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CHANGES TO AUTOMATIC THOUGHTS AND DYSFUNCTIONAL ATTITUDES IN GROUP CBT FOR DEPRESSION

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Abstract. The present study sought to clarify the role of cognitive change in Cognitive Behavioural Therapy (CBT) by examining the relationship between depression outcome and changes to automatic thoughts and dysfunctional attitudes at different points of therapy. Thirty patients suffering from Major Depression (MDD) or Dysthymia attended the 12 sessions of a group CBT program. Multiple regressions found total scores on the Automatic Thoughts Questionnaire (ATQ) and cumulative change scores on the Dysfunctional Attitudes Scale (DAS) to predict scores on the Beck Depression Inventory (BDI) at later stages of therapy, though neither form of cognition was predictive from earlier stages of therapy. Only scores on the ATQ were significantly related to both cognitive and somatic subscales of the BDI, indicating that automatic thoughts are more directly related to cognitive change than dysfunctional attitudes. Overall findings suggest that significant reductions in *both* automatic thoughts and dysfunctional attitudes are related to non-clinical levels of depressive symptoms at the end of the treatment.

Keywords: Depression, psychotherapy, cognitive behaviour therapy, cognition, treatment outcome.

Introduction

The need for further investigation into the active mechanisms of change in CBT is partly due to equivalent treatment outcomes when comparing different therapies (Free & Oei, 1989; Oei & Free, 1995; Jacobson et al., 1996) and to the finding that cognitive change is not exclusive to cognitive therapies, but is evident in the treatment outcomes of other therapies such as pharmacotherapy and behavioural therapy (Oei & Free, 1995; Oei, Llamas, & Devilly, 1999). In addition, previous studies have used ANOVA to analyse the roles of cognitions during therapy and thus only infer their specific relationship during recovery (Keller, 1983; DeRubeis et al., 1990; Oei & Sullivan, 1999), while other studies did not separately examine the difference between cognitive and somatic outcome measures of depression (Kwon & Oei, in press). Thus, while previous studies have added to the knowledge of cognitive change during recovery from depression, further investigation is required.

The current study firstly aimed to further clarify the role of cognitive change in the recovery from depression by examining the relationship between BDI outcome scores and

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changes to automatic thoughts and dysfunctional attitudes scores at different points in therapy for depression. It was expected that outcome measures of depression would be predicted at an earlier stage (Weeks 1 to 6) of assessment by automatic thoughts and at a later stage (Weeks 7 to 12) by dysfunctional attitudes. This expectation was derived from the following factors encompassed in cognitive theory of depression: changes in automatic thoughts are proposed to have a direct effect on changes in depressive symptoms while changes in dysfunctional attitudes are said to have an indirect effect on changes in depressive symptoms, mediated by automatic thoughts (Kwon & Oei, 1994, in press); automatic thoughts are described as surface level and are therefore more accessible to change than the deeper dysfunctional attitudes; automatic thoughts are the primary target of cognitive therapy in the early stages of treatment while attention to dysfunctional attitudes is given later in treatment (Jacobson et al., 1996).

The second aim of the current study was to analyse the relationship of two cognitive measures with the Cognitive and Somatic subscales of the Beck Depression Inventory (BDI: Beck & Steer, 1993). The expectation was that scores on the ATQ and DAS would predict changes in outcome on the BDI Total and Cognitive scores, but that the scores on the Somatic subscale would be better predicted by the ATQ than the DAS due to the direct effect that automatic thoughts are said to have on changes to depressive symptoms (Kwon & Oei, 1994). Although there have been a number of comprehensive reviews about the application and psychometric properties of the BDI (Beck, Steer, & Garbin, 1988; Robinson & Kelley, 1996), less attention has been given to the BDI subscales, which have been shown to differentiate among psychiatric, medical and normal samples. In particular, previous studies investigating the role of cognition in recovery from depression have used the BDI Total score rather than subscales.

Method

Participants

The participants were 30 patients (21 males and 9 females) who had been diagnosed with MDD or Dysthymia and who had completed all sessions of a 12-week, group CBT program. The mean age of participants was 41.8 years (SD = 12.5) and ranged from 18 to 69 years. Reports of marital status revealed 30.6% of subjects were single, 52.8% were married and 16.7% were divorced or separated. Although some patients were taking anti-depressant medication during the course of therapy, recent studies have shown that, overall, pre-existing medication regimes did not significantly affect the long-term outcome of a CBT program (Oei, Llamas, & Evans, 1997; Oei & Yeoh, 1999).

Recruitment of participation

Participants were recruited from the Brisbane community through a local media release seeking persons suffering from depression (Free, Oei, & Sanders, 1991). Participants were screened through a series of interviews before being selected into the group CBT program. Patients meeting DSM-IIIR criteria for current MDD (either single episode or recurrent) or Dysthymia were selected for participation. Diagnosis was established through a 1.5 hour interview that included the Structured Clinical Interview for Depression (SCID). Exclusion

from the study was based on participants meeting the criteria for the following DSM-IIIR diagnoses: bipolar mood disorder or other major psychiatric disorder (e.g. schizophrenia, personality disorder); organic brain disorder; abuse of drugs and/or alcohol. Exclusion from the study was also based on the presence of a major physical illness or problems in reading English. For more information on recruitment and exclusion criteria see Free et al. (1991) and Oei and Shuttlewood (1997).

Procedure

A series of group CBT programs were run by the University of Queensland between 1992–1994. CBT was delivered in a series of identical programs. Each program consisted of 12 two-hour group format sessions, held weekly. An outline of the program has been published previously (Oei & Shuttlewood, 1997) and will therefore not be detailed here. Measures for the study were taken pre-treatment (Week 1), post-treatment (Week 13) and approximately fortnightly (Weeks 3, 5, 7,9, and 11) throughout the CBT program.

Assessment measures

Beck Depression Inventory. The 21 items of the Beck Depression Inventory (BDI; Beck & Steer, 1993) are designed to assess the severity of the affective, cognitive, motivational, psychomotor and vegetative components of depression (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961; Beck et al., 1988). Alpha reliability coefficients of the BDI have been found to exceed .90 in a range of populations (Beck et al., 1988). The 21 items of the BDI can also be separated into two subscales: a cognitive-affective subscale (the sum of the first 13 items) and a somatic-performance subscale (the sum of the last eight items) (Beck & Steer, 1993). These subscales, as well as the Total score of the BDI, were used in the analyses of the current study. Finally, in accordance with guidelines stipulated by Beck and Steer (1993), the cut-offs for assessing different levels of depression were as follows: 0–9 = minimal depression, 10–16 = mild depression, 17–29 = moderate depression; and 30–36 = severe depression.

Automatic Thoughts Questionnaire. The Automatic Thoughts Questionnaire (ATQ; Hollon & Kendall, 1980) is a 30-item inventory in which clients are asked to indicate, on a scale of 1 (not at all) to 5 (all the time), how frequently negative automatic thoughts such as ''I'm worthless'' have occurred in the past week. Scores on the ATQ can range from 30 to 150: scores for depressed persons usually range from 90–130 and between 40–60 for non-depressed persons (DeRubeis et al., 1990). The ATQ is a widely accepted scale and has been found to have good reliability and validity (Hill, Oei, & Hill, 1989).

Dysfunctional Attitudes Scale. The Dysfunctional Attitudes Scale (DAS; Weissman & Beck, 1978; Weissman, 1979; Beck, Brown, Steer, & Weissman, 1991) uses a 7-point rating scale ranging from ''totally agree'' to ''totally disagree'' to measure those stable cognitive schemas associated with depression (Beck et al., 1991). For example, ''I should be happy all the time'' and ''My life is wasted unless I am a success''. The 66-item version of the DAS was used in the current study with scores ranging from 66 to 462. Lower scores indicate less dysfunction in attitudes, with 236 being the lowest clinical level (Oei & Sullivan, 1999). Finally, the DAS has been used widely and has good reliability and validity (Hill et al., 1989).

Statistical analyses

Transformations to the univariate and multivariate outliers that were present had little or no effect on the interpretation of the results. Thus an untransformed, mean substituted data set was chosen for analysis. Missing values were minimal (about 5%) and thus mean substitutions were used. A series of repeated measures ANOVA with polynomial contrasts was performed to analyse the significance between pre-treatment scores and changes in scores that occurred at each fortnightly assessment time. ANOVA were performed for scores on the ATQ, DAS, BDI Total, Cognitive, and Somatic measures.

A series of Linear Multiple Regressions were also performed using actual scores and cumulative change scores as predictors of outcome. Actual scores were the raw scores taken from the ATQ and DAS at each measurement time. Cumulative change scores were calculated by subtracting the pre-treatment raw scores from subsequent weeks of measurement (i.e., from Week 3, Week 5, Week 9, etc.). Multiple regressions were run for each week of assessment using the post-treatment Total, Cognitive and Somatic measures from the BDI as the dependent variables each time.

Results

Table 1 displays the means and standard deviations of scores for the measures taken fortnightly across therapy. At Weeks 9 and 11 of therapy the DAS and ATQ, respectively, showed that on average the scores were within non-depressed ranges (i.e. DAS < 236; ATQ < 60) (Oei & Sullivan, 1999; De Rubeis et al., 1990). Although it appears that the mean scores on the DAS reached a non-depressed range sooner than those of the ATQ, the latter group mean was on the border of the non-depressed range at Week 9. In addition, the mean scores on the ATQ up until Week 11 were within a range of scores that were below the range for depressed persons, but above the range for non-depressed persons, possibly indicating a lower level of depression. Repeated measures ANOVAs with polynomial contrasts revealed that from Week 9 onwards subjects' ATQ scores showed a significant change from pre-treatment baseline scores, Fs (1,26) > 24.04, ps<.01; while for DAS scores a significant change from baseline scores was not found until Week 11, Fs (1,25) > 7.19, ps<.01.

Table 1. Means and standard deviations of the scores on the ATQ, DAS, and BDI Total, Cognitive and Somatic scales at the seven times of assessment

		Pre	Week 3	Week 5	Week 7	Week 9	Week 11	Post
ATQ	*Mean*	81.77	77.87	76.73	71.11	61.5	58.70	50.03
	SD	27.62	28.88	29.70	30.41	26.77	26.05	25.68
DAS	*Mean*	242.80	260.08	251.58	247.27	229.6	220.27	193.07
	SD	58.85	47.13	56.44	58.50	65.2	67.37	72.76
BDI Tot	*Mean*	20.33	15.91	15.65	13.76	11.98	10.72	7.16
	SD	7.62	7.61	8.37	8.13	8.64	9.46	7.23
BDI Cog	*Mean*	12.98	10.04	9.95	8.62	7.43	7.02	4
	SD	4.98	5.30	6.35	5.78	6.99	6.94	4.35
BDI Som	*Mean*	7.19	5.87	5.75	5.22	5.54	4	3.16
	SD	3.13	4.00	3.32	3.43	3.70	3.25	3.74

For the BDI Total, baseline scores ranged from 12–37 and on average were within the moderately depressed range (17–29). BDI Total scores were not within the recovered/minimally-depressed range (0–9) until the completion of therapy and, at this time, 22 of the 30 participants had BDI Total scores within the range of 0–9. Repeated measures ANOVAs with polynomial contrasts revealed that the mean BDI Total scores were significantly different from pre-treatment scores at all of the measurement times across therapy, *Fs* (1,15) > 9.40, *ps*<.01. Excluding Week 5, changes in mean BDI Cognitive scores were significant throughout assessment, *Fs* (1,25) > 14.40, *ps*<.001; and for the BDI Somatic measure, *Fs* (1.25) > 8.34, *ps*<.01 for Weeks 5, 9, 11 and 13. These findings indicate that at these times of assessment, levels of depression were significantly less than pre-treatment levels of depression. Lastly, although on average the scores on the ATQ and the Total and subscales of the BDI all showed a steady decrease over the course of therapy, scores on the DAS worsened for the first three weeks of therapy and remained above pre-treatment levels until Week 9 of assessment.

The multiple regression analyses using raw scores from the ATQ and DAS as predictors and the BDT Total, Cognitive and Somatic scores as outcome variables showed significant results only for Week 9, *F*s (2,27) > 5.42, *p*<.01; for Week 11, *F*s (2,27) > 5.69, *p*<.01; and for Week 13, *F*s (2,27) > 7.04, *p*<.01. Weeks 1–7 were not significant (*p*>.05). Table 2 summarizes the findings for the significant regression analyses at Weeks 9, 11, and 13. At Week 9, 41% of the variance in BDI Total scores was accounted for by the ATQ and DAS

Table 2. Multiple regression analyses predicting BDI Total, BDI Cognitive and BDI Somatic scores from ATQ and DAS scores at Weeks 9, 11, and 13 of assessment

Criterion	Predictor	β	95% CI for β		sr^2	pr	R^2	Adj R^2
Week 9			Lower	Upper				
BDI Tot	ATQ	.62**	.24	1.01	.24	.54	.41***	.37
	DAS	.03	−.35	.41	.0005	.03		
BDI Cog	ATQ	.54**	.15	.93	.18	.48	.39***	.35
	DAS	.12	−.26	.51	.0009	.13		
BDI Som	ATQ	.59**	.17	1.01	.22	.48	.29**	.23
	DAS	−.09	−.51	.33	.0005	−.09		
Week 11			Lower	Upper				
BDI Tot	ATQ	.57**	.18	.95	.19	.50	.44***	.40
	DAS	.14	−.24	.52	.01	.14		
BDI Cog	ATQ	.48**	.09	.88	.14	.14	.42***	.38
	DAS	.22	−.16	.61	.03	.03		
BDI Som	ATQ	.54**	.11	.97	.17	.44	.30**	.24
	DAS	.01	−.42	.44	.00005	.01		
Week 13			Lower	Upper				
BDI Tot	ATQ	.70**	.38	1.01	.32	.65	.56***	.53
	DAS	.08	−.24	.40	.004	.10		
BDI Cog	ATQ	.62**	.31	.93	.25	.62	.59***	.56
	DAS	.23	−.08	.53	.03	.28		
BDI Som	ATQ	.64**	.25	1.03	.27	.54		
	DAS	−.11	−.28	.50	.008	−.11	.34**	.29

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

Table 3. Correlations between the predictors (ATQ and DAS); and between the predictors and the criterions (BDI Total, Cognitive and Somatic) for Weeks 9, 11, and 13

Predictors		DAS	BDI Total	BDI Cognitive	BDI Somatic
Week 9	— ATQ	.61***	.64***	.62***	.53***
	— DAS	—	.41**	.46**	.27
Week 11	— ATQ	.64***	.66***	.63***	.54***
	— DAS	—	.60**	.53**	.36
Week 13	— ATQ	.58***	.74***	.75***	.58***
	— DAS	—	.48***	.58***	.26

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

scores with up to 56% of the variance by Week 13. Similarly, the ATQ and DAS scores from Weeks 9–13 accounted for 39–59% of the variance in BDI Cognitive scores and 29–34% in BDI Somatic scores. As a predictor, the ATQ accounted for a greater proportion of the total variance in each of the BDI criterion scores from Weeks 9, 11, and 13. The DAS was not a significant predictor despite its significant correlations ($p<.01$ level) with the BDI Total and BDI Cognitive scores from Week 9 onwards. Table 3 shows the correlations between the predictors (ATQ and DAS); and between the predictors and the criterions (BDI Total, Cognitive and Somatic) for Weeks 9, 11, and 13. The correlations amongst the predictors ($p<.001$ level) may account for the lack of prediction by the DAS. A non-significant correlation was found between the DAS and the BDI Somatic measure at these times.

Similarly, analyses of cumulative change scores showed that only two regression analyses were significant while the other multiple regressions were not significant at a $p<.01$ level. The two significant regressions occurred when *Week 9 ATQ and DAS scores minus pre-treatment ATQ and DAS scores*, respectively, were used as cumulative change scores with the BDI Total as the criterion, $F(2,27) = 5.35$, $p<.01$; and similarly when *Week 13 ATQ and DAS scores minus pre-treatment ATQ and DAS scores*, respectively, were used as cumulative change scores with the BDI Cognitive scores as the criterion, $F(2,27) = 5.35$, $p<.01$. Table 4 summarizes the findings from these two significant regression analyses using cumulative change ATQ and DAS scores as predictors. As indicated 28% of BDI Total and 28%

Table 4. Multiple regression analyses predicting BDI Total scores and BDI Cognitive scores from cumulative ATQ and DAS scores

Criterion	Predictor change scores	β	95% CI for β		sr^2	pr	R^2	Adj R^2
			Lower	Upper				
BDI Tot	*Week 9 ATQ minus pre-treatment ATQ*	.01**	–.39	.41	.0006	.02	.28**	.23
	Week 9 DAS minus pre-treatment DAS	.53	.12	.93	.19	.14		
BDI Cog	*Week 13 ATQ minus pre-treatment ATQ*	.15*	–.39	.54	.02	.15	.28**	.23
	Week 13 DAS minus pre-treatment DAS	.44	.05	.82	.14	.40		

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

Table 5. Correlations between the predictors (Cumulative ATQ and DAS scores); and between the predictors and the criterions (BDI Total, Cognitive and Somatic scores) for Week 9 minus pre-treatment and Week 13 minus pre-treatment

Change Scores	DAS	BDI Total	BDI Cognitive	BDI Somatic
Week 9 ATQ minus pre-treatment ATQ	.58***	.31*	.29	.24
Week 9 DAS minus pre-treatment DAS	—	.53***	.24	.21
Week 13 ATQ minus pre-treatment ATQ	.52***	.29	.38	.26
Week 13 DAS minus pre-treatment DAS	—	.23	.52**	.21

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

of BDI Cognitive outcome scores could be predicted by scores measuring the amount of improvement in patients' automatic thoughts and dysfunctional attitudes between pre-treatment and Week 9 of therapy and between pre-treatment and Week 13 (post-treatment). The cumulative-change DAS scores showed to be better predictors and accounted for a greater proportion of total variance in the BDI Total measure, (when using Week 9 minus pre-treatment scores as predictors) and in the BDI Cognitive measure, (when using Week 13 minus pre-treatment scores as predictors) than did the cumulative-change ATQ scores at these times of assessment. The lack of significance of the cumulative change ATQ scores as a predictor in these regression analyses may be due to the correlations of .58 ($p<.001$) and .52 ($p<.01$), respectively, between the predictors (see Table 5 for correlations between the cumulative-change predictors; and between the cumulative-change predictors and the criterion for Week 9 minus pre-treatment and Week 13 minus pre-treatment).

Discussion

Examination of the mean scores on the ATQ and DAS indicates that changes in automatic thoughts occur early in treatment while improvements in dysfunctional attitudes occur later after an initial worsening. The early change to scores on the ATQ supports previous findings that automatic thoughts change relatively quickly during therapy (Oei & Shuttlewood, 1997; Oei & Sullivan, 1999); however, in the current study such changes were not significantly different from baseline scores until Week 9. At this time, ATQ scores were also significantly related to outcomes in both cognitive and somatic depression as measured by BDI Total, Cognitive and Somatic scales. The significant relationship between later ATQ scores and depression outcome may reflect the greater changes in automatic thoughts that have occurred by the end of therapy (Oei & Sullivan, 1999); alternatively the relationship may be due to the correlation of two similar depression measures (the ATQ and BDI) when completed closer in time to each other. Thus there appears to be some support for the association of depression outcome with significant changes to be automatic thoughts over therapy, but some caution must be taken when making conclusions about these findings.

As predicted, cumulative change scores on the DAS taken later in assessment were significantly related to depression outcome. A similar finding was not found for the actual DAS

scores. Possibly, cumulative change scores reduce much of the initial differences between individuals and are in fact measuring a rate of change throughout recovery. It is suggested that cumulative change scores are a more conservative measure of cognitive change and are less affected by depression severity compared to actual scores. Furthermore, the ability of cumulative change DAS scores to predict BDI total and Cognitive scores rather than Somatic scores supports the proposal that dysfunctional attitudes have an indirect effect on somatic symptoms of depression while their predictive ability towards the end of therapy rather than early in therapy supports the proposal that dysfunctional attitudes are of a deeper more rigid structure compared to automatic thoughts (Rude & Rehm, 1991; Kwon & Oei, 1994).

While early changes in ATQ scores lend support for their surface structure, it is possible that these changes are too small to predict depression outcome scores taken at the completion of therapy. Although scores on the DAS were not significantly different from baseline scores until Week 11, the finding that at Week 9 both ATQ and DAS mean scores reached non-clinical levels and were able to predict depression outcome scores may suggest that significant reductions in *both* automatic thoughts and dysfunctional attitudes may be required before a predictive relationship between cognitions and depression symptoms can be found. In fact, regression statistics may require critical changes in measurement scores before detection of change is statistically and clinically possible.

Alternatively, limitations in sample size may have prevented a true detection of cognitive change in the process of recovery from depression. Any results (significant or non-significant) may be confounded with the lack of variability that a small sample size offers. Clients who begin therapy with moderate levels of depression may not show significant changes to cognitions or somatic symptoms until later in therapy.

Finally, the initial worsening of dysfunctional attitudes over the first 7 weeks of therapy may be due to an increased awareness of cognitions brought about by therapeutic techniques (Oei & Shuttlewood, 1997). Dysfunctional attitudes may remain rigid and resistant to change until this type of cognition is addressed later in therapy. Automatic thoughts, having a surface level, situation-specific nature are addressed early in therapy and may be more accessible to change though increased awareness (Rude & Rehm, 1991; Kwon & Oei, 1994). Findings in the current study must be taken with caution due to the small sample ($N = 30$) that affected the power of analyses.

In summary, support is found for the proposal that automatic thoughts are more strongly related to changes to depressive symptoms and would be more closely related to both cognitive and somatic change in depression compared to dysfunctional attitudes (Kwon & Oei, 1994). That is, despite the correlation between actual DAS scores and the BDI Total and BDI Cognitive measures from Week 9 onwards, the ATQ was still the better predictor. This may be due to the correlation amongst the predictors, but also to the effect that automatic thoughts mediate between dysfunctional attitudes and depressive symptoms (Kwon & Oei, 1994, 2002). Finally, the current study supports previous findings that cognitive change coincides with the recovery from depression (De Rubeis et al., 1990, Oei & Shuttlewood, 1997; Oei & Sullivan, 1999) as decreases in both cognitive and somatic symptoms of depression to a ''recovered'' or ''non-depressed'' level were found.

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