The Thought Control Questionnaire – psychometric properties in a clinical sample, and relationships with PTSD and depression

MARTINA REYNOLDS[1] AND ADRIAN WELLS

From the Cognition, Emotion and Trauma Group, Department of Psychology, Royal Holloway, University of London, Egham; and University of Manchester Department of Clinical Psychology, School of Psychiatry and Behavioural Sciences, Manchester Royal Infirmary, Manchester

ABSTRACT

Background. Recent developments in research suggest that particular attempts to control thoughts may contribute to the problem of intrusion. An instrument capable of identifying strategies for dealing with unwanted intrusions in clinical populations may be used for differentiating between thought control strategies that may or may not be helpful.

Methods. The Thought Control Questionnaire (TCQ) (Wells & Davies, 1994) developed and validated on a normal sample, was administered to a clinical sample in order to investigate the consistency of the original factor structure and its psychometric properties. The sensitivity of the scale to change associated with recovery was also examined. Relationships between individual differences in thought control strategies and psychiatric symptoms in patients with DSM-IV major depression, and PTSD with or without major depression were investigated.

Results. The Scree Test suggested a six-factor solution which was rotated. This solution split the original distraction subscale into separate behavioural and cognitive distraction, otherwise the subscales were almost identical to those obtained in non-clinical subjects. As this split has been shown to be unreliable, further analyses in this study were based on the five-factor version of the TCQ obtained by Wells & Davies (1994). Predictors of recovery and of symptoms in PTSD and depression were explored.

Conclusions. Correlations between the TCQ subscales and other measures suggest that particular thought control strategies may be associated with the symptoms of PTSD and depression. The TCQ scales appear to be sensitive to changes associated with recovery. Significant differences emerged in thought control strategies between depressed and PTSD patients. Hierarchical regression analysis showed distraction, punishment and reappraisal control strategies predicted depression scores in depressed patients while use of distraction predicted intrusions in PTSD.

INTRODUCTION

Intrusive thoughts and memories that people find difficult to control have been identified as a symptom and maintaining factor in several disorders, such as obsessive–compulsive disorder (OCD) (Rachman & DeSilva, 1978; Salkovskis, 1985, 1989), post-traumatic stress disorder

(PTSD) (Horowitz, 1976) and generalized anxiety disorder (GAD) (Wells, 1995, 1997). The role played by distressing intrusions in the emotional processing of a traumatic event is discussed in several cognitive models of PTSD (Horowitz, 1976, 1986; Foa & Kozak, 1986; Janoff-Bulman 1989). More recently it has been suggested that negative thinking in depression may include intrusions about past negative life events (Teasdale, 1983), in which specific memories of past events are perceived as being very intrusive (Brewin, 1989). In two studies, high

[1] Address for correspondence: Dr Martina Reynolds, Department of Psychiatry of Addictive Behaviour and Psychological Medicine, St. George's Hospital Medical School, Cranmer Terrace, Tooting, London SW17 0RE.

levels of intrusiveness and avoidance were reported in association with memories of past life events in depressed patients (Kuyken & Brewin, 1994; Brewin *et al*. 1996*a*). Studies have identified problems associated with the suppression of unwanted thoughts. However, they have not addressed the nature of suppression strategies in detail (Wegner *et al*. 1987; Salkovskis & Campbell, 1993; Trinder & Salkovskis, 1994). Thus, an instrument capable of identifying strategies for dealing with unwanted intrusions in clinical populations may be useful for differentiating between thought control strategies that may or may not be helpful.

The Thought Control Questionnaire (TCQ) was developed by Wells & Davies (1994) to measure individual differences in the use of thought control strategies. Such an instrument was anticipated to have an important role in the exploration of the types of control behaviours that may be involved in the transformation of normal intrusive thoughts into pathological varieties. The TCQ consists of 30 statements describing thought control strategies. There are six items in each of the five factor groups, which are as follows: reappraisal, distraction, punishment, social control and worry. In preliminary small scale factor analyses the distraction subscale consistently split into separate cognitive and behavioural distraction factors (Wells & Davies, 1994), however in a final large scale analysis these two domains combined to form one distraction factor.

Wells & Davies (1994) used the TCQ to explore control behaviours associated with problematical intrusive thoughts. Significant associations were found between the punishment and worry scales of the TCQ, and other measures of emotional vulnerability concerned mainly with dimensions of worry, intrusive thoughts and anxiety. There was also a significant positive association between the reappraisal scale of the TCQ and the private self-consciousness subscale (Fenigstein *et al*. 1975), which is a measure of tendency to focus on thoughts, feelings, moods and attitudes. The distraction and social control scales of the TCQ did not correlate significantly with any of the emotional vulnerability measures used leading Wells & Davies (1994) to suggest that these subscales may be more closely associated with positive mental health. They concluded that under some circumstances such control strategies may buffer against stress proneness.

PTSD is associated with high levels of cognitive avoidance (Horowitz, 1976; Horowitz *et al*. 1979), which may involve strategies tapped by the distraction and social control scales of the TCQ. High levels of avoidance were also found in depressed samples investigated by Kuyken & Brewin (1994) and Brewin *et al*. (1996*b*). However, if as Wells & Davies suggest, some strategies such as distraction offer effective coping strategies in some circumstances, associations between the use of such strategies and some indices of emotional disorder would be expected. For example, in depression, distraction may interrupt depressive rumination and therefore have a positive effect on mood (Wells & Matthews, 1994).

The TCQ has been tested with promising results on a normal population, however, further development and assessment of its application to a clinical population is warranted if it is to be employed in clinical practice. The principal aims of this study were: (*i*) to explore the factor structure of the TCQ in a clinical sample with diagnoses of PTSD and depression, and to explore its psychometric properties; and (*ii*) to test the sensitivity of the TCQ to recovery. The secondary aims of this study were: (*i*) to explore relationships between TCQ subscales and symptoms of depression and PTSD; (*ii*) to explore possible differences in thought control strategies in people with these disorders; and (*iii*) to investigate the TCQ as a predictor of intrusions, depression and anxiety using hierarchical regression analysis, controlling for the interdependence of PTSD symptoms and depression, and the TCQ subscales.

METHOD

Subjects

Clinical subjects were recruited at psychiatric in-patient and out-patient departments, and clinical psychology departments in a range of inner city and suburban hospitals in the London area. The sample consisted of 124 psychiatric in-patients and out-patients, (55 males), aged 18–75 years. All subjects met DSM-IV criteria (American Psychiatric Association, 1994) for major depression and/or PTSD. Sixty-one subjects met criteria for depression and 63 for PTSD as a

primary diagnosis (16 PTSD, 47 PTSD and depression). Depression is a common co-morbid disorder associated with PTSD and many depressive symptoms appear in section C (avoidance) and D (arousal) of DSM-III-R (and IV) PTSD (see Brewin *et al.* 1996*b*). Subjects were excluded if there was evidence of organic brain disease, history of or current psychosis, psychotic depression, bipolar disorder, other primary disorder e.g. OCD, drug and/or alcohol abuse, and failure to meet diagnostic criteria for major depression and/or PTSD. In order to assess the sensitivity of the scales to recovery, 35 patients completed the TCQ again approximately 6 months later. Assessment of recovery was based on DSM-IV criteria for PTSD and/or depression. Eighteen had recovered and no longer met DSM-IV criteria for PTSD or depression (8 PTSD group, 10 depressed group). Seventeen still had symptoms and met DSM-IV criteria for PTSD or depression (7 PTSD group, 10 depressed group). In both the initial and follow-up interviews, subjects were assessed for diagnosis by a trained assessor using the Structured Clinical Interview for DSM-III-R (SCID) (Spitzer *et al.* 1987) modified to incorporate DSM-IV adjustments. The assessment was discussed with the clinician in charge of the patient and diagnosis was based on agreement on symptoms endorsed.

Procedure

This study was carried out as part of an interview that consisted of general demographic data, DSM-IV diagnostic assessment, life events and traumatic experiences and details of the nature of intrusive phenomena experienced based on 'The List of Threatening Experiences' designed by Brugha *et al.* (1985). Having identified significant life events and/or traumatic experiences, and subsequently the worst event among these, patients were asked to complete the TCQ, BDI, HAD and IES questionnaires. This report focuses on the applicability of the TCQ to a clinical sample.

Assessment and questionnaires

Thought Control Questionnaire (TCQ) (Wells & Davies, 1994)

Responses to items are rated on a 1–4 scale (1 = never, 2 = sometimes, 3 = often, 4 = almost always). The subscales are scored by totalling the relevant item scores. The social control subscale contains three reverse scored items. The total TCQ score is obtained by summing the individual subscales.

Structured Clinical Interview for DSM-III-R (SCID) (American Psychiatric Association, 1987)

The SCID is a structured diagnostic interview used widely in research and clinical practice to assess psychiatric disorders (adjusted to make it consistent with DSM-IV criteria). Questions pertain to the presence and intensity of clinical symptoms, taking into account organic causation. It outlines criteria for diagnosis in terms of number of symptoms and/or intensity/severity. The diagnosis is made on the basis of several sources, i.e. patients report, referral, medical notes and clinical judgement.

Post-traumatic stress Symptom Scale – interview version (PSS-I) (Foa *et al.* 1993)

This is a seventeen-item scale designed to assess PTSD symptomatology. It consists of questions pertaining to the symptoms in the re-experiencing, avoidance and arousal categories as identified in DSM-IV.

Beck Depression Inventory (BDI) (Beck *et al.* 1961)
Impact of Events Scale (IES) (Horowitz *et al.* 1979)

This fifteen-item self-report scale is designed to measure the form and quality of conscious experience relating to the traumatic event. The scale consists of two subscales measuring intrusion and avoidance. The responses cover the past 7 days, and the items are rated on a four-point scale of intensity; 0 = not at all, 1 = rarely, 3 = sometimes and 5 = often.

Hospital Anxiety and Depression Scale (HAD) (Zigmond & Snaith, 1983)

RESULTS

Factor analysis

The TCQ responses were analysed using a principal components factor analysis. The scree plot demonstrated a break in the slope between factors 6 and 7, thus a 6 factor solution was chosen and rotated using oblique rotation

Table 1. *Items and factor loadings for the six factor structure* (N = 124)

	Loadings on factors					
	1	2	3	4	5	6
Factor 1 Reappraisal						
10 I challenge the thought's validity	0·43	0·21	0·26	0·31	0·13	0·30
14 I analyse the thought rationally	0·69	0·09	0·14	0·04	0·22	0·15
20 I try to reinterpret the thought	0·76	0·16	0·18	−0·13	−0·06	0·05
23 I try a different way of thinking about it	0·74	0·20	0·08	−0·07	−0·17	0·29
27 I question the reasons for having the thought	0·72	0·18	0·05	−0·11	−0·28	0·08
Factor 2 Worry						
4 I replace the thought with a more trivial bad thought	−0·01	0·65	0·12	0·08	−0·29	0·09
7 I dwell on other worries	−0·01	0·49	−0·27	−0·02	−0·40	−0·39
18 I worry about more minor things instead	0·25	0·70	−0·07	0·21	−0·03	0·27
22 I think about the more minor problems I have	0·40	0·70	−0·13	−0·11	−0·01	0·28
24 I think about past worries instead	0·12	0·62	0·01	−0·07	−0·27	−0·22
26 I focus on different negative thoughts	0·22	0·63	0·09	−0·04	−0·16	−0·32
Factor 3 Social control						
5 I do not talk about the thought to anyone	−0·04	−0·04	0·34	0·27	0·21	0·07
8 I keep the thought to myself	−0·12	−0·14	0·77	0·31	0·16	0·06
12 I avoid discussing the thought	0·02	0·14	0·67	0·06	0·15	0·20
17 I find out how my friends deal with these thoughts	0·44	0·09	0·56	−0·15	−0·19	0·07
25 I ask my friends if they have similar thoughts	0·49	0·07	0·62	−0·22	−0·23	−0·01
29 I talk to a friend about the thought	0·25	−0·13	0·60	−0·28	−0·05	−0·16
Factor 4 Behavioural distraction						
9 I occupy myself with work instead	0·04	−0·04	−0·00	−0·73	0·08	0·24
30 I keep myself busy	0·11	0·10	−0·00	−0·76	0·20	0·33
Factor 5 Punishment						
2 I tell myself not to be so stupid	0·42	0·40	0·07	−0·01	−0·32	−0·33
6 I punish myself for thinking the thought	−0·06	0·29	−0·06	0·08	−0·69	−0·29
11 I get angry at myself for having the thought	0·30	0·16	−0·14	−0·20	−0·62	−0·03
13 I shout at myself for having the thought	0·10	0·30	−0·06	0·17	−0·60	−0·15
15 I slap or pinch myself to stop the thought	0·01	0·01	0·02	0·14	−0·65	−0·05
28 I tell myself that something bad will happen if I think the thought	0·11	0·42	0·05	0·49	−0·39	0·06
Factor 6 Cognitive distraction						
1 I call to mind positive images instead	0·17	0·18	0·21	−0·07	0·18	0·64
3 I focus on the thought	0·07	0·36	−0·19	0·06	−0·09	−0·55
16 I think pleasant thoughts instead	0·25	−0·01	−0·03	−0·20	0·31	0·76
19 I do something that I enjoy	0·26	0·08	0·02	−0·25	0·17	0·75
21 I think about something else	0·13	−0·01	−0·02	−0·16	−0·01	0·77

(varimax rotations produced a similar solution). The 6 factor solution accounted for 54·5 % of the total variance (range of eigenvalues = 1·43–4·73). The following dimensions were obtained based on item content: factor 1, re-appraisal; factor 2, worry; factor 3, social control; factor 4, behavioural distraction; factor 5, punishment; factor 6, cognitive distraction. The factor structure replicated that of the original TCQ apart from the splitting of cognitive distraction (items 1, 3, 16, 19 and 21) and behavioural distraction (9 and 30) into separate factors. One item loaded on a different factor (item 3), in the original study it loaded positively on re-appraisal, in this study it loaded negatively on cognitive distraction (factor 6) (see Table 1).

The pattern of factor loadings obtained were compared with those of Wells & Davies (1994) using Catell's salient similarity index *s* (Cattell, 1957; Cattell & Baggaley, 1960). A cut-off of 0·40 was used for determining salience. Wells & Davies' (1994) five factors: distraction; re-appraisal; social control; punishment; and worry were compared with the factors, cognitive distraction, reappraisal, social control, punishment and worry obtained in the six-factor solution. The hyperplane count exceeded 70 % for the 30 variables compared. The *s* values obtained were 0·72 (distraction), 0·71 (reappraisal), 0·90 (social control), 0·73 (punishment) and 0·85 (worry), therefore *s* > 0·56, *P* < 0·0005 suggesting that the five factors compared are highly similar. Wells & Davies's (1994) distraction factor was also compared with the

Table 2. *TCQ subscale inter-correlations* (N = 124)

TCQ subscale	1	2	3	4	5	Total
1 Reappraisal	—	0·32***	0·13	0·22*	0·26**	0·68****
2 Worry	—	—	−0·00	−0·07	0·43***	0·65****
3 Social control	—	—	0·05	−0·07	—	0·36****
4 Distraction	—	—	—	—	−0·13	0·33****
5 Punishment	—	—	—	—	—	0·50****

Two-tailed significance: * $P < 0.05$; ** $P < 0.01$; *** $P < 0.005$; **** $P < 0.0005$.

behavioural distraction factor obtained in the six factor solution the *s* value obtained was 0·44 ($s > 0.34$, $P < 0.01$) suggesting that these two factors are also similar.

In their preliminary analysis, Wells & Davies reported that two distraction factors emerged as in this analysis, however, subsequent analyses produced only one factor of combined cognitive and behavioural distraction. The split, therefore, appears to be unreliable, this may be because it is associated with patients more than non-patients, or with smaller sample sizes. Furthermore, only two items loaded on the cognitive distraction factor and this is usually considered insufficient to constitute a factor (Kline, 1994). Further studies using both clinical and non-clinical samples are required to clarify this. Since there was a significant similarity between the factors obtained in this study and those obtained previously, the subsequent analyses reported here are based on the original five factor scoring of the TCQ.

Internal consistency of subscales

Cronbach coefficient alphas computed for the individual TCQ subscales ($N = 124$) were as follows: re-appraisal = 0·66; worry = 0·74; social control = 0·67; punishment = 0·65; distraction = 0·78. These results are similar to those obtained by Wells & Davies (1994).

Subscale inter-correlations

Pearson correlations between the individual subscales of the TCQ are reported in Table 2. Some of these coefficients are higher than those obtained previously. In particular re-appraisal was positively correlated with worry in the present sample, but these subscales did not correlate in non-patients. Similarly, and unlike previous work, reappraisal correlated with distraction in this study.

Tests of group differences

The sample was analysed for group differences on the basis of primary diagnosis; PTSD or depression, using one-way ANOVAs. The PTSD group had significantly higher scores on the IES intrusion (PTSD group, mean = 26·48, s.d. = 6·48; depressed group, mean = 20·62, s.d. = 9·39, $F(1, 118) = 15.9$, $P < 0.0001$) and avoidance (PTSD group, mean = 24·17, s.d. = 7·66; depressed group, mean = 20·66, s.d. = 8·59, $F(1, 118)$ 5·55, $P < 0.02$) subscales. There was only one difference between the groups on the TCQ subscales. Here the PTSD subgroup scored significantly higher on distraction (PTSD group, mean = 13·92, s.d. = 3·11; depressed group, mean = 12·28, s.d. = 3·26, $F(1, 123)$ 8·25, $P < 0.005$) than the depressed subgroup.

Correlations between the TCQ and symptom measures (PTSD and depression subgroups)

The sample was split on the basis of primary diagnosis, i.e. PTSD ($N = 63$, male:female 28:35, age 20–66 years) and major depression ($N = 61$, male:female 27:34, age 20–73 years), and Pearson correlations were calculated between TCQ subscales and other standardized measures for these subgroups. While we cannot infer causality from the correlational data, there are a number of potential causal relationships some of which are outlined below. Further study may be warranted to determine the nature of these relationships.

For the PTSD group there was a significant negative correlation between IES avoidance and TCQ social control ($r = -0.36$, $P < 0.005$) suggesting that talking about ones unwanted thoughts results in less avoidance. There were also significant associations between the BDI and TCQ distraction ($r = -0.45$, $P < 0.0005$), and HAD anxiety and TCQ distraction (r

Table 3. *Sensitivity of TCQ scales to recovery*

| | Time 1* | | Time 2 | | Between subjects (Recovery) | | Within subjects | | | |
| | | | | | | | Time | | Recovery × Time | |
TCQ scale	R	U	R	U	F†	P	F†	P	F†	P
Distraction	13·38	12·41	15·61	12·52	6·67	< 0·02	3·40	< 0·08	2·75	> 0·10
Punishment	11·83	11·94	9·44	12·58	3·11	< 0·09	3·10	< 0·09	9·42	< 0·004
Reappraisal	12·11	13·47	15·11	13·23	0·10	> 0·10	5·79	< 0·05	7·93	< 0·008
Social control	10·44	12·82	11·77	12·17	2·71	> 0·10	0·23	> 0·10	1·90	> 0·10
Worry	10·61	12·82	10·16	12·41	5·11	< 0·04	0·42	> 0·10	0·00	> 0·10

Time 1, initial interview; Time 2, follow-up; R, recovered ($N = 18$, 8 PTSD, 10 depressed); U, unrecovered ($N = 17$, 7 PTSD, 10 depressed).
* At time 1 all people met criteria for DSM-IV depression and/or PTSD.
† df = (1, 33) throughout.

$= -0.30$, $P < 0.05$), suggesting that as distraction increases depression and anxiety decrease.

There were significant associations for the depressed subgroup between the BDI and the following measures: TCQ reappraisal ($r = -0.27$, $P < 0.05$); TCQ punishment ($r = 0.47$, $P < 0.0005$); TCQ distraction ($r = -0.51$, $P < 0.0005$). HAD depression was associated with TCQ punishment ($r = 0.26$, $P < 0.05$); and TCQ distraction ($r = -0.47$, $P < 0.005$). These relationships suggest that depression is associated with a reduction in reappraisal and distraction strategies and an increase in the use of self-punishment techniques. Similarly, HAD anxiety was associated with TCQ worry ($r = 0.27$, $P < 0.05$); and TCQ punishment ($r = 0.33$, $P < 0.01$). IES intrusion was associated with TCQ reappraisal ($r = -0.28$, $P < 0.05$); and TCQ punishment ($r = 0.28$, $P < 0.05$). These associations suggest that intrusion is also indicative of a reduction in appraisal and an increase in the use of self-punishment techniques. Finally there was a significant negative association between IES avoidance and TCQ social control ($r = -0.30$, $P < 0.05$).

Sensitivity of the TCQ to recovery
Sensitivity to recovery was analysed using a mixed model ANOVA with repeated measures. Due to insufficient numbers the PTSD and depressed groups were collapsed into one, so the analysis was based on recovery status. For the TCQ distraction subscale there was a significant main effect of recovery status and a non-significant main effect of time, but no interaction indicating that ability to use distraction was higher in the recovered group at baseline and improved at follow-up, while the unrecovered

group had a lower score at baseline which did not change at follow-up. There was a significant recovery status × time interaction for the punishment subscale, this result can be explained by a decrease in the use of self-punishment by the recovered group, and an increase in the same in the unrecovered group. There was a significant main effect of time and a significant recovery status × time interaction for the reappraisal subscale, accounted for by a lower score in the recovered group relative to the unrecovered group at baseline, and an improvement in the recovered group at follow-up while the unrecovered group deteriorated. Finally, there was a main effect of recovery status for the worry subscale, accounted for by higher scores in the unrecovered group at baseline and follow-up (see Table 3).

Multiple regression analyses
Multiple regression was used to explore relationships between the variables. We aimed to test for separate patterns of thought control that may be linked to anxiety and depression while partialling out the overlap between these states and between the TCQ subscales. Regressions were run for the PTSD and depressed groups. For each dependent variable two equations were run. The first examined independent TCQ predictors and the second examined TCQ predictors while controlling for depression or anxiety. Hierarchical regression analyses were carried out with intrusions (measured using the IES intrusions subscale), depression and anxiety (measured using the BDI and HAD anxiety subscale respectively) as the dependent variables. The analyses were carried out as follows: (*i*) with intrusion (IES) as dependent, entering the TCQ

Table 4. *Regression analysis: PTSD group*

Reg. block	Variable	Beta	Partial r	t	P
Dependent: Intrusions (IES)					
1	BDI	0·50	0·43	3·66	< 0·0006
2	TCQ				
	Distraction	0·26	0·23	1·79	> 0·05
	Punishment	−0·17	−0·17	−1·27	> 0·10
	Reappraisal	−0·02	−0·02	−0·19	> 0·10
	Social control	−0·06	−0·06	−0·49	> 0·10
	Worry	0·07	0·06	0·49	> 0·10
Dependent: Depression (BDI)					
1	TCQ				
	Distraction	−0·44	−0·42	−3·53	< 0·008
	Punishment	0·12	0·12	0·91	> 0·10
	Reappraisal	0·07	0·06	0·47	> 0·10
	Social control	−0·18	−0·19	−1·53	> 0·10
	Worry	0·03	0·03	0·23	> 0·10
Dependent: Depression (BDI)					
1	HAD (Anxiety)	0·37	0·41	2·71	< 0·02
2	TCQ				
	Distraction	−0·31	−0·35	−2·28	< 0·03
	Punishment	0·24	0·27	1·65	> 0·10
	Reappraisal	−0·04	−0·001	−0·00	> 0·10
	Social control	−0·09	−0·11	−0·70	> 0·10
	Worry	−0·13	−0·14	−0·84	> 0·10

We also ran analyses using a six-factor version of the scale, and this did not change the results.

Table 5. *Regression analysis: Depressed group*

Reg. block	Variable	Beta	Partial r	t	P
Dependent: Intrusions (IES)					
1	TCQ				
	Distraction	−0·12	−0·13	−0·94	> 0·10
	Punishment	0·32	0·31	2·29	< 0·05
	Reappraisal	−0·32	−0·33	−2·45	< 0·05
	Social control	−0·08	−0·09	−0·66	> 0·10
	Worry	−0·01	−0·01	−0·11	> 0·10
Dependent: Depression (BDI)					
1	TCQ				
	Distraction	−0·42	−0·49	−4·16	< 0·0001
	Punishment	0·43	0·47	3·94	< 0·0005
	Reappraisal	−0·25	−0·31	−2·42	< 0·02
	Social control	−0·00	−0·00	−0·45	> 0·10
	Worry	0·09	0·11	0·83	> 0·10
Dependent: Depression (BDI)					
1	HAD (Anxiety)	0·42	0·53	4·48	< 0·0005
2	TCQ				
	Distraction	−0·32	0·45	−3·63	< 0·0005
	Punishment	0·33	0·43	3·45	< 0·005
	Reappraisal	−0·22	−0·33	−2·51	< 0·05
	Social control	0·04	0·06	0·47	> 0·10
	Worry	0·00	0·00	0·00	> 0·10

We also ran analyses using a six-factor version of the scale, and this did not change the results.

scales alone, then entering the BDI and HAD respectively on step 1 and the TCQ subscales on step 2; (*ii*) with depression as dependent, entering the TCQ subscales alone, then entering anxiety (HAD) on step 1 and the TCQ subscales on step 2, and; (*iii*) with anxiety as dependent entering the TCQ subscales alone, then entering depression on step 1 and the TCQ subscales on step 2. Non-significant equations are not reported.

PTSD subgroup (see Table 4)

Dependent variables: IES intrusions

The only significant predictor of IES intrusions was BDI depression. The statistics for this equation were as follows: the multiple R was 0·37 which was significant ($F_{(1, 63)} = 9·91$, $P < 0·003$). The value of R^2 was 0·14 showing that the BDI accounted for 14% of the variance in IES intrusions. The TCQ scales entered alone or on step 2 after the BDI did not contribute significantly to IES intrusions.

Dependent variable: BDI depression

The TCQ scales were entered alone in the first regression predicting BDI. The overall statistics for this equation were as follows: the multiple R

was 0·52 which was significant ($F_{(1, 61)} = 4·20$, $P < 0·005$). The value of R^2 was 0·27 and the value of R^2 adjusted for shrinkage was 0·20, showing that the TCQ accounted for 20% of the variance in BDI depression. Distraction emerged as the only significant predictor.

In the second regression, HAD anxiety ($r = 0·49$, $P < 0·01$) was controlled on the first step, and the TCQ scales were entered as a block on step 2. The statistics for the first step of the equation were as follows: the multiple R was 0·49 which was significant ($F_{(1, 41)} = 13·32$, $P < 0·001$) and the value of R^2 was 0·24. The overall statistics for the final equation were as follows: the multiple R was 0·63 ($F_{(6, 36)}$ 4·07, $P < 0·005$). The value of R^2 was 0·30, and the change in R^2 was 0·05 and non-significant ($F_{(6, 36)}$ 1·92, $P > 0·10$). Distraction and HAD anxiety emerged as the only significant predictors.

Depressed subgroup (see Table 5)

Dependent variable: IES intrusions

The only equation yielding significant independent predictors of IES intrusions was that in which the TCQ scales were entered alone. The

statistics for the overall equation were as follows: the multiple R was 0·48, which was significant ($F(1, 54) = 3·04$, $P < 0·05$). The value of R^2 was 0·23, and the value of R^2 adjusted for shrinkage was 0·16. Punishment and reappraisal emerged as significant predictors.

Dependent variable: BDI depression

In the first regression TCQ subscales were entered alone in predicting BDI. The final statistics for this equation were as follows: the multiple R was 0·71, which was significant ($F(1, 58) = 10·99$, $P < 0·0005$). The value of R^2 was 0·50 (adjusted $R^2 = 0·46$) showing that the TCQ scales accounted for 46 % of the variance in BDI depression. Distraction, punishment, and reappraisal emerged as significant predictors.

A second regression was run controlling for anxiety on step 1 and entering the TCQ scales as a block on step 2. The statistics for the first step of the equation with HAD anxiety alone entered were as follows: the multiple R was 0·62 and significant ($F(1, 57) = 34·93$, $P < 0·0005$). The value of R^2 was 0·38. The overall statistics for the final equation were as follows: the multiple R was 0·80 ($F(6, 52) = 15·46$, $P < 0·00005$). The value of R^2 was 0·64 (adjusted $R^2 = 0·59$). The change in R^2 was 0·26 ($F = 7·97$, $P < 0·005$) showing that the TCQ subscales accounted for a further 26 % of the variance in BDI depression. Distraction, punishment and reappraisal subscales emerged as significant predictors of BDI depression (in addition to anxiety).

DISCUSSION

The principal aims of this study were: (*i*) to explore the factor structure of the TCQ in a clinical sample with diagnoses of PTSD and depression, and to explore its psychometric properties; and (*ii*) to test the sensitivity of the TCQ to recovery. The secondary aims of this study were: (*i*) to explore relationships between TCQ subscales and symptoms of depression and PTSD; (*ii*) to explore possible differences in thought control strategies in people with these disorders; and (*iii*) to investigate relationships between the TCQ, intrusions, depression and anxiety, while controlling for common variance in these measures.

Principal Components Factor Analysis followed by the Scree test suggested a six factor

solution. Six factors were rotated to obtain simple structure. The content of these factors suggested that the TCQ was measuring dimensions of re-appraisal, worry, social control, behavioural distraction, punishment and cognitive distraction. The factor structure replicated that of the original TCQ apart from the splitting of cognitive and behavioural distraction into separate factors. The pattern of factor loadings obtained were compared with those of Wells & Davies's (1994) solution using Catell's salient similarity index *s* (Cattell, 1957; Cattell & Baggaley, 1960) and the results suggested that the factors were very similar. We therefore used the five-factor scoring of the TCQ for subsequent analyses.

A legitimate alternative or additional analysis that one might consider is Confirmatory Factor Analysis (CFA). However, this is only the second factor analysis study using the TCQ, and the first study with a clinical sample, and it was thought that it was not appropriate to impose a particular factor structure on the data at such an early stage. A CFA would almost certainly produce a good fit because of the parameter to case ratio, and therefore would not be rigorous test of goodness-of-fit. CFA is described as a technique designed for use in the advanced stages of the research process to test a theory about latent processes (Tabachnick & Fidell, 1996). Principal Components Factor Analysis allows for a different factor structure to emerge, and it was therefore possible to genuinely replicate the structure rather than having an *a priori* hypothesis and a weak test of goodness-of-fit. If after several further studies using clinical and non-clinical populations a similar structure emerges, then the subsequent use of CAF would be deemed appropriate.

Cronbach coefficient alphas computed for the individual subscales were similar to those obtained by Wells & Davies (1994). Some of the subscale inter-correlation coefficients were higher than those obtained in the original study, in particular the reappraisal subscale was significantly positively correlated with the worry, distraction and punishment subscales in this study. The relationship between worry and reappraisal in patients but not non-patients suggests that worry may form a component of reappraisal (coping) processes in the patient group. This relationship is consistent with a

cognitive approach to understanding emotional vulnerability in which preferred reappraisal (coping) processes may be characterized by active worry or negative rumination (Wells & Matthews, 1994, 1996; Wells, 1995, 1997).

The PTSD group had higher scores than the depressed group on the IES intrusion and avoidance subscales, and the PSS intrusion, avoidance and arousal subscales. They also had higher scores on the TCQ distraction subscale. There were no differences between the groups in measures of depression and anxiety.

Correlational analyses showed relationships between the TCQ subscales and other measures. There were negative associations between measures of depression and the distraction subscale of the TCQ in both the PTSD and depressed groups. These associations suggest that distraction techniques are associated with lower levels of depression and support Wells & Davies (1994) who suggested that strategies such as distraction may offer effective coping mechanisms in some circumstances.

Punishment was associated with depression and anxiety in the depressed subgroup. This finding is consistent with the Wells & Davies (1994) suggestion that self-punishing techniques are associated with measures of stress vulnerability and psychopathology, i.e. trait anxiety (Spielberger *et al.* 1983) and the neuroticism subscale of the Eysenck Personality Inventory (Eysenck & Eysenck, 1964). Worry was also associated with anxiety in the depressed group.

The social control subscale was negatively correlated with avoidance in the two subgroups, suggesting that using strategies such as discussing unwanted thoughts may be helpful in reducing avoidance and arousal in both depression and PTSD. This assumption is consistent with Freeston *et al.*'s (1995) finding that 'talking to someone' as a thought control strategy was rated as reasonably efficient and was used for dealing with more intense and probable thoughts.

The reappraisal subscale of the TCQ was negatively associated with the BDI and the IES intrusion subscale for the depressed group only. This could suggest that reappraisal reduces depression and intrusions, however, it could also suggest that depression may be associated with reduced efficacy of reappraisal and/or a change in the nature of reappraisal. Perhaps

depression reduces the cognitive capacity available for reappraisal which is probably one of the most effortful control strategies. Wells & Matthews (1994) suggest that more effortful coping strategies may be abandoned when cognitive resources are overloaded.

Analysis of sensitivity to recovery effects showed some interesting and promising results for future research using the TCQ. A significant main effect of recovery status and a non-significant main effect of time for the distraction subscale suggests that unrecovered subjects use distraction less than recovered subjects. Moreover, distraction increases with recovery while it remains the same in those who do not recover. A significant recovery status × time interaction for the punishment subscale suggests that use of punishment techniques for dealing with un-wanted intrusions decreases with recovery. There was an effect of time and a recovery status × time interaction for the reappraisal subscale, suggesting that recovery is associated with increased use of reappraisal as a thought control strategy. Finally, there was a main effect of recovery status for the worry subscale; people who recovered used less worry as a thought control strategy. These findings are generally consistent with other correlational data, and support the idea that symptoms such as depression and anxiety are associated with the use of mal-adaptive coping strategies like worry and pun-ishment (e.g. Wells & Davies, 1994) while techniques such as distraction and reappraisal are associated with fewer symptoms of de-pression and anxiety.

Regression analyses were run to disentangle independent TCQ predictors of intrusions, de-pression and anxiety. The use of distraction emerged as a negative predictor of depression scores when covariances with other TCQ scales was controlled, in both the PTSD and the depressed patient groups. In the depressed group, punishment was positively associated with depression scores and reappraisal nega-tively contributed to depression. These variables remained significant even when anxiety was controlled. Both punishment and reappraisal predicted intrusions in depressed patients, but no TCQ subscales independently predicted intru-sions in the PTSD group. Overall these results combined with treatment effects suggest that control strategies measured by the TCQ may be

assessing helpful and unhelpful control strategies. In clinical cases of depression at least, distraction, punishment and reappraisal emerge as contenders for future study. Depression was found to be the best predictor of intrusion in the PTSD group, and the distraction subscale predicted depression in this group. This suggests that further investigation of the relationship between these variables should be included in future studies.

In conclusion, this study replicated the original study with a clinical sample. The factor structure of the TCQ was almost identical to that in studies of non-patients supporting its validity as a measure of control strategies in patients. There were significant correlations between the TCQ subscales, i.e. reappraisal, punishment, worry, behavioural and cognitive distraction and other measures of psychopathology. In particular, the correlations between other indices of psychopathology and the distraction, social control and reappraisal subscales of the TCQ support Wells & Davies' (1994) suggestion that such control strategies may buffer against stress proneness. The TCQ subscales were sensitive to differences between the two groups, to recovery, and showed meaningful links with symptoms. These results are promising in terms of potential use of the TCQ as an instrument in clinical and research settings. Further research should include replication of the factor structure with both non-clinical and clinical populations, and examine the sensitivity of the instrument in different disorders and to treatment effects. The relationships between the TCQ subscales and indices of psychopathology highlight some interesting research questions pertaining to potential cause and effect links between symptoms and choice of self-regulation strategies.

REFERENCES

American Psychiatric Association (1994). *Diagnostic and Statistical Manual of Mental Disorders*, 4th edn. APA: Washington, DC.

Beck, A. T., Ward, C. H., Mendelssohn, M., Mock, J. & Erbaugh, J. (1961). An inventory for measuring depression. *Archives of General Psychiatry* **18**, 561–571.

Brewin, C. R. (1989). Cognitive change processes in psychotherapy. *Psychological Review* **96**, 379–394.

Brewin, C. R., Hunter, E., Carroll, F. & Tata, P. (1996*a*). Intrusive memories in depression. *Psychological Medicine* **26**, 1271–1276.

Brewin, C. R., Joseph, S. & Kuyken, W. (1996*b*). PTSD and depression: What is their relation? In *Psychosocial Perspectives on Trauma: From Disaster to Political Violence* (ed. G. Mulhern and S. Joseph), pp. 11–18. British Psychological Society: Northern Ireland Branch, Belfast.

Brugha, T. S., Bebbington, P., Tennant, C. & Hurry, J. (1985). The List of Threatening Experiences: a subset of 12 life event categories with considerable long-term contextual threat. *Psychological Medicine* **15**, 189–194.

Cattell, R. B. (1957). *Personality and Motivation Structures and Measurement*. World Books: Yonkers-on-Hudson, NY.

Cattell, R. B. & Baggaley, A. R. (1960). The salient variable similarity index for factor matching procedures: an improvement of the *s* index; with tables. *Educational and Psychological Measurement* **29**, 781–792.

Eysenck, H. J. & Eysenck, S. B. J. (1964). *The Eysenck Personality Inventory*. London University Press: London.

Fenigstein, A., Scheier, M. F. & Buss, A. H. (1975). Public and private self-consciousness: assessment and theory. *Journal of Consulting and Clinical Psychology*, **43**, 522–527.

Foa, E. B. & Kozak, M. J. (1986). Emotional processing of fear: exposure to corrective information. *Psychological Bulletin*, **99**, 20–35.

Foa, E. B., Riggs, D. S., Dancu, C. V. & Rothbaum, B. O. (1993). Reliability and validity of a brief instrument for assessing post-traumatic stress disorder. *Journal of Traumatic Stress* **6**, 459–473.

Freeston, M. H., Ladouceur, R., Provencher, M. & Blais, F. (1995). Strategies used with intrusive thoughts: context appraisal, mood and efficacy. *Journal of Anxiety Disorders* **9**, 201–215.

Horowitz, M. J. (1976). *Stress Response Syndromes*, Jason Aronson Inc.: New York.

Horowitz, M. J. (1986). Stress response syndromes: review of post-traumatic and adjustment disorders. *Hospital and Community Psychiatry* **37**, 241–249.

Horowitz, M., Wilner, N. & Alvarez, W. (1979). Impact of Events Scale: a measure of subjective stress. *Psychosomatic Medicine* **41**, 209–218.

Janoff-Bulman, R. (1989). Assumptive worlds and the stress of traumatic events: applications of the schema construct. *Social Cognition* **7**, 113–136.

Kline, P. (1994). *An Easy Guide to Factor Analysis*. Routledge: London.

Kuyken, W. & Brewin, C. R. (1994). Intrusive memories of childhood abuse during depressive episodes. *Behaviour Research and Therapy* **32**, 525–528.

Rachman, S. J. & De Silva, P. (1978). Abnormal and normal obsessions. *Behaviour Research and Therapy* **16**, 233–248.

Salkovskis, P. M. (1985). Obsessive–compulsive problems: a cognitive-behavioural analysis. *Behaviour Research and Therapy* **23**, 571–583.

Salkovski, P. M. (1989). Cognitive-behavioural factors and the persistence of intrusive thoughts in obsessional problems. *Behaviour Research and Therapy* **27**, 677–682.

Salkovskis, P. M. & Campbell, P. (1994). Thought suppression induces intrusion in naturally occurring negative intrusive thoughts. *Behaviour Research and Therapy* **32**, 1–8.

Spielberger, C. D., Gorsuch, R. L., Vagg, P. R. & Jacobs, G. A. (1983). *Manual for the State–Trait Anxiety Inventory* (*Form Y*). Consulting Psychologists Press: Palo Alto, CA.

Spitzer, R. L., Williams, J. W. B. & Gibbon, M. (1987). *Instruction Manual for the Structural Clinical Interview for DSM-III-R* (*SCID*) *1987 Revision*. Biometrics Research Department, New York Psychiatric Institute: New York.

Tabanick, B. G. & Fidell, L. S. (1996). *Using Multivariate Statistics*, *3rd edn*. Harper Collins College Publishers: New York.

Teasdale, J. D. (1983). Negative thinking in depression: Cause, effect or reciprocal relationship? *Advances in Behaviour Research and Therapy* **5**, 3–25.

Trinder, H. & Salkovskis, P. M. (1994). Strategies for dealing with personally relevant intrusions outside the laboratory: long-term suppression increases intrusion. *Behaviour Research and Therapy* **32**, 833–842.

Wegner, D. M., Schneider, D. J., Carter, S. R. & White, T. L. (1987). Paradoxical effects of thought suppression. *Journal of Personality and Social Psychology* **53**, 5–13.

Wells, A. (1995). Meta-cognition and worry: a cognitive model of GAD. *Behavioural and Cognitive Psychotherapy* **23**, 301–320.

Wells, A. (1997). *Cognitive Therapy of Anxiety Disorders: A Practice Manual and Conceptual Guide*. Wiley: Chichester.

Wells, A. & Davies, M. I. (1994). The thought control questionnaire: a measure of individual differences in the control of unwanted thoughts. *Behaviour Research and Therapy* **32**, 871–878.

Wells, A. & Matthews, G. (1994). *Attention and Emotion: A Clinical Perspective*. Laurence Erlbaum: Hove.

Wells, A. & Matthews, G. (1996). Modelling cognition in emotional disorder: the S-ref model. *Behaviour Research and Therapy* **34**, 881–888.

Zigmond, A. & Snaith, R. P. (1983). The hospital anxiety and depression inventory. *Acta Psychiatrica Scandinavica* **67**, 361–370.