Research paper

Development and validation of the Core Beliefs Questionnaire in a sample of individuals with social anxiety disorder☆

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ABSTRACT

Background: Prominent cognitive models of social anxiety have consistently emphasised the importance of beliefs about the self in the aetiology and maintenance of social anxiety. The present study sought to develop and validate a new measure of core beliefs about the self for SAD, the Core Beliefs Questionnaire (CBQ).
Methods: Three versions of the CBQ were developed: a Trait version (fundamental absolute statements about the self), a Contingent version (statements about the self related to a specific social-evaluative situation), and an Other version (statements about how others view the self in social-evaluative situations generally). The psychometric features of the scales were examined in clinical ($n=269$) and non-clinical ($n=67$) samples.
Results: Exploratory factor analysis yielded a one factor model for all three versions of the questionnaire. Total scores differentiated individuals with SAD from individuals without a psychiatric condition, and demonstrated excellent internal consistency. The three CBQ versions had positive associations with social anxiety while controlling for depression, although zero-order correlations indicated the Trait version was more strongly related to depression than social anxiety, the Contingent version was similarly related to depression and social anxiety, and the Other version was more strongly related to social anxiety than depression. Scores on all three versions of the CBQ reduced from pre- to post-treatment and this change predicted treatment outcome.
Limitations: This is the first validation study of the CBQ.
Conclusions: This study provides initial support for the reliability and validity of the CBQ.

1. Introduction

Social anxiety disorder (SAD) is characterised by an intense and persistent fear of social or performance situations where the individual is exposed to possible scrutiny from others (American Psychiatric Association, 2013). The disorder is common (lifetime prevalence around 12%), chronic, and debilitating (Ruscio et al., 2008; Wittchen and Fehm, 2003). In a number of existing psychological models of SAD, specific enduring maladaptive beliefs about the self in relation to social-evaluative contexts are proposed to contribute to the persistence of the disorder (Clark and Wells, 1995; Heimberg et al., 2010; Hofmann, 2007; Moscovitch, 2009; Rapee and Heimberg, 1997; Wong and Rapee, 2016; see also Gregory et al., 2016, for a review). For example, in Clark and Wells' (1995) model, such beliefs include: high standard beliefs (e.g., "I have to get everyone's approval"), conditional beliefs (e.g., "If I make mistakes, others will reject me"), and unconditional beliefs (e.g., "People think I'm inferior"). In one relatively recent model

of SAD, maladaptive beliefs about the self in relation to social-evaluative contexts, as well as maladaptive beliefs about the self that stand independent of social-evaluative context, have been emphasised. According to Moscovitch's (2009) model, an individual with SAD believes that there are flaws in aspects of their self, which may include their social skills or behaviours (e.g., "I will have nothing to say"), their control and concealment of anxiety (e.g., "I will sweat"), their physical appearance (e.g., "I am ugly"), or their character or personality (e.g., "I am stupid").

In accordance with the majority of models of SAD, researchers have developed measures that focus on capturing maladaptive beliefs about the self in relation to social-evaluative contexts (see Wong et al., 2016, for a review). There are currently several psychometrically validated measures (see Table 1). These measures of enduring maladaptive beliefs have been shown to have significant positive associations with measures of social anxiety symptoms (rs range from .38 and .85; Boden et al., 2012; Fergus et al., 2009; Gros and Sarver, 2014; Levinson et al.,

Table 1
Existing psychometrically validated measures of enduring maladaptive beliefs of individuals with SAD.

Measure	Description of beliefs measured	Type of belief (s) captured according to cognitive theory[a]	Example items	References
21-item Social Thoughts and Beliefs Scale (STABS)	Beliefs that other people are more socially competent; beliefs related to behaving awkwardly or appearing anxious in social situations	CB Type 2, IB	"Other people are bored when they are around me" (CB Type 2); "When I am in a social situation, I appear clumsy to other people" (IB)	Turner et al., 2003; see also Fergus et al., 2009;Gros and Sarver, 2014
9-item Core Extrusion Schema (CES-R)	Beliefs about revealing one's self leading to negative evaluation	IB	"If I said what I really think, people would probably reject me" (IB)	Levinson et al., 2015; see also Rodebaugh, 2009
15-item Self-Beliefs related to Social Anxiety (SBSA)	Three maladaptive belief types based on the Clark and Wells (1995) model of SAD: high standard beliefs, conditional beliefs, unconditional beliefs	CB Type 2, IB	"People think I'm inferior" (CB Type 2); "if I make mistakes, others will reject me" (IB)	Wong and Moulds, 2011;Wong et al., 2014; see also Wong and Moulds, 2009
9-item Maladaptive Interpersonal Belief Scale (MIBS)	Interpersonal beliefs related to SAD	CB Type 1, CB Type 2, IB	"I am lovable" [reverse scored] (CB Type 1); "People like me" [reverse scored] (CB Type 2); "If people knew how nervous I get, they would think I was weird" (IB)	Boden et al., 2012

[a] CB Type 1=Core Belief Type 1=beliefs about the self that are global, generalised, and absolute; CB Type 2=Core Belief Type 2=beliefs about the self that reflect the (perceived) perspective of other people and are therefore relatively less global, generalised, and absolute; IB=Intermediate Beliefs=beliefs about the self that are contextualised in social-evaluative situations and are therefore even less global, generalised, and absolute.

2015; Rodebaugh, 2009), with some studies also showing this relationship to be independent of depression levels (Wong and Moulds, 2011; Wong et al., 2014).

Interestingly, when the beliefs contained in these measures are examined more closely, it is evident that there are degrees to which these maladaptive beliefs about the self include a social-evaluative context. A framework that allows the categorisation of such beliefs can be found in cognitive theory (Beck, 2011; Clark and Beck, 1999). In cognitive theory, core beliefs about the self, irrespective of social-evaluative context, are considered to be the most fundamental level of cognition, reflecting global, generalised, and absolute statements about the self. Stable negative core beliefs are typically thought to characterise individuals with depression, and although individuals with SAD can also hold negative core beliefs, their core beliefs are thought to be less stable (i.e., activated typically by social-evaluative situations; Clark and Wells, 1995). In contrast to core beliefs, intermediate beliefs are proposed within cognitive theory to capture rigid context-dependent attitudes, rules, and assumptions related to the self. Applying this framework to existing measures of maladaptive beliefs for SAD, it is evident that there is one measure that captures core beliefs about the self (see Table 1; designated as Core Beliefs Type 1). Three measures capture beliefs about the self that are similar to core beliefs but reflect the (perceived) perspective of other people, and so are relatively less global, generalised, and absolute (see Table 1; designated as Core Beliefs Type 2). Finally, all existing measures capture beliefs about the self that are contextualised in social-evaluative situations and these beliefs are the least global, generalised, and absolute of all the beliefs assessed (see Table 1; designated as Intermediate Beliefs).

It is clear from the current literature that there is no comprehensive and dedicated measure of core beliefs about the self for SAD. The current study therefore aimed to develop and validate such a measure, referred to as the Core Beliefs Questionnaire (CBQ). To reflect the hierarchy of beliefs in cognitive theory and comprehensively capture beliefs over a range of social-evaluative contexts, the CBQ has three versions: a Trait version (fundamental absolute statements about the self), a Contingent version (statements about the self related to a specific social-evaluative situation), and an Other version (statements about the self related to social-evaluative situations generally). In relation to models of SAD, the three versions of the CBQ capture beliefs that are most closely related to the unconditional beliefs of Clark and Wells' (1995) model.

Given there is no prior analysis of the factor structure of the three versions of the CBQ, we aimed to conduct exploratory factor analyses (EFA) on the three measures. Considering the relative homogeneity of the items, we predicted that all three versions of the CBQ would exhibit single factor structures. We also aimed to determine the internal consistency, construct validity, and response to treatment of the three versions of the CBQ. Based on previous research (Wong et al., 2014), we predicted that all three versions of the CBQ would be positively associated with social anxiety symptoms even when controlling for depression levels. Additionally, based on the role of absolute beliefs in depression, we predicted that the Trait version would be more strongly related to depression levels than social anxiety levels while the Contingent and Other versions would be more strongly associated with social anxiety levels than depression levels. We further predicted that the three versions of the CBQ would be able to discriminate individuals with SAD from non-clinical control individuals. Finally, we predicted that scores on the three versions of the CBQ would decrease for individuals with SAD following a course of cognitive-behavioural therapy (CBT).

2. Method

2.1. Participants

The clinical sample consisted of 269 (127 female) adults participat-

ing in one of two treatment trials[1] for SAD at the Emotional Health Clinic (EHC), Macquarie University, Sydney, Australia. Inclusion into the trials required a primary diagnosis of SAD assigned following the Anxiety Disorders Interview Schedule–IV (ADIS–IV; Di Nardo, Brown, and Barlow, 1994) and a Clinician Severity Rating of 4 or above (i.e., there was at least moderate impairment caused by SAD). The exclusion criteria for all trials included active suicidal ideation, unmanaged substance abuse or dependence, co-morbid psychosis, or a recent change (within a three month period) in medication type or dosage. Participants had an average age of 33.71 (*SD*=11.09, range=18–75 years), and most met criteria for the generalised subtype of SAD (91%; note 9 participants had missing information on subtype). Around 38% met criteria for an additional anxiety disorder and 26% met criteria for a mood disorder. Around 45% met criteria for avoidant personality disorder, assessed using the avoidant personality disorder section of the Personality Disorder Examination (Loranger et al., 1997). Further diagnostic information revealed that 45% held a bachelor degree or higher, 46% were employed full-time (10% were unemployed and 15% were students), and 59% were never married.

A convenience sample of 67 (36 females) adults were recruited through promotional materials (e.g., advertisements in local newspapers and on community boards) to comprise the non-clinical control sample. These individuals were paid a small sum as reimbursement for their time and travel expenses. Recruitment strategies intended to capture individuals who did not identify as having some level of social fear by using statements such as 'we are seeking confident and outgoing people to participate in research at Macquarie University' in promotional materials. None of the control group had ever sought help from a mental health professional. These 67 participants did not receive any diagnoses following the ADIS-IV (Di Nardo et al., 1994) at individual research sessions. The non-clinical sample had an average age of 37.38 (*SD*=16.20, range=18–75 years). Around 48% of these participants held a bachelor degree or higher, 27% were employed full-time (8% were unemployed and 27% were students), and 48% were never married. No significant demographic differences were observed between clinical and non-clinical participants (all *p*s > .05), except controls were more likely to be employed, *p*=.015.

2.2. Measures

2.2.1. Core Beliefs Questionnaire (CBQ)

Three versions of the CBQ were developed: a Trait version (fundamental absolute statements about the self), a Contingent version (statements about the self related to a specific social-evaluative situation), and an Other version (statements about how others view the self in social-evaluative situations generally). Instructions differed between the three versions. The Trait version instructed participants to report how much they believed each belief item (e.g., "*I am unlikeable*"). The Contingent version instructed participants to report how much they believed each belief item (e.g., "*I am unlikeable*") if they found out that someone they respected had a low opinion of them as a person. The Other version instructed participants to report how much they believed each belief item captured what others thought of them in social situations (e.g., "*Others think I am unlikeable*"). Each version of the CBQ originally had 20 items rated on 6-point Likert scales (1=*strongly disbelieve* to 6 *strongly believe*) that did not include a neutral middle option. The final versions of the CBQ (see Results section) each have 17 items. Items were generated for the CBQ based on theoretical knowledge and clinical experience. Total scores ranged from 0 to 102, with higher scores indicating greater endorsement of negative core beliefs about the self.

2.2.2. Social Interaction Anxiety Scale (SIAS) and the Social Phobia Scale (SPS; Mattick and Clarke, 1998)

The SIAS and SPS are two companion questionnaires designed to measure two types of commonly feared social situations: those involving general social interactions with others (assessed using the SIAS), and those involving public scrutiny (assessed using the SPS). Both scales consist of 20 items rated on 5-point Likert scales (0=*not at all characteristic or true of me* to 4=*extremely characteristic or true of me*). Total scores range from 0 to 80, with higher scores indicating greater symptom severity. Scores on the SIAS and SPS have been shown to possess desirable psychometric properties with a high level of internal consistency (*a*=.88 to .94), high test–retest reliability (*r* > .91; Mattick and Clarke, 1998; Osman et al., 1998), and adequate discriminant and construct validity (Mattick and Clarke, 1998; Peters, 2000). To improve the psychometric properties of the SIAS, recent recommendations advise that reverse-scored items should be omitted from the scale (Rodebaugh et al., 2011). Thus, only straightforwardly worded items of the SIAS were used in present analyses.

2.2.3. Depression Anxiety Stress Scales (DASS; Lovibond and Lovibond, 1995)

The DASS is a 21-item questionnaire designed to measure symptoms of dysphoric mood, symptoms of physiological arousal and fear, and symptoms of tension and negative appraisals of stressful events. Items are rated on 4-point Likert scales (0=*did not apply to me at all* to 3=*applied to me very much, or most of the time*). The DASS has demonstrated adequate psychometric properties in prior studies, with the scales correlating moderately to strongly with other indices of anxiety and depression (*r*s ranging from .51 to .85; Antony et al., 1998; Lovibond and Lovibond, 1995).

2.3. Treatment

All participants received CBT delivered in small groups (6–8 participants) over 12 weekly, 2 h sessions. Primary therapists were clinical psychologists or graduate clinical psychology students with specific expertise in the treatment of SAD. In most cases a graduate psychology student acted as a co-therapist. Detail about the treatment protocol has been reported previously (Rapee et al., 2009). Session 1 covered basic psycho-education followed by Session 2, which introduced attentional retraining toward the task at hand. Sessions 3–4 included identifying and modifying maladaptive cognitive patterns through hypothesis testing and evidence gathering. Sessions 5–6 introduced and encouraged ongoing behavioural experiments and in vivo exposure through exposure hierarchies. Sessions 7–8 focused on reduction of safety behaviours and subtle avoidance, as well as realistic appraisal and feedback of social performance. Session 9 provided an opportunity to practice integrating previously introduced skills through in vivo exposure. Sessions 10–11 included the examination and refutation of underlying core beliefs. Session 12 involved relapse prevention and revision.

2.4. Procedure

The procedures received approval from the Macquarie University Human Research Ethics Committee and all participants gave informed consent. Procedures for enrolment into the treatment trials, of which the clinical participants from this study are drawn, have been outlined previously (Rapee et al., 2009, 2013). Procedures directly related to the current study involved the completion of a questionnaire battery at pre- and post-treatment. The two research sessions were approximately 12 weeks apart. All the three versions of the CBQ were administered for the Enhanced trial (Rapee et al., 2009), however only the Trait version of the CBQ was administered for the Attention trial (Rapee et al., 2013). The control sample attended a research session at Macquarie University, which included administration of the questionnaire battery

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[1] n=225 participants were included in Rapee et al. (2009); n=44 participants were included in Rapee et al. (2013).

and the diagnostic interview, and returned approximately 12 weeks later to complete the questionnaire battery.

3. Results

3.1. Preliminary analyses

3.1.1. Missing data

The Trait version of the CBQ was administered in both the Enhanced trial and the Attention trial (N=269), and 268 participants made a reasonable attempt at completing the measure (> 80% items completed). Of these 268 participants at pre-treatment, there were 5345 data-points out of a possible 5360 data-points (99.7% completed). Little's Missing Completely at Random (MCAR) test was not significant, $\chi^2(152)=139.05$, $p=.766$, indicating randomness in the missing data (i.e., missing values were unrelated to both the observed and missing data). The Contingent and Other versions of the CBQ were administered only in the Enhanced trial (N=225), and 214 and 220 participants made reasonable attempts at completing the Contingent and Other versions, respectively (> 80% items completed). Of the 214 participants at pre-treatment who made a reasonable attempt at the Contingent version, there were 4268 data-points out of a possible 4280 data-points (99.7% completed). Little's MCAR test was not significant for the Contingent version, $\chi^2(95)=84.64$, $p=.768$. Of the 220 participants at pre-treatment who made a reasonable attempt at the Other version, there were 4383 data-points out of a possible 4400 data-points (99.6% completed). Little's MCAR test was not significant for the Other version, $\chi^2(207)=238.27$, $p=.067$. Given the low proportion and randomness of missing data, missing values were estimated with the expectation-maximization algorithm, a method used to obtain maximum likelihood estimates (Schafer and Graham, 2002).

3.1.2. Distribution of variables

Items of the Trait, Contingent, and Other versions of the CBQ had skew and kurtosis values within normal limits (i.e., all absolute skew values < 3 and absolute kurtosis values < 8; Kline, 2011). No outliers were detected.

3.1.3. Inter-item relationships

Correlation coefficients between each item and the total scores of the respective scales were calculated. We thought that it would be useful to have parallel forms of the three versions (i.e., they would all have the same items), so performance of items was evaluated across the three versions. It was anticipated that items with an item-total

correlation less than .40 would be excluded from the scale. All item-total correlations across the Trait, Contingent, and Other versions of the CBQ were > .64. Inter-item correlations for the items within each of the versions of the CBQ were also calculated so that content overlap of item pairs with correlations > .80 could be examined. Two item pairs had high correlations on the Trait version (items 5 and 6 correlated .88, and items 12 and 13 correlated .86; all other item pairs correlated < .78). Five item pairs had high correlations on the Contingent version (items 3 and 4 correlated .81, items 5 and 6 correlated .93; items 9 and 16 correlated .86; items 12 and 13 correlated .90, items 17 and 18 correlated .83; all other item pairs correlated < .80). Three item pairs had high correlations on the Other version (items 5 and 6 correlated .93, items 12 and 13 correlated .91; items 17 and 18 correlated .80; all other item pairs correlated < .80). Examination of these item pairs resulted in 3 items being dropped because of similar content (item 6: "I am boring" for Trait and Contingent versions/"Others think I am boring" for Other version; item 13: "I'm odd/peculiar" for Trait and Contingent versions/"Others think I'm odd/peculiar" for Other version; item 17: "I am undesirable" for Trait and Contingent versions/"Others think I am undesirable" for Other version), leaving 17 items for each of the three versions of the CBQ.

3.2. Factor structure

Following recommendations in the literature (O'Connor, 2000), parallel analysis and Velicer's Minimum Average Partial (MAP) test were conducted on each of the 17 item versions of the CBQ prior to EFA. The MAP test indicated 1 factor should be extracted for the Trait, Contingent, and Other versions of the CBQ, whereas the parallel analysis indicated 2 factors for the Trait and Other version, and 1 factor for the Contingent version. Considering these results on balance (across all versions, 4 of the tests indicated 1 factor, and 2 of the tests indicated 2 factors) as well as the principle of parsimony for the ease of interpretation, a one-factor model was chosen for all CBQ versions.

Three EFAs with one-factor specified were carried out on the 17 items of the Trait, Contingent, and Other versions of the CBQ. In support of each version's suitability for factor analysis procedures, Bartlett's test of sphericity was significant (Trait: $\chi^2(136)=3321.12$, p < .001; Contingent: $\chi^2(136)=3464.77$, $p < .001$; Other: $\chi^2(136)=3187.30$, $p < .001$) and the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy for each version (Trait: KMO=.95; Contingent: KMO=.96; Other: KMO=.94) was above the suggested minimum of .60. The one-factor solution explained 58.6% of the variation in scores on the Trait version, 66.4% of the variation in scores on the Contingent

Table 2
EFA factor loadings for the three versions of the CBQ in the clinical sample of individuals with SAD.

Original item no.	Trait version	Factor Loading	Contingent version	Factor Loading	Other version	Factor Loading
1	I am unlikeable	.713	I am unlikeable	.813	Others think I am unlikeable	.744
2	I am foolish	.769	I am foolish	.788	Others think I am foolish	.762
3	I am inadequate	.792	I am inadequate	.847	Others think I am inadequate	.804
4	I am inferior	.779	I am inferior	.842	Others think I am inferior	.776
5	I am uninteresting	.723	I am uninteresting	.779	Others think I am uninteresting	.700
7	I am dumb/stupid	.695	I am dumb/stupid	.768	Others think I am dumb/stupid	.712
8	I am a weak person	.673	I am a weak person	.762	Others think I am a weak person	.639
9	I am incompetent	.778	I am incompetent	.855	Others think I am incompetent	.843
10	I am unacceptable	.764	I am unacceptable	.849	Others think I am unacceptable	.860
11	I am not a worthwhile person	.818	I am not a worthwhile person	.852	Others think I am not a worthwhile person	.802
12	I'm a weird person	.592	I'm a weird person	.631	Others think I'm a weird person	.714
14	I'm unimportant	.802	I'm unimportant	.802	Others think I'm unimportant	.806
15	I'm physically unattractive	.675	I'm physically unattractive	.681	Others think I'm physically unattractive	.648
16	I am inept	.781	I am inept	.845	Others think I am inept	.822
18	I am unlovable	.787	I am unlovable	.831	Others think I am unlovable	.760
19	I am a failure	.812	I am a failure	.869	Others think I am a failure	.837
20	I'm defective	.736	I'm defective	.786	Others think I'm defective	.792

Note. Each version of the CBQ originally had 20 items. The final versions of the CBQ as shown in the table each have 17 items.

Table 3
Versions of the CBQ and their zero-order correlations with social anxiety and depression in the clinical sample of individuals with SAD.

Measure	Social anxiety composite	DASS depression
Trait CBQ	.517[***]	.612[***]
Contingent CBQ	.483[***]	.513[***]
Other CBQ	.570[***]	.414[***]

*p < .05.
**p < .01.
***p < .001.

version, and 61.4% the variation in scores on the Other version. Factor loadings for the 17-items of each version of the CBQ are presented in Table 2. All items had satisfactory factor loadings with loadings between .592 and .869 across the three versions. Thus, after the EFAs, each version of the scales contained 17 items. The remainder of the analyses utilised these 17-item versions.

3.3. Internal consistency

The Trait, Contingent, and Other versions of the CBQ had excellent internal consistency (Cronbach's α=.96, .97, and .96, respectively).

3.4. Construct validity

To reduce the number of analyses, we first created a social anxiety composite measure by averaging the *z*-scores for the SIAS and SPS. Table 3 shows the zero-order correlations between the measures. Tests of the difference between the correlations (Steiger, 1980) showed that the Trait CBQ was more strongly related to DASS depression than the social anxiety composite (*Z*=2.08, *p*=.038). The Contingent CBQ was similarly related to both DASS depression and the social anxiety composite (*Z*=.49, *p*=.625). The Other CBQ was more strongly related to the social anxiety composite than DASS depression (*Z*=2.57, *p*=.010). Further analyses examining partial correlations showed that the Trait, Contingent, and Other versions of the CBQ all had positive associations with the social anxiety composite while controlling for depression (Trait *r*=.28, Contingent *r*=.35, and Other *r*=.48, all *p*s < .001).[2]

Construct validity was further investigated by comparing the sample of individuals with SAD with the non-clinical control sample on the three versions of the CBQ. The clinical sample had higher scores on all three versions of the CBQ (Trait: *M*=56.89, *SD*=21.65; Contingent: *M* =64.79, *SD*=23.89; Other: *M*=60.72, *SD*=20.67) compared with the control sample (Trait: *M*=25.15, *SD*=10.27; Contingent: *M*=28.33, *SD*=12.43; Other: *M*=25.98, *SD*=9.90), all *F*s > 86.33, all *p*s < .001. These differences remained significant after controlling for DASS depression, all *F*s > 22.19, all *p*s < .001, as well as after sample differences in employment were additionally controlled (see Participants section), all *F*s > 21.45, all *p*s < .001. Hence, the three versions of the CBQ were able to discriminate between the clinical and non-clinical samples.[3]

As an exploratory exercise, a receiver operating characteristic (ROC) analysis was also conducted to determine the ability of the three versions of the CBQ to discriminate between those in the clinical and non-clinical samples. The area under the ROC curve (AUC) indicates the ability of a measure to detect those with a disorder of interest and those without the disorder. AUC values > .50 indicate that a test is performing better than chance in discriminating between those with and without the disorder. The AUC for the Trait CBQ, the Contingent CBQ, and the Other CBQ were .90 (*SE*=.018, *p* < .001), .90 (*SE*=.021, *p* < .001), and .92 (*SE*=.018, *p* < .001), respectively. The optimum cut-off score for discriminating between individuals with SAD and non-clinical control individuals is 56 or higher for the Trait CBQ (sensitivity=53.36, specificity=98.51), 58 or higher for the Contingent CBQ (sensitivity=63.55, specificity=100.00), and 54 or higher for the Other CBQ (sensitivity=65.00, specificity=100.00).

3.5. Responsiveness to change

Multilevel modelling was used to determine whether the three versions of the CBQ could detect change resulting from treatment. For the Trait CBQ, of the 268 participants who completed the measure at pre-treatment, 180 participants also completed the measure at post-treatment (67% completion rate). For the Contingent CBQ, of the 214 participants who completed the measure at pre-treatment, 172 participants also completed the measure at post-treatment (80% completion rate). For the Other CBQ, of the 220 participants who completed the measure at pre-treatment, 179 participants also completed the measure at post-treatment (81% completion rate). Unconditional linear growth models showed that there were significant reductions in scores on all three versions of the CBQ from pre- to post-treatment (see Table 4). Similarly, models showed that SIAS and SPS scores significantly decreased from pre- to post-treatment.[4]

Subsequent modelling examined whether changes in scores on each version of the CBQ could predict changes in SIAS and SPS scores.[5] In conditional linear growth models with one of the versions of the CBQ and DASS depression specified as time-varying predictors of trajectories of SIAS scores, changes in scores on each of the versions of the CBQ positively predicted changes in SIAS scores, controlling for effects associated with linear changes over time and changes in depression levels (see Models 1, 3, and 5 in Table 5). That is, decreases in Trait CBQ, Contingent CBQ, and Other CBQ over time were associated with decreases in SIAS scores over time. Similar results were found for models predicting trajectories of SPS scores (see Models 2, 4, and 6 in Table 5).

4. Discussion

The present study sought to develop and validate a new compre-

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[2] Interestingly, as an exploratory exercise, we also examined the partial correlations between individual CBQ items and the social anxiety composite, controlling for DASS depression scores, in the clinical sample. On the Trait version, the three items with the highest partial correlations were: "I am inferior" (.319), "I am foolish" (.310), and "I am uninteresting" (.271). On the Contingent version, the three items with the highest partial correlations were: "I am foolish" (.349), "I am inadequate" (.317), and "I am dumb/stupid" (.309). On the Other version, the three items with the highest partial correlations were: "I am inadequate" (.443), "I am foolish" (.418), and "I'm a weird person" (.413). All *p*s < .001.

[3] An exploratory analysis was also conducted comparing the control sample with a subsample of individuals with pure SAD, and a subsample of individuals with primary SAD and major depressive disorder somewhere in their diagnostic profile (i.e., SAD+MDD subsample). On the trait version, the SAD+MDD subsample (n=44) scored

(footnote continued)
significantly higher than the pure SAD subsample (n=127), *F*(1,169)=30.98, *p* < .001, which in turn scored significantly higher than the control sample (n=67), *F*(1,192)=71.66, *p* < .001. On the contingent version, the SAD+MDD sample (n=34) scored significantly higher than the pure SAD subsample (n=99), *F*(1,131)=11.19, *p*=.001, which in turn scored significantly higher than the control sample (n=39), *F*(1,136)=50.79, *p* < .001. On the Other version, there was no significant difference in scores between the SAD+MDD subsample (n=34) and the pure SAD subsample (n=102), *F*(1,134)=3.54, *p*=.062, and both these groups scored significantly higher than the control sample (n=41), both *F*s > 78.18, both *p*s < .001.

[4] The metric of the dependent variable can affect the estimates of a multilevel model analysis (Seltzer et al., 1994). Hence, we chose to analyse the raw SIAS and SPS scores, rather than the social anxiety composite (which is a scaled score).

[5] Some researchers recommend significant variation in individual trajectories to be present in order to justify further modelling of predictors of such variation (e.g., Singer and Willett, 2003). However, it is possible that even without significant variation in individual trajectories to begin with, the modelling of predictors can lead to more power to detect individual slope variation (e.g., Hox, 2010). Thus, significant individual slope variation was not a prerequisite for further modelling in our study.

Table 4

Unconditional linear growth models for versions of the CBQ and measures of social anxiety during CBT for SAD.

Variable	Fixed effects		Random effects	
	Mean initial status	Mean linear change	Initial status (variance)	Mean linear change (variance)
Trait CBQ	65.55[***]	−8.66[***]	391.54[***]	18.77
Contingent CBQ	76.12[***]	−11.34[***]	401.16[***]	37.60
Other CBQ	72.10[***]	−11.37[***]	287.47[***]	29.32
SIAS	58.95[***]	−12.03[***]	164.43[***]	10.63
SPS	49.18[***]	−12.31[***]	315.49[***]	23.25

Note. Negative growth rates indicate decreases in the variable over time. CBQ=Core Beliefs Questionnaire; SIAS=Social Interaction Anxiety Scale; SPS=Social Phobia Scale.

*p < .05.

**p < .01.

*** p < .001.

researchers and clinicians who wish to strictly examine the core beliefs of participants or clients with SAD may decide to use only the Trait version of the CBQ.

The findings concerning the versions of the CBQ and their relationships with social anxiety and depression levels deserve further consideration. Although the specific result related to the Contingent version was in contrast to predictions, the pattern of results in relation to all three versions is consistent with previous research showing that the more absolute a self-belief characteristic of SAD is, the more strongly it will be related to depression levels as well (Wong et al., 2014). The Trait version of the CBQ, capturing the most absolute beliefs about the self, was most strongly related to DASS depression. With decreasing absoluteness in the beliefs as captured by the Contingent version followed by the Other version, there were decreasing associations with DASS depression. Interestingly, these results in relation to the three versions of the CBQ have implications at the disorder level. SAD and depression commonly co-occur (e.g., Ohayon

Table 5

Conditional linear growth models predicting trajectories of social anxiety variables during CBT for SAD.

Predictors	Model 1 SIAS trajectory	Model 2 SPS trajectory	Model 3 SIAS trajectory	Model 4 SPS trajectory	Model 5 SIAS trajectory	Model 6 SPS trajectory
Intercept	52.64[***]	43.26[***]	49.46[***]	39.33[***]	48.63[***]	39.10[***]
Level 1						
Time	−7.80[***]	−8.27[***]	−6.93[***]	−7.04[***]	−6.46[***]	−6.80[***]
DASS depression	.45[***]	.37[***]	.41[***]	.27[**]	.41[***]	.26[***]
Trait CBQ	.22[***]	.21[***]	–	–	–	–
Contingent CBQ	–	–	.18[***]	.21[***]	–	–
Other CBQ	–	–	–	–	.24[***]	.27[***]

Note. DASS=Depression Anxiety Stress Scales; CBQ=Core Beliefs Questionnaire; SIAS=Social Interaction Anxiety Scale; SPS=Social Phobia Scale.

*p < .05.

** p < .01.

*** p < .001.

hensive measure of core beliefs about the self for SAD, referred to as the CBQ. As predicted, EFAs yielded a one factor model for each of the three versions of the CBQ, suggesting each version is fairly homogenous in terms of item content. Each CBQ version also demonstrated excellent internal consistency. In terms of construct validity, each version of the CBQ had positive associations with social anxiety symptoms while controlling for depression scores, as predicted. Moreover, in other analyses, the Trait version was found to be more strongly associated with depression than social anxiety and the Other version of the CBQ was found to be more strongly related to social anxiety than depression, consistent with predictions. Notably, the Contingent version of the CBQ unexpectedly demonstrated similarly strong associations with both social anxiety and depression scores. Each version of the CBQ also demonstrated an ability to discriminate between individuals with SAD and non-clinical controls, in line with expectations. Finally, as predicted, scores on each version of the CBQ decreased from pre- to post-CBT, and these decreases in CBQ scores predicted decreases in social anxiety symptoms.

These results provide support for the CBQ as a reliable and valid tool to assess negative core beliefs about the self in individuals with SAD. The three versions of the CBQ were originally intended to be used together in research and clinical contexts to provide a comprehensive measure of beliefs about the self in SAD that reflect the hierarchy of beliefs presented in cognitive theory. Given evidence from the current study that the three versions of the CBQ relate differently to social anxiety and depression levels, it will be important that the three versions of the CBQ are used together in future research to continue to examine whether the beliefs they capture have different properties and functions. We recognise though that certain versions of the CBQ may be more useful in some research and clinical contexts. For example,

and Schatzberg, 2010) and studies have shown that individuals with SAD and individuals with depression display similar cognitive features (e.g., corresponding levels of self-criticism and attributional styles, similar negative self-schematic structures for interpersonal content; Cox et al., 2000; Dozois and Frewen, 2006). Extending this research, our finding that each version of the CBQ was associated with both social anxiety levels and depression levels raises the possibility that enduring maladaptive beliefs about the self may be a transdiagnostic vulnerability factor linking SAD and depression. To further examine this issue, future research should compare CBQ responses in samples of individuals with SAD, individuals with depression, and individuals with comorbid SAD and depression.

Our results in relation to the CBQ and CBT also deserve elaboration. The finding that scores on the three CBQ versions decreased over the course of CBT is consistent with a body of research demonstrating CBT for SAD reduces negative self-related beliefs from pre- to posttreatment (e.g., Boden et al., 2012; Bögels et al., 2014; Koerner et al., 2013; Rapee et al., 2009). A number of these studies have also shown that such belief change predicts social anxiety improvement (e.g., Koerner et al., 2013), a finding that was replicated in the present study for all three versions of the CBQ. Notably, the present study controlled for depressive symptoms in these predictive analyses, something which has only been done in one prior study (Koerner et al., 2013).

4.1. Limitations and directions for future research

First, a limited number of psychometric tests was conducted in our study and additional psychometric evaluation of the CBQ is required (e.g., confirmatory factor analysis, test-retest reliability, incremental validity). Second, our study utilised a treatment-seeking sample of

individuals with SAD who were entered into a CBT program. Future tests of the CBQ could be conducted on other types of SAD samples (e.g., individuals with SAD who are seeking pharmacological treatment). Third, there is evidence that individuals with social anxiety below diagnostic thresholds experience elevated distress and impairment (Fehm et al., 2008). Thus, a better understanding of the CBQ in non-clinical populations remains a warranted endeavour. Fourth, our study provided no within treatment data, or long-term outcome data. Future research should address these issues. Finally, by administering the CBQ to individuals with SAD, the current study assessed the content of each participant's self-concept. However, the content of the self-concept can be influenced by how the content is organised (i.e., structural aspects of the self; Stopa, 2009; Stopa et al., 2010). Future research may use the CBQ to further examine the interaction between content and structure when studying the self in the context of SAD.

5. Conclusions

The CBQ is a reliable and valid tool to assess negative core beliefs related to the self in clinical populations with SAD. More research is needed to replicate and further establish the psychometric properties of the CBQ, as well as test the applicability of the measure to other populations.

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