Shifting the Focus of One's Attention Mediates Improvement in Cognitive Therapy for Social Anxiety Disorder

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Abstract

Background—Cognitive therapy is an effective treatment for social anxiety disorder but little is known about the mechanisms by which the treatment achieves its effects.

Aims—This study investigated the potential role of self-focused attention and social phobia related negative automatic thoughts as mediators of clinical improvement.

Method—Twenty-nine patients with social phobia received individual cognitive therapy (ICT) in a randomized controlled trial. Weekly process and outcome measures were analysed using multilevel mediation models.

Results—Change from self-focused to externally focused attention mediated improvements in social anxiety one week later. In contrast, change in frequency of, or belief in, negative social phobia related negative automatic thoughts did not predict social anxiety one week later.

Conclusions—Change in self-focused attention mediate therapeutic improvement in ICT. Therapists should therefore target self-focused attention.

Keywords

Social phobia; cognitive therapy; attention; beliefs; individual CBT

Introduction

Social anxiety disorder (social phobia) (American Psychiatric Association, 1994) is a common and disabling anxiety disorder with an early onset and a generally unremitting course (Bruce et al., 2005; Kessler, Berglund, Demler, Jin and Walters, 2005). Significant

progress has been made in developing effective psychological treatments for the condition. Six meta-analytic reviews have concluded that there is strong empirical support for the efficacy of cognitive behavioural treatments (CBTs) (Feske and Chambless, 1995; Taylor, 1996; Chambless and Hope, 1996; Gould, Buckminster, Pollack, Otto and Yap, 1997; Acaturk, Cuijpers, van Straten and de Graaf, 2009; Fedoroff and Taylor, 2001). However, little is known about the mechanisms by which CBTs achieve their effects.

Individual cognitive therapy (ICT), a relatively recent development within CBTs for social anxiety disorder, is associated with large effect sizes and has been shown to be superior to SSRIs (Clark et al., 2003), a form of group CBT (Stangier, Heidenreich, Peitz, Lauterbach and Clark, 2003), exposure in vivo combined with applied relaxation (Clark et al., 2006), intensive group cognitive therapy, (Mörtberg, Clark, Sundin and Åberg Wistedt, 2007), medication based treatment as usual (Mörtberg et al., 2007), interpersonal psychotherapy (Stangier, Schramm, Heidenreich, Berger and Clark, 2011), and psychodynamic psychotherapy (Leichsenring, 2012). ICT is derived from a cognitive model of social anxiety disorder (Clark and Wells, 1995; Clark, 2001) and specifically targets the maintenance factors specified in the model. The hypothesized maintenance factors are: 1) Negative social phobia related cognitions (automatic thoughts, images and beliefs); 2) self- focused evaluative attention, which reduces the processing of external social events and increases access of potential misleading internal information (feelings and images); and 3) Safety-seeking behaviours, which prevent disconfirmation of social phobia related negative beliefs and have a negative impact on the social interaction. It is tempting to assume that ICT works by changing these maintenance factors but so far there have been no direct tests of this hypothesis.

Five studies have explored mediators of therapeutic improvement in other CBTs for social anxiety disorder and have generally reported results that are consistent with cognitive models (Clark and Wells, 1995; Rapee and Heimberg, 1997), but one cannot safely assume that these results would generalize to ICT as it involves several unique therapeutic procedures. In the first study, Hofmann (2000) found that pre to post change in self-focused attention mediated differences in outcome between a group CBT and a wait-list control condition. In the second study, Rapee and colleagues (Rapee, Gaston and Abbott, 2009) found that pre to post change in the perceived cost of negative outcomes mediated differences on outcome between another group CBT and control conditions. In the third study, Boden et al. (2012) found that pre to post change in social-phobia related interpersonal beliefs mediated differences in outcome between individual CBT (Heimberg protocol) and a wait-list control. All three of these studies only assessed putative mediators at pre and posttreatment. As a consequence, they were unable to assess a key requirement of mediation, namely that change in the mediator must precede change in the outcome. In the fourth study, in which temporal precedence was tested, it was found that judgemental biases (probability and cost of harm) mediated changes in social anxiety during a brief exposure based treatment (Smits, Rosenfield, McDonald and Telch, 2006). The final study (Hoffart, Borge, Sexton and Clark, 2009) assessed putative mediators and outcome weekly during residential versions of CT and interpersonal psychotherapy. Both treatments had been substantially modified for residential, largely group based delivery. Consistent with

cognitive models, changes in self-focused attention at week X predicted changes in social anxiety at week X plus 3 days over a 10-week course of either residential treatment.

The present study is the first to examine change processes within ICT. Two putative mediators (self-focused attention and social anxiety related negative automatic thoughts) were assessed every week during therapy and related to changes in social anxiety one week later.

Data for our study were collected in a randomized controlled trial (Mörtberg et al., 2007), which demonstrated the superior effects of ICT as compared to an intensive (3-week) group cognitive therapy (IGCT), and to medication based treatment as usual (TAU). ICT was associated with a high effect-size (Cohen's $d = 2.14$) on the primary outcome measure, and 56% of patients demonstrated a reliable and clinically significant change at posttreatment (Mörtberg et al., 2007). Weekly process and outcome measures were only collected in the ICT branch of the trial. The study addresses the following questions:

1.   Do the specified cognitive process variables change with treatment?

2.   Do weekly changes in the process variables predict subsequent changes in social anxiety?

Method

Participants

Participants were 29 patients who received ICT as part of the randomized controlled trial reported by Mörtberg et al. (2007). Three participants who were randomized to ICT were not included as they only attended the initial assessment and provided baseline data. Participants were recruited through advertisements in the local newspaper and were included in the original trial if they: (a) had a diagnosis of social anxiety disorder (social phobia) according to DSM–IV (First, Spitzer, Gibbon and Williams, 1995); (b) were 18 to 65 years old; (c) did not suffer from current depressive episode, bipolar disorder, acute stress disorder, addiction or psychosis; (d) did not take psychotropic medication; or (e) did not undergo current psychotherapy (for further details see Mörtberg et al., 2007).

In the present sample, the mean age was 35.9 years ($SD = 9.6$). Seventy-six percent were suffering from generalized social phobia. Forty-one percent were married or cohabiting, 48% had a higher education, 69% were female. On average, participants' duration of social phobia was 21 years ($SD = 10.1$).

Individual cognitive therapy

The main-steps of ICT (16 weeks) were: (a) Deriving an individualized version of the cognitive model using the patient's thoughts, images, anxiety symptoms, safety-behaviours and strategies of attention; (b) Conducting behavioural experiments to demonstrate the adverse effects of safety behaviours and self-focused attention; (c) Using video feedback to modify distorted self-imagery; (d) Training externally-focused attention (i.e. to shift attention away from oneself and onto to the social situation; (e) Conducting behavioural experiments to enable patients to test the validity of their negative predictions in a variety of

social situations; (f) Identification and modification of problematic anticipatory and post-event negative processing; and (g) Identification and modification of social anxiety related dysfunctional assumptions.

CBT competence and supervision

Seven CBT-trained therapists with between 5 and 25 years of experience in the treatment of anxiety disorders delivered ICT. Therapists had group supervision by a highly experienced cognitive therapist (Anna Kåver) once a month to check adherence to the protocol. All sessions were video-recorded and the tapes were viewed during supervision to check treatment integrity.

Process measures

Self-focused attention—Self versus external focus of attention in social situations was measured weekly by one item of the (5-item) Social Phobia Weekly Summary Scale (SPWSS) (Clark et al., 2003). Participants were asked to rate (on a 0–8 scale) their focus of attention in social situations during the previous week on a scale from 0 (totally focused on the situation) to 8 (totally self-focused).

Social phobia related negative automatic thoughts—Negative thoughts related to social phobia (e.g. "I will not be able to speak") were measured weekly by the 22-item Social Cognitions Questionnaire (SCQ) (Wells, Stopa and Clark, 1993; Clark and Wells, 1995). Each thought was rated twice: for the *frequency* with which the thought occurred in the last week when he/she was "nervous or frightened" (1 = never, to 5 = always when frightened) and for the *belief* with which the thought was believed to be true (0 = I do not belief this thought, to 100 = I am completely convinced that this thought is true). Both scales (frequency and belief) had good internal consistency (Cronbach's $a = 0.89$) and discriminant validity.

Social anxiety measures

For the mediation analysis, social anxiety levels were measured every week by four of the five items (rated on a 0–8 scale) of the SPWSS (i.e. not including the self versus external focus of attention item) that covered feeling anxious in social situations, avoidance of social situation, anxious anticipation of social encounters, and post-event rumination (Clark et al., 2003). The SPWSS has good internal consistency (Cronbach's $a = 0.81$) (Clark et al., 2003, 2006) and is sensitive to treatment effects (Clark et al., 2003, 2006; Mörtberg et al., 2007).

The self-report version of the LSAS (Baker, Heinrichs, Kim and Hofmann, 2002) was also used to assess severity of social anxiety but was administered only at pre and posttreatment. In our sample, there was a significant correlation ($p < .01$) between the pre to post change score on the SPWSS (four items) and the pre to post change scores on the LSAS ($r = .46$), supporting the validity of the four item SPWSS as an outcome measure.

Statistical analyses

The present study aimed to examine whether weekly changes in the specified cognitive process variables mediated subsequent weekly changes in social anxiety. In longitudinal

designs, repeated measurements that have been obtained on the same individuals can be appropriately analysed with hierarchical linear models where repeated measures (lower level units) are nested within persons (upper level units). Multilevel models can effectively manage unequal observation numbers as well as missing data and control for the correlation of repeated observations within each subject (Raudenbush and Bryk, 2002). Mediation analysis aims to describe a potential causal pathway through which an independent variable affects an outcome variable (Bauer, Preacher and Gil, 2006). For the present study, we specified "elapsed time" (days) as the independent variable, "process variables at week j" as potential mediators; and "social anxiety at week j+1" as the dependent variable, to model a temporal lag between changes in mediator and outcome variables, which has been deemed necessary to establish mediation (Kraemer, Wilson, Fairburn and Agras, 2002). The multilevel models include: (a) the effect of elapsed time on changes in the putative mediator (path a_i) which was specified as random to account for the fact that the mediator might change differentially over time across patients; (b) the effect of changes in the suggested process variable on subsequent changes in social anxiety if time was being held constant (path b), which was specified as fixed as the influence between mediator and outcome by definition be the same across patients and time points; and (c) the indirect effect of elapsed time on social anxiety via changes in the putative mediator ($a_i b$). The parameters were estimated in a multilevel model using the procedure described in Bauer et al. (2006) when all relevant variables are measured at the lower level. This procedure allows for the simultaneous estimation of all parameters (the point estimates of a_i, b, c' and their standard errors) involved in lower level mediation. Simulations have shown that these estimates are unbiased under most conditions. The product of the two-path coefficients $a_i b$ was tested for significance using the Sobel test (Sobel, 1986) as applied for multilevel mediation models[1] (Krull and MacKinnon, 1999). For all analyses HLM 6.08 was used. Figure 1 illustrates the tested mediational models.

Results

Overall outcome

A detailed description of the overall outcome findings for the study is reported elsewhere (Mörtberg et al., 2007). In summary, all three treatments (individual CT, intensive group CT, and treatment as usual) were associated with significant reductions in social anxiety, with ICT producing significantly greater improvement.

Turning to the within ICT analyses for this report, the random total effect of time on social anxiety (as measured by the SPWSS) was significant (path $c_i = -0.0132$, $SE = 0.0018$, $p < .0001$) indicating that patients' social anxiety changed significantly over time. There was no therapist x time interaction effect indicating that therapists did not differ in their impact on social anxiety over time. Descriptive data for the outcome (LSAS) and process measures at pre and posttreatment are shown in Table 1.

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[1]In multilevel random effects mediation models, the indirect effect is calculated as the product of the path coefficients a and b plus the covariance of both parameter (Krull and MacKinnon, 1999; Bauer, Preacher and Gil, 2006). In the present analyses, however, the formula simplified to a times b, as the covariance between the random parameter a_i and the fixed parameter b is zero.

Assessment of potential mediators

Self-focused attention and social phobia related negative automatic thoughts were examined in separate multilevel mediation models. The aim was to examine if changes in social anxiety could be attributed to preceding changes in the respective process variable. Changes in self-focused attention mediated subsequent changes in social anxiety, whereas changes in social phobia related negative automatic thoughts (frequency and belief) did not predict subsequent changes in anxiety. See Table 2 for the relevant path coefficients and estimates of the indirect effects.

Both self-focused attention and social phobia related negative automatic thoughts changed significantly with treatment. However, holding time constant, only changes in self-focused attention further predicted subsequent changes in social anxiety. The indirect effect for self-focused attention was significant, indicating that changes in social anxiety over time could be attributed to preceding changes in this process variable. Importantly, the reverse mediation model, which tested whether changes in social anxiety mediated the effect of elapsed time on subsequent self-focused attention, was not significant (c'_j: −0.0146 [SE = 0.0018] $p < .001$; a_j: −0.0149 [SE = 0.0026] $p < .001$; b: −0.0033 [SE = 0.0512] $p > .05$; ab: 0.0000 [SE = 0.0009] $p > .05$). There was also no evidence of reverse mediation for social phobia related negative automatic thoughts. It is possible that the lack of a significant lagged relationship between social phobia related thoughts and subsequent social anxiety is due to the fact that changing thoughts has a fairly immediate effect on anxiety (see Clark, 1993 for example). If that is correct, we would expect to obtain evidence for mediation in a non-lagged model; this was in fact the case. In a concurrent (non-lagged model) change in social phobia related thoughts mediated the relationship between elapsed time and change in social anxiety (SCQf: c'_j: −0.0077 [SE = 0.0019] $p < .001$; a_j: −0.1510 [SE = 0.0199] $p < .001$; b: 0.0450 [SE = 0.0090] $p < .001$; ab: −0.0068 [SE = 0.0012] $p < .001$; SCQb2: c'_j: −0.0073 [SE = 0.0021] $p < .001$; a_j: -4.0259 [SE = 0.5494] $p < .001$; b: 0.0016 [SE = 0.0003] $p < .001$; ab: −0.0065 [SE = 0.0012] $p < .001$).

Discussion

The present study examined the predictive relationships between self-focused attention, social phobia related negative automatic thoughts and social anxiety in ICT. The main findings were that weekly changes in self-focused attention accounted for subsequent changes in social anxiety and that frequency of, and belief in, social phobia related negative automatic thoughts were not predictive of subsequent social anxiety. Moreover, changes in social anxiety did not account for subsequent changes in self-focused attention. However, both self-focused attention and negative social phobia related automatic thoughts changed in line with overall outcome and were significantly reduced over the course of treatment.

The findings are consistent with previous studies suggesting a causal link between self-focused attention and levels of social anxiety (Bögels and Lamers, 2002; McManus et al., 2009), and a relation between treatment change of self-focused attention and decreases in social anxiety (Woody, Chambless and Glass, 1997; Hofmann, 2000).

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[2]For the SCQb, paths a and c were fixed to allow for model convergence.

It is difficult to interpret the lack of an indirect effect of time on social anxiety via changes in social phobia related negative thoughts. Clearly, social phobia related thoughts decrease over the course of successful treatment (Wells et al., 1995; Wells and Papageorgiou, 1998; Hofmann, 2000; Mörtberg et al., 2007; McManus, Sacadurab and Clark, 2008). It is possible that the temporal relationship may be tighter than that observed for self-focused attention and social anxiety. Consistent with this suggestion, Hoffart et al. (2009) found that changes in the estimated probability and cost of feared outcomes predicted subsequent changes in social anxiety after a gap of half a week, rather than the full week interval used in this study. Consistent with the short time lag idea, we found that change in social phobia related thoughts did account for improvement in social anxiety in a concurrent (non-lagged mediation) model. Sample size may also be an important consideration. For example, Boecking, Ehlers and Clark (2013) recently found evidence for a significant relationship between changes in social phobia related negative automatic thoughts and subsequent changes in social anxiety in a study with a substantially larger sample of patients treated with ICT.

The main strength of this study was the frequent assessment of both process and outcome variables and the use of multilevel methods to estimate process-outcome relationships. Some limitations should be recognized when interpreting the results of the present study, most of which relate to measurement issues. First, putative mediators and outcome were assessed using self-report measures, although with sound psychometric characteristics. Second, self-focused attention was measured by only one item. Third, process variables were measured only on a weekly basis in the ICT branch of the trial. The superiority of ICT compared to the other treatments in the trial was evident in the process variables as well as the social anxiety measures (Mörtberg et al., 2007). However, as weekly process ratings were not collected in the other treatments, we were unable to determine whether similar mediators accounted for improvement in the other treatments.

In summary, the present study provides preliminary support for the proposed mediation model that changes in self-focused attention over time lead to reductions in social anxiety during cognitive therapy for social anxiety disorder. This suggests that clinicians should pay careful attention to monitoring the extent to which self-focused attention does, or does not, change during the course of therapy. ICT emphasizes attention training. The present results suggest that outcome might be further improved by enhancing this component of the treatment. Other psychological therapies for social anxiety disorder may also benefit from an explicit emphasis on facilitating a shift from internal to externally focused attention.

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References

Acarturk C, Cuijpers P, van Straten A, de Graaf R. Psychological treatment of social anxiety disorder: a meta-analysis. Psychological Medicine. 2009; 39:241–254. [PubMed: 18507874]

American Psychiatric Association (APA). Diagnostic and Statistical Manual of Mental Disorders (DSM-IV). Washington, DC: APA; 1994.

Baker S, Heinrichs N, Kim H-J, Hofmann S. The Liebowitz Social Anxiety Scale as a self-report instrument: a preliminary psychometric analysis. Behaviour Research and Therapy. 2002; 40:701–715. [PubMed: 12051488]

Bauer JB, Preacher KJ, Gil KM. Conceptualizing and testing random indirect effects and moderated mediation in multilevel models: new procedures and recommendations. Psychological Methods. 2006; 11:142–163. [PubMed: 16784335]

Boden MT, John OP, Goldin PR, Werner K, Heimberg RG, Gross JJ. The role of maladaptive beliefs in cognitive-behavioral therapy: evidence from social anxiety disorder. Behaviour Research and Therapy. 2012; 50:287–291. [PubMed: 22445947]

Boecking, B.; Ehlers, A.; Clark, DM. Cognitive Precursors of Symptom Reduction in Cognitive Therapy for Social Phobia. 2013. Manuscript submitted for publication

Bögels SM, Lamers CTJ. The causal role of self-awareness in blushing-anxious, socially-anxious and social phobic individuals. Behaviour Research and Therapy. 2002; 40:1367–1384. [PubMed: 12457633]

Bruce SE, Yonkers KA, Otto MW, Eisen JL, Weisberg RB, Pagano M, et al. Influence of psychiatric comorbidity on recovery and recurrence in generalized anxiety disorder, social phobia, and panic disorder: a 12-year prospective study. American Journal of Psychiatry. 2005; 162:1179–1187. [PubMed: 15930067]

Chambless, DL.; Hope, DA. Cognitive Approaches to the Psychopathology of Social Phobia. New York: Guilford Press; 1996.

Clark DM. Cognitive mediation of panic attacks induced by biological challenge tests. Advances in Behaviour Research and Therapy. 1993; 15:75–84.

Clark, DM. A cognitive perspective on social phobia. International Handbook of Social Anxiety. Crozier, RW.; Alden, LE., editors. New York: John Wiley and Sons; 2001. p. 406-430.

Clark DM, Ehlers A, Hackmann A, McManus F, Fennell M, Grey N, et al. Cognitive therapy versus exposure and applied relaxation in social phobia: a randomized controlled trial. Journal of Consulting and Clinical Psychology. 2006; 74:568–578. [PubMed: 16822113]

Clark DM, Ehlers A, McManus F, Hackmann A, Fennell M, Campell H, et al. Cognitive therapy vs. fluoxetine plus self exposure in the treatment of generalized social phobia (social anxiety disorder): a randomized placebo controlled trial. Journal of Consulting and Clinical Psychology. 2003; 71:1058–1067. [PubMed: 14622081]

Clark, DM.; Wells, A. A cognitive model of social phobia. Social Phobia: diagnosis, assessment and treatment. Heimberg, MR.; Liebowitz, M.; Hope, DA.; Schneier, FR., editors. New York: Guilford Press; 1995. p. 69-93.

Fedoroff IC, Taylor S. Psychological and pharmacological treatments of social phobia: a meta-analysis. Journal of Clinical Psychopharmacology. 2001; 21:311–324. [PubMed: 11386495]

Feske U, Chambless DL. Cognitive behavioural versus exposure only treatment for social phobia: a meta-analysis. Behavior Therapy. 1995; 26:695–720.

First, BM.; Spitzer, RL.; Gibbon, M.; Williams, JBW. User's Guide for the Structured Clinical Interview for DSM-IV Axis I Disorders: SCID-I clinician version. Washington, DC: American Psychiatric Press; 1995.

Gould RA, Buckminster S, Pollack MH, Otto MW, Yap L. Cognitive-behavioral and pharmacological treatment for social phobia: a meta-analysis. Clinical Psychology: Science and Practice. 1997; 4:291–306.

Hoffart A, Borge FM, Sexton H, Clark DM. Change processes in residential cognitive and interpersonal psychotherapy for social phobia: a process-outcome. Behavior Therapy. 2009; 40:10–22. [PubMed: 19187813]

Hofmann SG. Self-focused attention before and after treatment of social phobia. Journal of Consulting and Clinical Psychology. 2000; 72:588–596.

Kessler RC, Berglund P, Demler O, Jin R, Walters EE. Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the National Comorbidity Survey Replication. Archives of General Psychiatry. 2005; 62:593–602. [PubMed: 15939837]

Kraemer HC, Wilson GT, Fairburn CG, Agras WS. Mediators and moderators of treatment effects in randomized clinical trials. Archives of General Psychiatry. 2002; 59:877–883. [PubMed: 12365874]

Krull JL, MacKinnon DP. Multilevel mediation modeling in group-based intervention studies. Journal of Consulting and Clinical Psychology. 1999; 68:438–450.

Leichsenring, F. The Social Phobia Psychotherapy Research Network (SOPHONET): structure and preliminary results; Paper presented at the "Milestones in Research and Practice" Psychotherapy Congress; Germany: Medical University of Hannover; 2012.

McManus F, Clark DM, Grey N, Wild J, Hirsch C, Fenell M, et al. A demonstration of the efficacy of two components of cognitive therapy for social phobia. Journal of Anxiety Disorders. 2009; 23:201–209.

McManus F, Sacadurab C, Clark DM. Why social anxiety persists: an experimental investigation of the role of safety behaviours as a maintaining factor. Journal of Behaviour Therapy and Experimental Psychiatry. 2008; 39:147–161.

Mörtberg E, Clark DM, Sundin Ö, Åberg Wistedt A. Intensive group cognitive treatment and individual cognitive therapy versus treatment as usual in social phobia: a randomized controlled trial. Acta Psychiatrica Scandinavica. 2007; 115:142–154. [PubMed: 17244178]

Rapee RM, Gaston JE, Abbott MJ. Testing the efficacy of theoretically derived improvements in the treatment of social phobia. Journal of Consulting and Clinical Psychology. 2009; 77:317–327. [PubMed: 19309190]

Rapee RM, Heimberg RG. A cognitive-behavioral model of anxiety in social anxiety disorder. Behaviour Research and Therapy. 1997; 35:741–756. [PubMed: 9256517]

Raudenbush, SW.; Bryk, AS. Hierarchical Linear Models: applications and data analysis methods. Newbury Park, CA: Sage; 2002.

Smits JJ, Rosenfield D, McDonald R, Telch MJ. Cognitive mechanisms of social anxiety reduction: an examination of specificity and temporality. Journal of Consulting and Clinical Psychology. 2006; 74:1203–1212. [PubMed: 17154749]

Sobel ME. Some new results on indirect effects and their standard errors in covariance structure models. Sociological Methodology. 1986; 16:159–186.

Stangier U, Heidenreich T, Peitz M, Lauterbach W, Clark DM. Cognitive therapy for social phobia: individual versus group treatment. Behaviour Research and Therapy. 2003; 41:991–1007. [PubMed: 12914803]

Stangier U, Schramm E, Heidenreich T, Berger M, Clark DM. Cognitive therapy vs interpersonal psychotherapy in social anxiety disorder: a randomized controlled trial. Archives of General Psychiatry. 2011; 68:692–700. [PubMed: 21727253]

Taylor S. Meta-analysis of cognitive-behavioral treatments for social phobia. Journal of Behaviour Therapy and Experimental Psychiatry. 1996; 27:1–9.

Wells A, Clark DM, Salkovskis P, Ludgate J, Hackmann A, Gelder M. Social phobia: the role of in-situation safety behaviours in maintaining anxiety and negative beliefs. Behavior Therapy. 1995; 29:357–370.

Wells A, Papageorgiou C. Social phobia: effects of external attention on anxiety, negative beliefs and perspective taking. Behavior Therapy. 1998; 29:357–370.

Wells, A.; Stopa, L.; Clark, DM. The Social Cognitions Questionnaire. University of Oxford; 1993. unpublished manuscript

Woody SR, Chambless DL, Glass CR. Self-focused attention in the treatment of social phobia. Behaviour Research and Therapy. 1997; 35:117–129. [PubMed: 9046675]
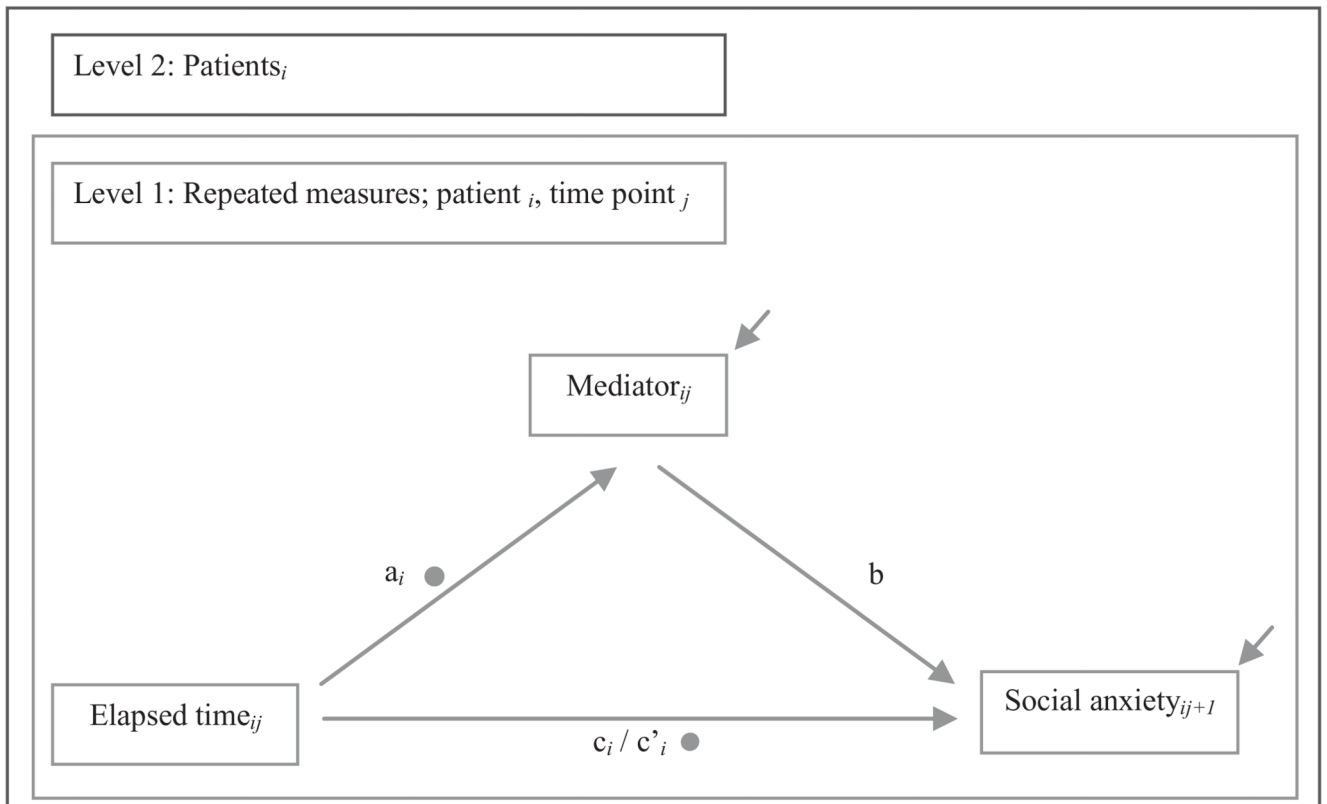
Figure 1.
Random effects multilevel mediation model as estimated for the present study. Subscripts indicate varying measures across patients *i* and time points *j*. Continuous arrows and path labels illustrate hypothesized causal effects. Filled circles adjacent to path labels represent random slopes. Path labels without filled circles represent fixed slopes. Raised arrows indicate residuals.

Table 1

Outcome measure and process measures at pre and posttreatment ($n = 28$[1])

Measure	Pretreatment *M (SD)*	Posttreatment *M (SD)*	*F* (1, 27)	Cohen's *d*
LSAS	80.2 (21.8)	45.4 (24.1)	50.0[***]	1.51
SPWSS	5.2 (1.6)	2.1 (1.6)	125.0[***]	1.94
Self-focused attention	5.0 (2.0)	1.8 (1.5)	77.6[***]	1.81
SCQ - frequency	60.0 (14.3)	35.3 (14.8)	101.8[***]	1.70
SCQ - belief	918.2 (432.5)	329.8 (320.1)	64.6[***]	1.50

Notes:

[1]One patient who dropped out after five sessions was not included. LSAS = Liebowitz Social Anxiety Scale, SPWSS = Social Phobia Weekly Summary Scale, SCQ = Social Cognitions Questionnaire.

[***]$p < .001$

Table 2

Path coefficients and indirect effects for process effects on social anxiety

Process	Self-focused attention		Negative thoughts - frequency		Negative thoughts - belief	
Paths	Coefficient (*SE*)	Indirect effect *ab* (*SE*)	Coefficient (*SE*)	Indirect effect *ab* (*SE*)	Coefficient (*SE*)	Indirect effect *ab* (*SE*)
		− 0.0012 *		0.0006		−0.0011(0.0010)
		(0.0006)		(0.0010)		
		PM = 9.15%				
c'_j	−0.0124		−0.0138		−0.0122	
	(0.0021) ***		(0.0023) ***		(0.0022) ***	
a_j	−0.0152		−0.0070		−0.1870	
	(0.0020) ***		(0.0009) ***		(0.0243) ***	
b	0.0773		−0.0809		0.0061	
	(0.0370) *		(0.1408)		(0.0050)	

Notes:

Path c' denotes the direct effect of time on outcome, controlling for a process effect. Path a_j denotes the effect of time on the specified process variable. Path b denotes the effect of a specified process variable on the subsequent week's outcome, when time is being held constant.

PM = Percent Mediation (i.e. proportion of the total effect which is accounted for by the indirect effect). *SE* = standard error; *p* < .05, ***p* <.0001