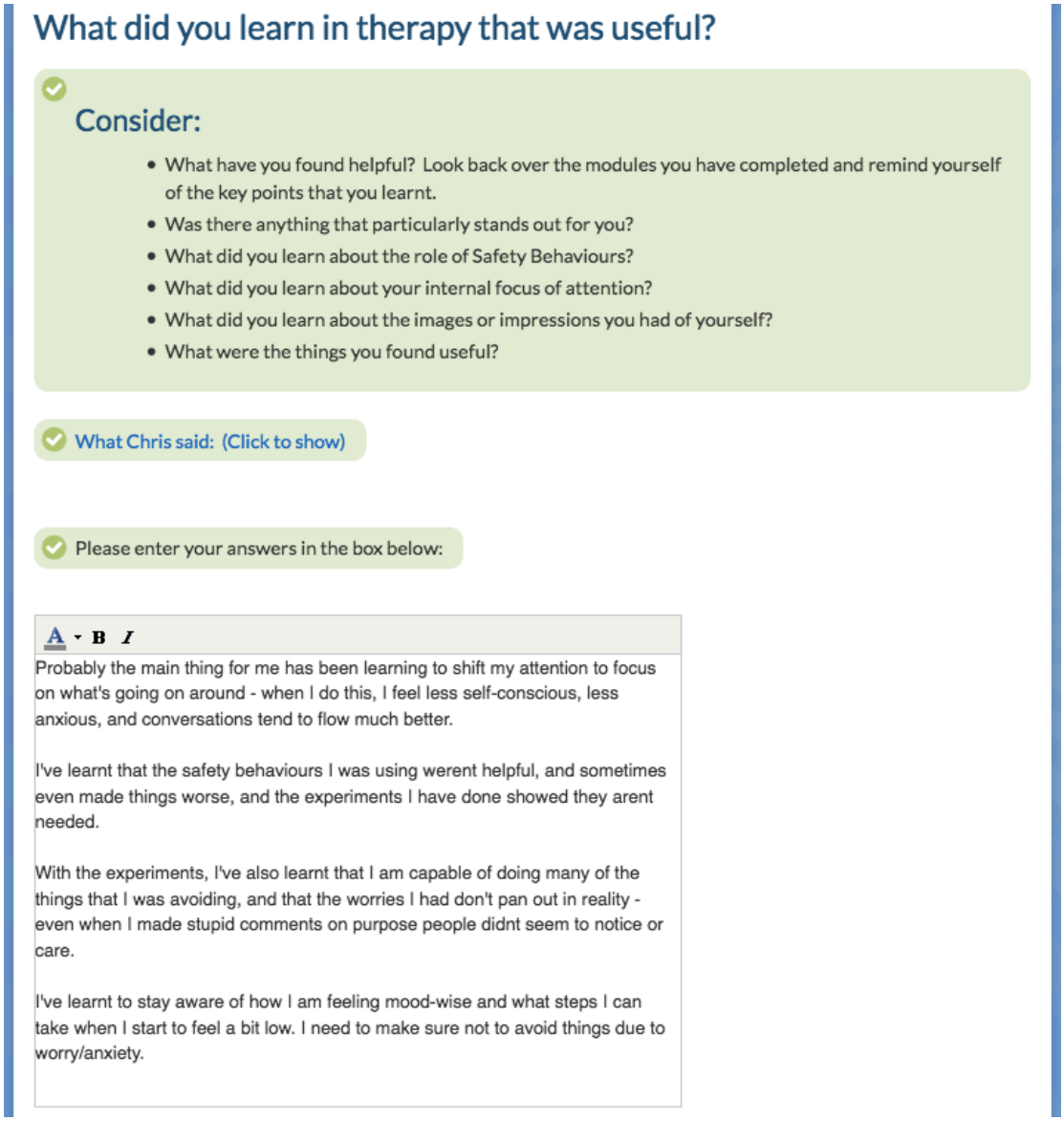
> *Thanks for your message, sorry for the delay in getting back to you.*
>
> *I've been finding things quite hard going recently – some difficulties with family at the moment, and busy at work, so by the time I get home I'm exhausted and don't really feel motivated or focused enough to work on the site. I don't want to let you down, and I have been finding things helpful so far, but it's just a struggle at the moment…*
>
> *Julie*

****

Please write a message in response to Julie below:

Client 7: Simon, 40

Simon is in week 14 of treatment and is about to move into the follow-up phase. He has just messaged you to say he has completed the blueprint module. An extract is shown below:



What did you learn in therapy that was useful?

Consider:

- What have you found helpful? Look back over the modules you have completed and remind yourself of the key points that you learnt.
- Was there anything that particularly stands out for you?
- What did you learn about the role of Safety Behaviours?
- What did you learn about your internal focus of attention?
- What did you learn about the images or impressions you had of yourself?
- What were the things you found useful?

What Chris said: (Click to show)

Please enter your answers in the box below:

Probably the main thing for me has been learning to shift my attention to focus on what's going on around - when I do this, I feel less self-conscious, less anxious, and conversations tend to flow much better.

I've learnt that the safety behaviours I was using werent helpful, and sometimes even made things worse, and the experiments I have done showed they arent needed.

With the experiments, I've also learnt that I am capable of doing many of the things that I was avoiding, and that the worries I had don't pan out in reality - even when I made stupid comments on purpose people didnt seem to notice or care.

I've learnt to stay aware of how I am feeling mood-wise and what steps I can take when I start to feel a bit low. I need to make sure not to avoid things due to worry/anxiety.

****

What suggestions might you make to Simon to help him improve this response?