Behavioural and Cognitive Psychotherapy, 1998, 26, 271–282
Cambridge University Press. Printed in the United Kingdom

Brief Clinical Reports

CATASTROPHIC COGNITIONS AND THE CLINICAL OUTCOME: TWO CASE STUDIES

Nigar G. Khawaja and Tian P. S. Oei

The University of Queensland, Australia

Abstract. The present study used two single case studies to evaluate clinical improvement as a result of cognitive behavior therapy in panic disorder with or without agoraphobia (PDA). A special emphasis was placed on assessing the reduction in catastrophic cognitions, which are considered to be of prime importance in PDA. Multiple measures were employed, during pre and post treatment and at a six month follow-up. Data from self-report questionnaires, physiological measures and cognitive sampling during *in vivo* exposure were used. Convergent results demonstrated clinical improvement and supported the importance of catastrophic cognitions in the process of change for treatment outcome of PDA.

Keywords: Panic, agoraphobia, treatment, cognitive behavior therapy, case studies, anxiety.

Introduction

The cognitive models of panic disorder with or without agoraphobia (PDA) have emphasized that patients misinterpret their bodily and environmental cues as more dangerous and disastrous than they really are (Salkovskis, 1988). As a part of this process catastrophic cognitions, which are thoughts with a theme of danger, are activated. These cognitions contribute to the disorder's pathogenesis (Khawaja & Oei, 1998). Cognitive models propose that a patient's improvement depends mainly on the amelioration of catastrophic cognitions. These theoretical developments have enhanced the use of cognitive behavioral therapies (CBT) in the treatment of PDA. This treatment strategy primarily focuses upon the modification of cognitions and its efficacy in the treatment of PDA has been strongly supported by outcome studies (see review by Oei, Llamas, & Devily, in press). Most findings demonstrated the importance of catastrophic cognitions in the process of change; however, the roles of these cognitions in the improvement of PDA patients during *in vivo* exposure situations are still

Reprint requests and requests for extended report to Professor Oei, School of Psychology, University of Queensland, Brisbane, Queensland 4072, Australia. email: oei@psy.uq.edu.au

© 1998 British Association for Behavioural and Cognitive Psychotherapies

https://doi.org/10.1017/S1352465898000289 Published online by Cambridge University Press

unknown and requires future research (Oei et al., in press). It is therefore the intention of this study to investigate the clinical outcome of two patients with PDA as a result of CBT. Keeping in view the well documented importance of catastrophic cognitions, a special emphasis was placed on evaluating the reduction in these cognitions. In association with cognitive improvement, reduction in other symptoms was also taken into account. The Catastrophic Cognitions Questionnaire-Modified (CCQ-M), a self-report measure recently developed and validated by us, was used to evaluate the decrease in danger schemas. Additionally, a combination of cognitive sampling and physiological ambulatory monitoring was employed to examine the improvement in patients' spontaneous cognitions, concurrent anxiety and physiological responses, whilst exposed to their phobic situations. The improved methodology for *in vivo* cognitive assessment, which involved the patients reporting the cognitions into the coding process (Khawaja & Oei, 1998) was also incorporated. It was hypothesized that along with the other positive changes, the number of catastrophic cognitions would be reduced as a result of CBT.

Method

Subjects

Two subjects meeting the DSM-III-R diagnostic criteria for panic disorder with agoraphobia (300.21) participated in the study. The subjects were not receiving any treatment at the time of their participation in the study.

Subject 1 was a 29-year-old married woman, a homemaker and mother of one. The clinical interview indicated that the patient had experienced about 20 panic attacks in the previous month. Her agoraphobic avoidance was severe. The duration of illness was 1 year at the time of participation in the present study. Subject 2 was a 48-year-old married woman, a homemaker and mother of two. Although the subject was not experiencing panic attacks at the time of assessment, she reported a constant fear of experiencing one. Currently, the avoidance was of moderate severity. The duration of the subject's illness was 17 years.

Dependent measures

Self-report measures. A battery of six paper and pencil measures was administered which comprised Fear Questionnaire (FQ), State Trait Anxiety Inventory (STAI), Agoraphobic Cognitions Questionnaire (ACQ), Body Sensation Questionnaire (BSQ), Beck Anxiety Inventory (BAI), and Catastrophic Cognitions Questionnaire-Modified (CCQ-M). The CCQ-M measures catastrophic cognitions by asking the respondents to indicate, on a 5-point scale, the extent to which they rate each item as personally dangerous (see Khawaja, Oei, & Baglioni, 1995; Oei et al., in press).

Ambulatory monitoring and cognitive sampling. Vitalog PMS-8 is an ambulatory microprocessor, which records heart rate and physical activity when worn by the person. Heart rate and physical activity are recorded in epochs as short as five seconds. The event marker of this device is a button, which is pressed to record any panic attack

https://doi.org/10.1017/S1352465898000289 Published online by Cambridge University Press

onset. Subjects' spontaneous cognitions and subjective distress levels (SUDS) were sampled every minute. SUDS ranged from 0–10.

Procedure

The subjects were selected from the University's Psychology Clinic. They arrived at the clinic seeking treatment for their panic and phobic problems. The subjects initially completed a battery of questionnaires. In order to determine their diagnosis they were interviewed by the first author on the basis of the SCID-NP. The subjects were provided with training in reporting their cognitions and subjective distress levels. They were further instructed to record any panic attack onset by pressing the event marker, or reporting loudly. A baseline recording was conducted for a period of 10 minutes. During this phase, subjects were asked to report their cognitions and subjective distress levels, firstly, while sitting alone in a clinic room for five minutes and, then, walking around the clinic at a normal pace with the experimenter for another five minutes. Heart rates and activities were automatically being recorded. Subsequently, assessment was conducted during a period of exposure to situations of self-reported high anxiety and avoidance. Subject 1 was asked to take a crowded bus at peak hour. Subject 2 was taken out to unfamiliar areas and exposed to buildings with elevators and small rooms. The total duration of the experiment was approximately 70 minutes. For approximately 15 to 20 minutes, subjects were asked to be on their own in the *in vivo* settings. A second appointment, within the next 3–5 days, was given to the subjects. During this interval the tapes with the subjects' recorded cognitions were transcribed. On the second visit, subjects were asked to classify cognitions reported during the exposure. The subjects classified their cognitions, using the simplified version of Last, Barlow and O'Brien's (1985) classification system. According to this classification system, subjects were instructed to classify their cognitions as catastrophic, escape, negative affect, approach, coping, positive affect, descriptive and irrelevant.

Subjects participated in the group CBT along with the other patients at the clinic. The CBT was conducted by the first author. Six weekly sessions were carried out, each lasting three hours. The treatment strategy was based on a CBT package designed by Evans, Holt and Oei (1991).

The battery of questionnaires administered at pre-treatment was repeated 1, 3, and 6 months after the termination of treatment. The CCQ-M and FQ were administered after each treatment session. A follow-up ambulatory monitoring and cognitive sampling assessment, replicating the initial assessment procedure, was conducted 6 months after the treatment.

Results

Outcome on self report measures

The results from the self-report measures are presented in Table 1. Subject 1 had higher scores at pre-treatment than did Subject 2. Further, this subject showed a marked improvement on subsequent assessments. Subject 2 showed moderate improvement.

https://doi.org/10.1017/S1352465898000289 Published online by Cambridge University Press

https://doi.org/10.1017/S1352465898000289 Published online by Cambridge University Press

Table 1. The subjects' scores and the percentage of change on all the different assessments

Measures	Pre-treatment	Assessments							
		1st session	2nd session	3rd session	4th session	5th session	6th session	1 month FU	3 month FU	6 month FU
Subject 1:										
FQ	76		50 (34.21)	43 (43.42)	39 (48.68)	42 (44.73)	35 (53.94)	26 (65.78)	14 (81.57)	13 (82.89)
FQ Ag	34		26 (23.52)	24 (29.41)	19 (44.11)	22 (35.29)	16 (52.94)	18 (47.05)	6 (82.35)	10 (70.58)
FQ BL	7		8 (14.28)*	5 (28.57)	4 (42.85)	7 (0.00)	5 (28.57)	4 (42.85)	4 (42.85)	0 (100.00)
FQ Soc	35		16 (54.28)	14 (60.00)	16 (54.28)	13 (62.85)	14 (60.00)	4 (88.57)	4 (88.57)	3 (91.42)
FQ Anx/Dep	33		20 (39.39)	20 (39.39)	14 (57.57)	21 (36.36)	22 (33.33)	10 (69.69)	9 (72.72)	8 (75.75)
FQ Severity	6		6 (0.00)	0 (100.00)	3 (50.00)	3 (50.00)	2 (66.66)	1 (83.33)	2 (66.66)	1 (83.33)
BAI	47							8 (82.97)	13 (72.34)	18 (61.70)
STATE	68							28 (58.82)	27 (60.29)	23 (66.17)
TRAIT	75							45 (40.00)	38 (49.00)	36 (48.00)
ACQ	3.78							3.28 (13.22)	2.07 (45.23)	2 (47.08)
BSQ	3.41							2.64 (22.58)	2.35 (31.08)	2.29 (32.84)
CCQ-M	83		46 (44.57)	48 (42.16)	38 (54.21)	45 (45.78)		46 (44.57)	40 (51.80)	47 (43.37)
CCQ-M (F1)	17		7 (58.82)	9 (47.05)	7 (58.82)	7 (58.82)		7 (58.82)	7 (58.82)	7 (58.82)
CCQ-M (F2)	31		20 (35.48)	11 (64.51)	15 (51.61)	14 (54.83)		17 (45.16)	14 (54.83)	20 (35.48)
CCQ-M (F3)	35		19 (45.71)	28 (20)	16 (54.28)	24 (31.42)		22 (37.14)	19 (45.71)	20 (42.85)
Subject 2:										
FQ	29	29 (0.00)	29 (0.00)	23 (20.68)	39 (34.48)*	23 (20.68)	22 (24.13)	27 (6.89)	19 (34.48)	18 (37.93)
FQ Ag	9	12 (25.00)*	10 (11.11)*	8 (11.11)	16 (77.77)*	7 (22.22)	17 (88.88)*	9 (0.00)	5 (44.44)	4 (55.55)
FQ BL	14	13 (7.14)	15 (7.14)*	12 (14.28)	14 (0.00)	14 (0.00)	13 (7.14)	13 (7.14)	3 (50.00)	9 (35.71)
FQ Soc	6	4 (33.33)	4 (33.33)	3 (50.00)	9 (50.00)*	7 (16.66)*	2 (66.66)	5 (16.66)	11 (21.42)	5 (16.66)
FQ Anx/Dep	13	18 (38.46)	20 (53.84)*	17 (30.76)*	20 (53.84)*	14 (7.69)*	15 (15.38)*	18 (38.46)*	7 (46.15)	11 (15.38)
FQ Severity	5	4 (20.00)	4 (20.00)	4 (20.00)	4 (20.00)	4 (20.00)	4 (20.00)	3 (40.00)	3 (40.00)	3 (40.00)
BAI	34							9 (73.52)	9 (73.52)	13 (61.76)
STATE	54							45 (16.66)	42 (22.22)	36 (33.33)
TRAIT	52							53 (1.92)*	47 (9.61)	49 (5.76)
ACQ	3							2.35 (21.66)	2.21 (26.33)	2.07 (31)
BSQ	2.52							2.23 (11.50)	2.05 (18.65)	1.94 (23.01)
CCQ-M	58	51 (2.00)	56 (3.44)	49 (15.51)	55 (5.17)	51 (12.06)	52 (10.34)	50 (13.79)	46 (20.68)	43 (25.86)
CCQ-M (F1)	16	14 (12.50)	15 (6.25)	14 (12.50)	15 (6.25)	15 (6.25)	14 (12.50)	14 (12.50)	14 (12.50)	12 (25.00)
CCQ-M (F2)	24	21 (12.50)	23 (4.16)	20 (20.00)	22 (8.33)	21 (12.50)	20 (20.00)	20 (20.00)	18 (25.00)	17 (29.16)
CCQ-M (F3)	18	16 (11.11)	18 (0.00)	15 (16.66)	18 (0.00)	15 (16.66)	18 (0.00)	16 (11.11)	15 (16.66)	14 (22.22)

Note: = Missing data; * = Score higher than the pre-treatment; FQ Ag, FQ BL, FQ Soc, FQ Anx/Dep and FQ Severity = Subscales of FQ CCQ-M (F1) = Emotional Catastrophes; CCQ-M (F2) = Physical Catastrophes; CCQ-M (F3) = Mental Catastrophes; Percentage of change is in parentheses.

On the cognitive scales (ACQ, BSQ and CCQ-M) the two subjects showed moderate improvement (see Table 1).

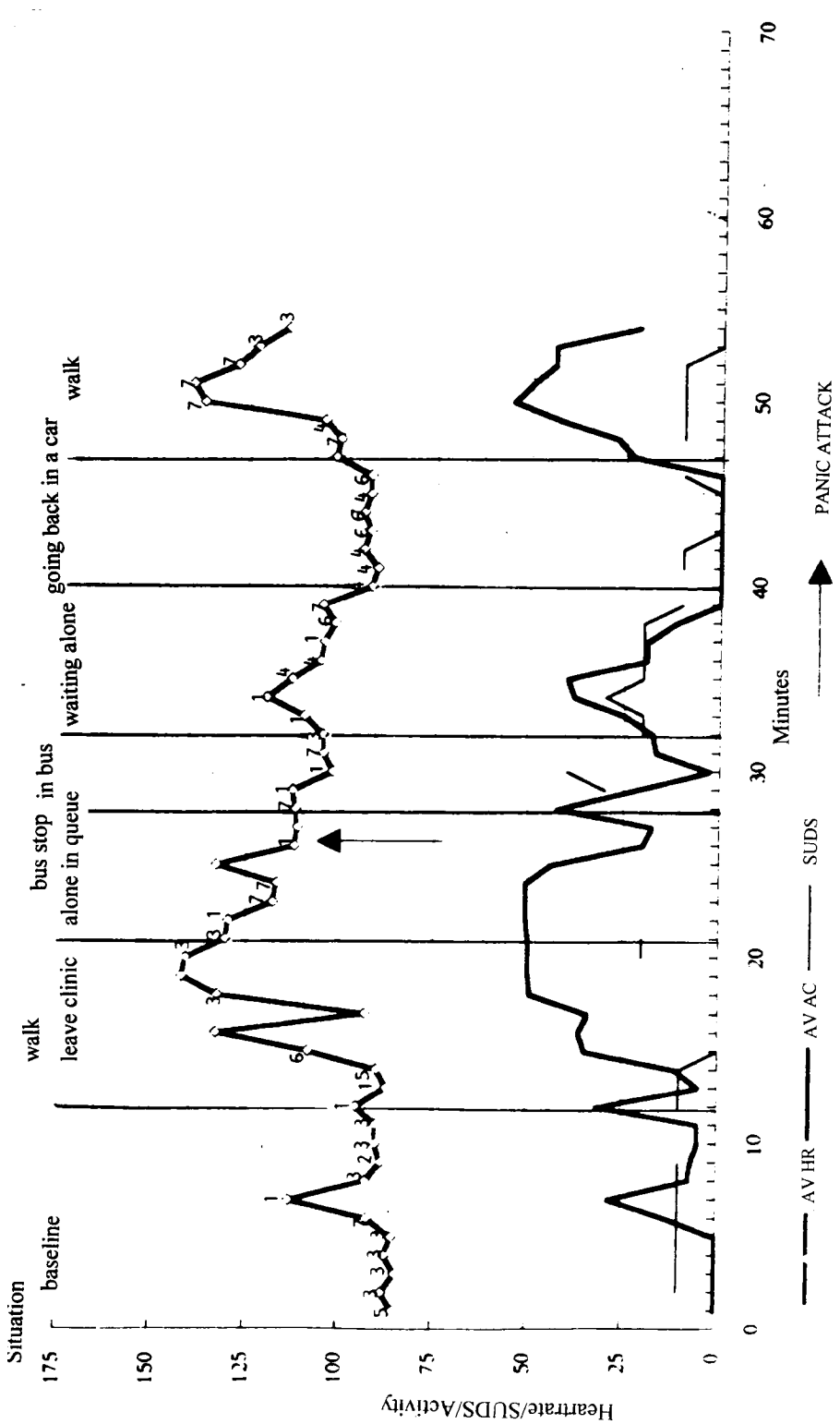
Outcome on ambulatory monitoring and cognitive sampling

The Figures show the first (1A and 1B) and second subject's (2A and 2B) overall responses on ambulatory and cognitive sampling at the pre-treatment and 6 month follow-up assessments. The Figures also reflect the different phases of *in vivo* exposure. Each subject's responses were compared across time. Visual examination of Figure 1A indicates that, during the pre-treatment assessment, subject 1 reported a panic attack whilst in a bus queue. The cognitions at that time were catastrophic. On the other hand, there was no reported panic attack at the follow-up when in a similar situation (Figure 1B). As can be seen from Figure 1A, at pre-treatment assessment the subject's cognitions were of a negative affect type during the baseline period and changed to catastrophic as the situation became more fearful. At the end of the assesssment, positive and neutral cognitions were reported in that situation. Follow-up assessment shows that the cognitions were generally of neutral type (description and irrelevant) (Figure 1B). There were few negative affect and escape cognitions reported when in the situation that was previously extremely anxiety-provoking. SUDS were low and were frequently unreported. As shown by Figures 1A and 1B, heart rate during the pre- and post-treatment assessment appeared to be affected by activity. It was not found to be elevated at the time of panic attack or catastrophic cognitions. However, on a few occasions at pre-treatment, heart rate peaks coincided with the catastrophic cognitions (Figure 1A).

As can be seen from Figure 2A, the second subject reported a panic attack whilst sitting in a small room, a maximum anxiety-provoking situation for her. The cognition at that time was catastrophic. However, exposure to the small room did not provoke a panic attack at the follow-up assessment (Figure 2B). At the pre-treatment assessment, the subject's cognitions, which were generally of descriptive type at baseline, altered to catastrophic as the situation became more phobic. However, cognitions were of a neutral and positive nature during the last few minutes of the assessment. At the follow-up assessment (Figure 2B), cognitions were generally of a positive and neutral nature. The SUDS, which were moderate at the pre-treatment (Figure 2A), decreased at the follow-up assessment (Figure 2B). During the pre-treatment assessment the subject's heart rate fluctuated during the baseline and became steadier in the latter part of the exposure (Figure 2A). At the follow-up her heart rate was generally steady (Figure 2B).

Table 2 presents a fine-grained comparison of the heart rates, activity levels, SUDS and percentages of the different types of cognitions, for the pre-treatment and six month follow-up time points. As can be seen from Table 2, there is some indication of improvement in the first subject's heart rate as a result of treatment. However, in the case of the second subject, mean heart rates, at the two baselines and at the two exposures to the phobic situations, were approximately equal, indicating an absence of change in physiology as a result of treatment (Table 2). As an effect of the treatment, the maximum level of the SUDS decreased by 40% in the case of the second subject. The two subjects' mean physical activity was not different across the two assessments.

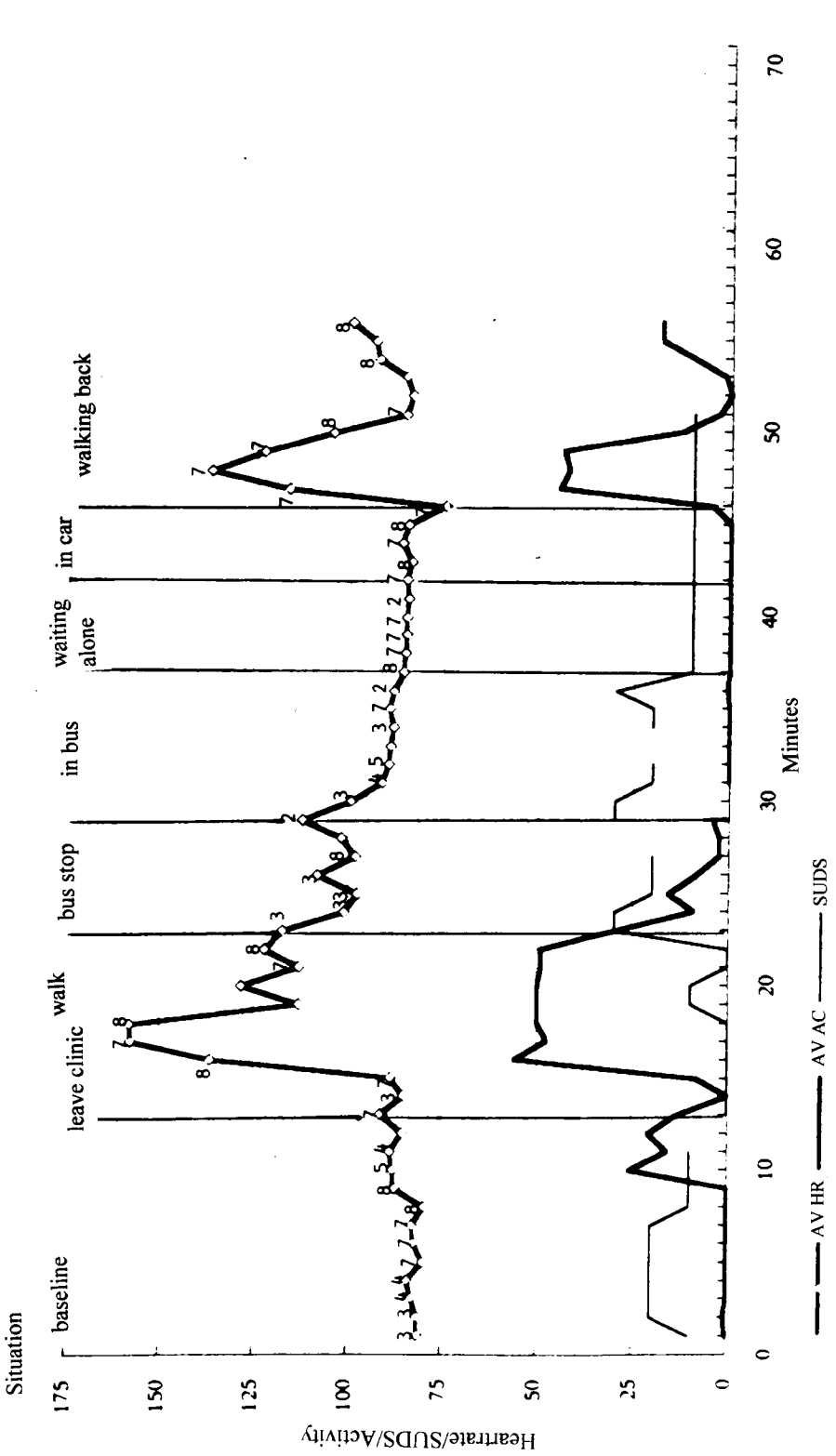
https://doi.org/10.1017/S1352465898000289 Published online by Cambridge University Press



Note: AV HR = average bpm; AV AC = average activity level per minute; SUDS = subjective distress level per minute; activity and SUDS are multiplied by 10; 0–10 minutes = base line; onwards = *in vivo* exposure; cognitions: 1 = catastrophic, 2 = escape, 3 = negative affect, 4 = coping, 5 = approach 6 = positive affect, 7 = description, 8 = irrelevant. Gaps in cognitions and curves showing AV HR, AV AC and SUDS = missing data/no response.

Figure 1A. Subject 1 responses at pre-treatment *in vivo* assessment

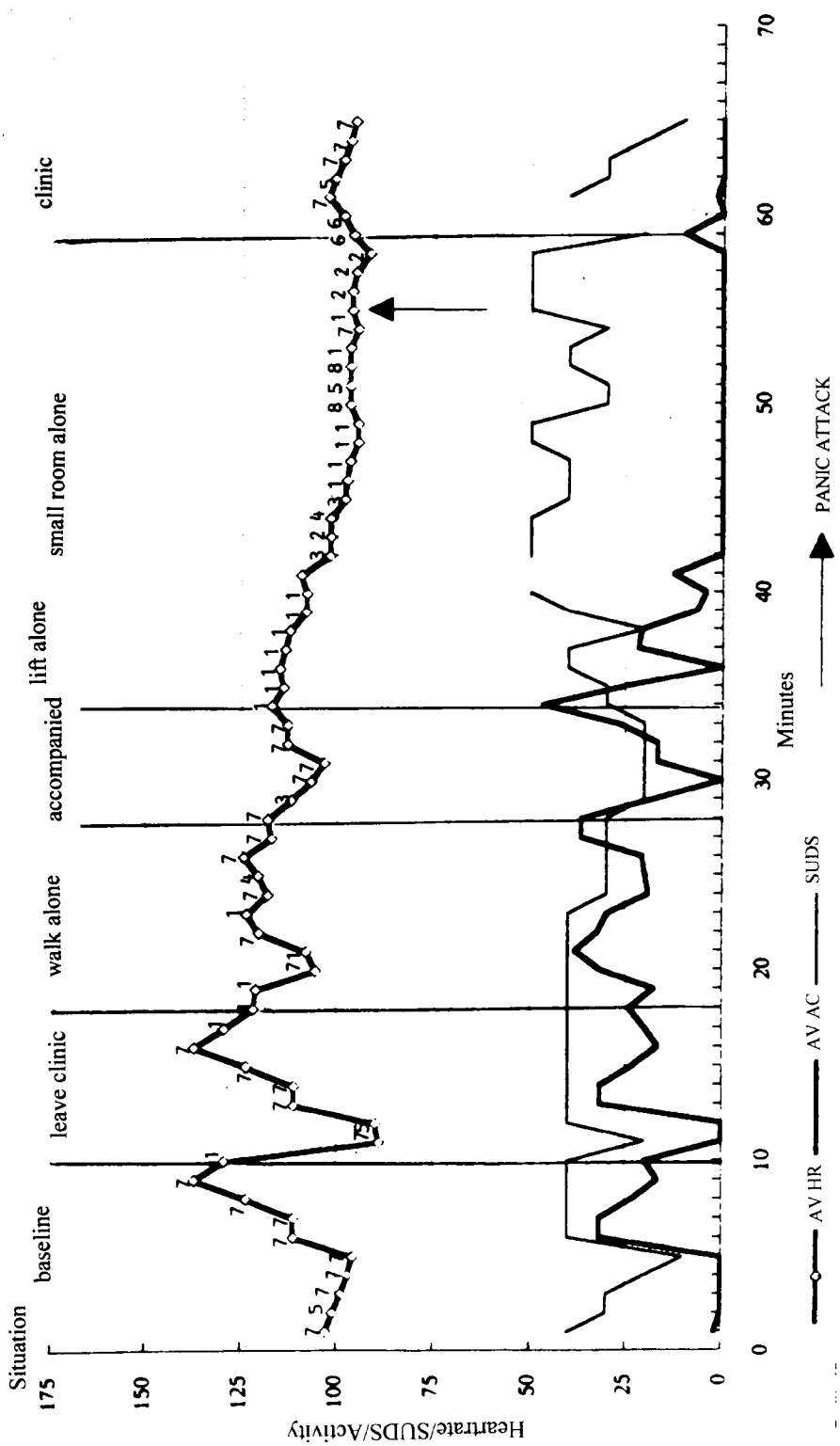
https://doi.org/10.1017/S1352465898000289 Published online by Cambridge University Press



Note: AV HR = average bpm; AV AC = average activity level per minute; SUDS = subjective distress level per minute; activity and SUDS are multiplied by 10; 0–10 minutes = base line; onwards = *in vivo* exposure; cognitions: 1 = catastrophic, 2 = escape, 3 = negative affect, 4 = coping, 5 = approach 6 = positive affect, 7 = description, 8 = irrelevant. Gaps in cognitions and curves showing AV HR, AV AC and SUDS = missing data/no response.

Figure 1B. Subject 1 responses at follow-up *in vivo* assessment

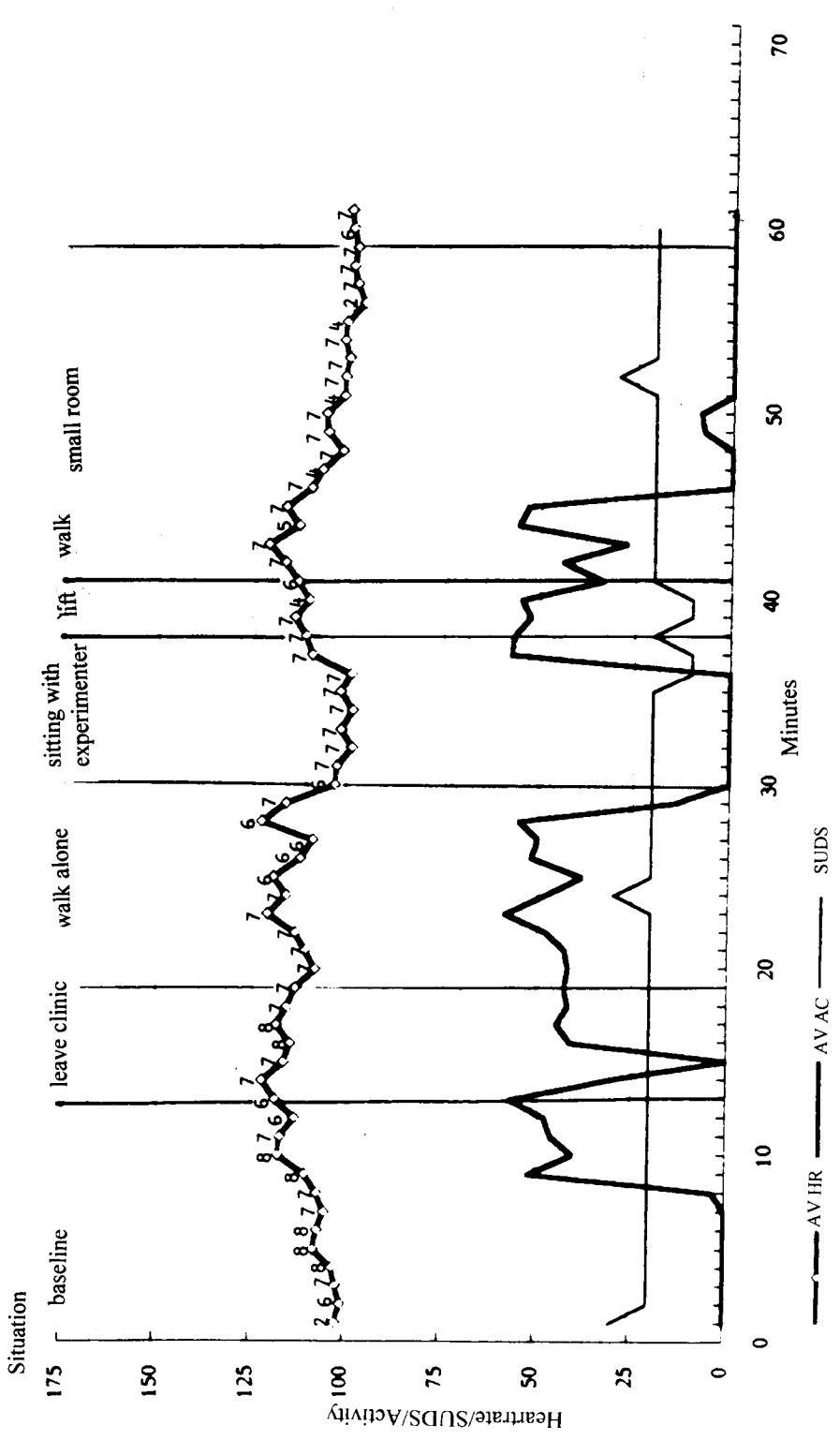
https://doi.org/10.1017/S1352465898000289 Published online by Cambridge University Press



Note: AV HR = average bpm; AV AC = average activity level per minute; SUDS = subjective distress level per minute; activity and SUDS are multiplied by 10; 0–10 minutes = base line; onwards = *in vivo* exposure; cognitions: 1 = catastrophic, 2 = escape, 3 = negative affect, 4 = coping, 5 = approach 6 = positive affect, 7 = description, 8 = irrelevant. Gaps in cognitions and curves showing AV HR, AV AC and SUDS = missing data/no response.

Figure 2A. Subject 2 responses at pre-treatment *in vivo* assessment

https://doi.org/10.1017/S1352465898000289 Published online by Cambridge University Press



Note: AV HR = average bpm; AV AC = average activity level per minute; SUDS = subjective distress level per minute; activity and SUDS are multiplied by 10; 0–10 minutes = base line; onwards = *in vivo* exposure; cognitions: 1 = catastrophic, 2 = escape, 3 = negative affect, 4 = coping, 5 = approach 6 = positive affect, 7 = description, 8 = irrelevant. Gaps in cognitions and curves showing AV HR, AV AC and SUDS = missing data/no response.

Figure 2B. Subject 2 responses at follow-up *in vivo* assessment

https://doi.org/10.1017/S1352465898000289 Published online by Cambridge University Press

Table 2. Comparison of heart rates, Activity levels, SUDS and cognitions at pre-treatment and follow up

	Pre-treatment	Follow-up
Subject 1:		
Mean heart rate at baseline	90.72 (7.84)	83.53 (3.20)
Mean heart rate at the maximum anxiety provoking situation	115.75 (10.35)	87.56 (3.94)
Minimum mean heart rate	85.00	75.00
Maximum mean heart rate	142.00	158.00
Minimum mean activity	0.00	0.00
Maximum mean activity	5.50	5.80
Minimum SUD	0.00	0.00
Maximum SUD	2.00	3.00 (50%#)
Cognitions		
Catastrophic	18.51%	0.00%
Escape	3.70%	5.35%
Negative affect	24.07%	16.07%
Coping	12.96%	7.14%
Approach	3.70%	3.57%
Positive affect	9.25%	0.00%
Description	18.51%	32.14%
Irrelevant	0.00%	21.42%
Subject 2:		
Mean heart rate at baseline	108.81 (15.26)	107.66 (5.61)
Mean heart rate at the maximum anxiety provoking situation	98 (3.95)	105.47 (6.98)
Minimum mean heart rate	89.00	97.00
Maximum mean heart rate	137.00	123.00
Minimum mean activity	0.00	0.00
Maximum mean activity	4.70	5.80
Minimum SUD	1.00	1.00
Maximum SUD	5.00	3.00 (40% @)
Cognitions		
Catastrophic	29.23%	0.00%
Escape	6.15%	3.27%
Negative affect	4.61%	0.00%
Coping	3.07%	4.91%
Approach	7.69%	1.63%
Positive affect	3.07%	16.39%
Description	43.07%	59.01%
Irrelevant	3.07%	11.47%

Note: SD is in parentheses: # = % of increase in SUDS: @ = % of decrease in SUDS.

Marked changes in the percentages of cognitions, reported by the subjects at the two time points, are summarized in Table 2. As can be seen, the percentage of catastrophic cognitions reported by the two subjects dropped to zero at the follow-up. Another salient feature was the reduction in negative affect cognitions after the treatment. Descriptive and irrelevant cognitions increased at the follow-up. Few cognitions with a theme of escape, coping and approach were reported at both assessments. The first

https://doi.org/10.1017/S1352465898000289 Published online by Cambridge University Press

subject reported positive affect cognitions only at pre-treatment. However, in the case of the second subject those that were present at the two assessments increased at follow-up.

Discussion

Clinical improvement occurred in the cognitions, physiology and anxiety symptoms of the subjects as a result of CBT. This outcome was successfully assessed by different procedures. With reference to the cognitions, moderate improvement in the case of subject 1 and mild improvement in the case of subject 2 was demonstrated by the cognitive scales. Further, the findings indicated an outstanding cognitive improvement on the *in vivo* assessment as a result of the CBT. Catastrophic cognitions appeared to be the principal feature of the panic attacks experienced at the pre-treatment assessment. A total absence of these cognitions at the follow-up indicated that the internal or external cues were not misinterpreted as dangerous (see Figures 1B and 2B). This may have contributed to the absence of panic attacks after the treatment. However, the presence of other negative cognitions indicated that exposure at the follow-up was still regarded as an unpleasant experience. A high number of neutral thoughts related to the situation or to a wide range of other topics reported at the follow-up, indicates a decrease in hypervigilance for the panic-related somatic sensations. Marked improvement in the symptoms of anxiety, panic and phobia were indicated by the self-report measures. The data obtained by the ambulatory monitoring highlighted the subjects' physiological and anxiety responses. A marked improvement was recorded in the heart rate of the first subject. Subject 1's heart rate appeared to increase at the time of high anxiety. This physical arousal may have acted as a trigger for catastrophic misinterpretation. However, it is important to note that as subject 1 was, in general, physically active during the ambulatory monitoring, it is unclear to what extent the heart rates were confounded by physical activity. No clearcut change in the heart rate appeared in the case of the second subject.

In summary, the present study has provided empirical evidence that the frequency and intensity of catastrophic cognitions is successfully reduced by CBT. This decrease in catastrophic cognitions, which has been effectively measured by cognitive sampling and the CCQ-M, sheds light on the underlying cognitive changes as an effect of therapy (Oei et al., in press; Khawaja & Oei, 1998). Application of cognitive sampling in the *in vivo* setting has been demonstrated as a valuable procedure to monitor the change in spontaneous catastrophic cognitions as a result of therapy. However, this procedure appears more effective and practical in the detailed study of the cognitions of small sample sizes. In contrast, the CCQ-M, a paper and pencil measure, can be used with large samples. It is important to note that the results of this study are based on only two cases with only simple AB design. Further replication with more complex design is needed.

Acknowledgements

We would like to thank the patients for their participation in the study. Dr Khawaja on leave from University of Punjab, Lahore was supported by the Pakistan government. This paper was partially supported by a grant from NH&MRC. Professor Oei is also Team Leader, Cognitive Behaviour Therapy Unit, Toowong Private Hospital.

https://doi.org/10.1017/S1352465898000289 Published online by Cambridge University Press

References

Evans, L., Holt, C., & Oei, T. P. S. (1991). Long term follow-up of agoraphobics treated by brief intensive group cognitive behavioral therapy. *Australian and New Zealand Journal of Psychiatry*, *25*, 343–399.

Khawaja, N. G., & Oei, T. P. S. (1998). Catastrophic cognitions in panic disorder with or without agoraphobia: A review. *Clinical Psychology Review*, *8*, 341–365.

Khawaja, N. G., Oei, T. P. S., & Baglioni, A. J. (1995). Modification of the catastrophic cognitions questionnaire (CCQ-M) for normals and patients: Exploratory and LISREL analyses. *Journal of Psychopathology and Behavioral Assessment*, *15*, 325–342.

Last, C. G., Barlow, D. H., & O'Brien, G. T. (1985). Assessing cognitive aspects of anxiety: Stability and agreement between several methods. *Behavior Modification*, *9*, 72–93.

Oei, T. P. S., Llamas, M., & Devilly, G. (in press). The efficacy and cognitive process of cognitive behaviour therapy in the treatment of panic disorder with agoraphobia. *Behavioural and Cognitive Psychotherapy*.

Salkovskis, P. M. (1988). Phenomenology, assessment, and the cognitive model of panic. In S. Rachman & J. D. Maser (Eds.), *Panic: Psychological perspectives* (pp. 111–136). New York: Erlbaum.

https://doi.org/10.1017/S1352465898000289 Published online by Cambridge University Press