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THE EFFICACY AND COGNITIVE PROCESSES OF COGNITIVE BEHAVIOUR THERAPY IN THE TREATMENT OF PANIC DISORDER WITH AGORAPHOBIA

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Abstract. The present paper aimed (1) to review the literature to examine the effectiveness of CBT as treatment for PDA and (2) to evaluate whether the efficacy of CBT treatments is related to the change to cognitive processes that are postulated to be important in the cognitive models of PDA. A literature review of CBT studies in the area of PDA was conducted using both descriptive and quantitative (meta-analysis) procedures. In all, 35 studies published between 1969 and 1996 were included. The results show that CBT is an effective treatment for PDA. However, the contribution of cognitive processes to this disorder and the role that they play in the successful outcome of CBT remain unclear and in need of further empirical investigation. At present, CBT treatment provides limited support to validate the cognitive models of PDA.

Keywords: Panic disorders, agoraphobia, psychotherapy, treatment, anxiety disorders.

Introduction

Cognitive behaviour therapy (CBT) is becoming increasingly more popular in the treatment of anxiety disorders. This marked growth of interest in the use of CBT with anxiety disorders has, to a large extent, been due to an increasing awareness of the importance of cognitive processes in these and other emotional disorders (Emmelkamp, 1982; Free & Oei, 1989; Oei, Duckham, & Free, 1989; Oei, Lim, & Young, 1991; Powell & Oei, 1991; Oei & Free, 1995; Oei & Shuttlewood, 1996). One anxiety disorder that has received particular attention has been agoraphobia with panic attacks (APA, 1980) or panic disorder with agoraphobia (PDA) (APA, 1987, 1994). This condition refers to a well recognized clinical syndrome encompassing panic attacks, phobic anxiety and avoidance, as well as anticipatory anxiety or fear of panic. The central notion of CBT is the idea that cognitions and information processing, in particular catastrophic cognitions, are central in the causation and maintenance of PDA (Clark, 1988; Lang, 1988; Rapee, 1987; Salkovskis, 1988; Khawaja & Oei, 1998). Consequently, many consider that therapy should involve the utilization of cognitive techniques to modify maladaptive catastrophic cognitions and to produce psychological and behavioural changes,

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while others may view any intervention as being able to create cognitive shifts (see Chambless & Gillis, 1993 and Khawaja & Oei, 1998 for reviews).

Two issues that require further attention relate to the efficacy and underlying processes (or assumptions) of CBT in the treatment of PDA. While various reviews have examined the efficacy of CBT in the treatment of depression (Oei & Free, 1995), social phobia (Heimberg, 1989) and alcohol dependence (Oei et al., 1989), there are currently few extensive reviews of the relevance of CBT for panic disorder without agoraphobia (e.g. Beamish, Granello, Granello, McSteen, et al., 1996) or for PDA. This is surprising given that PDA is one of the most debilitating conditions amongst the anxiety disorders (see Barlow, l988). Consequently, this review will seek first to examine whether CBT is an efficacious treatment for PDA.

In addition, several cognitive models of causative processes have been highlighted in the literature in relation to PDA (see Rachman & Maser, 1988, Khawaja & Oei, 1998). Beck (1988), for example, claims that PDA is precipitated by danger signals that are based on the interpretation of internal sensations as indicative of heart attack and dying. Similarly, Clark (1988) and Rapee (1986, 1987) propose that panic disorder originates from the catastrophic interpretations of certain bodily sensations; for example, perceiving palpitations as evidence of impending heart attack or racing thoughts as evidence of going crazy. Additionally, Lang (1988) views PDA in the context of a faulty information processing system designed to control the pattern, sequence and timing of behaviour. However, irrespective of how one conceptualizes the role of cognitions in PDA, adherents of cognitive theories of this disorder commonly hold cognitive variables to be of primary importance (see Khawaja & Oei 1998 for a review). As a result, the assumption has implicitly or explicitly been made that cognitions cause and maintain PDA. Consequently, there is a belief among clinicians that demonstrations of the efficacy of CBT treatments for PDA will provide the evidence required to confirm the cognitive models of such psychopathology. Such an inference has been argued by Oei et al. (1989, 1995) to be invalid. To date, there is no systematic review of empirical evidence to support this assumption in the literature. The second aim of the paper, therefore, is to examine whether the CBT literature supports the cognitive models of PDA.

CBT and panic disorder with agoraphobia: overview of studies

Two computer searches of the literature on CBT and PDA were conducted to identify the relevant papers in this area during the periods 1969 to 1989 and 1990 to 1996. Two major data bases, PsycLit CD and Carl online, were searched, using the keywords *panic disorder*, *agoraphobia*, *treatment* and *outcome*. On the search from 1990 to 1996, 45 papers were highlighted. Studies employing CBT were included in the review if the CBT had been applied to subjects who met the criteria for agoraphobia with panic attacks (APA, 1980), or PDA (APA, 1987, 1994), or who would have met either of these criteria had they been applied. Studies were excluded if they were a sub-set of an already included study, a review of the literature, or written in a language other than English.

In all, 35 empirical studies that fulfilled the above criteria were identified. However, this is not to infer that the current review is exhaustive; indeed, considering the rapid rate of research within this area, even if it were exhaustive by the time of going to press

this status would have changed. Rather, this paper aims to provide an indication of the trend to non-researchers who may have neither the time nor the resources to investigate this particular area in any depth, and to produce an estimate of the research climate so that our comments can be appreciated with this backdrop. Table 1 summarizes these studies.

It can be seen from Table 1 that a number of research groups have been involved in conducting studies that meet the criteria outlined above. In total, 1317 patients have been studied. Of the studies which delineated between gender, 761 out of 948 (80.27%) patients were female. This figure is consistent with reports in the literature that PDA is more frequently diagnosed in women (e.g. Oei, Wanstall, & Evans, 1990).

Several research designs have been employed in the studies listed in Table 1 including: (a) group comparison (e.g. Ascher, Schotte, & Grayson, 1986); (b) single case-study (e.g. de Voge, Minor, & Karoly, 1981); (c) multiple baseline across subjects (e.g. Last, Barlow, & O'Brien, 1984); (d) post hoc design (Chambless & Williams, 1995); (e) cross-over (e.g. Emmelkamp, Kuipers, & Eggeraat, 1978); (f) sequential staggering of treatment conditions (e.g. Ascher, 1981) and (g) time series and repeated measures (e.g. Salkovskis, Jones, & Clark, 1986). Seventeen studies used randomization as part of their research design and only four studies included a clean control group.

A number of CBT approaches are represented by the studies in Table 1 including: cognitive restructuring and training, self-statement training, paradoxical intervention, covert rehearsal of coping with anxiety, reattribution of somatic symptoms, coping thoughts training, thought stopping, breathing and relaxation training and variations of prolonged exposure. Twenty studies investigated the effects of CBT on PDA but did not include other treatment comparison groups in their evaluations. The remaining studies, however, did attempt to compare CBT to other forms of therapy (e.g. exposure alone, fluvoxamine, etc.) or to varying versions of CBT itself.

With regard to outcome measures, eight studies employed few such measures while the remainder tended to employ large and comprehensive assessment batteries. Fewer still included physiological as well as cognitive and behavioural assessments as part of their outcome measures. Thus there are only a limited number of studies available that take into account the tripartite (cognitive, behavioural and physiological) nature of PDA in their assessments. Furthermore, there is a large variability and lack of agreement that exists amongst researchers regarding the assessment techniques and instruments used when researching PDA. Clearly, more agreement and consistency in assessment strategies needs to exist if comparisons of results across future studies is to be made easier. Additionally, future researchers need to take more account of the "triple response" nature (Himadi, Boice, & Barlow, 1985) of PDA in their assessments.

Finally, Table 1 also shows that most studies, with the exception of eight (Ascher, 1981; Ascher et al., 1986; Barlow, O'Brien, & Last, 1984; Marchione et al., 1987; Michelson, Mavissakalian, Marchione, Dancu, & Greenwald, 1990; de Beurs, Lange, Koele, & van Dyck, 1993; de Beurs, Lange, van Dyck, & Koele, 1995; Hoffart, 1995), included follow-up periods as part of their investigations. These reported follow-up periods ranged between 1 to 16 months and one study of 9 years.

The efficacy of CBT in the treatment of panic disorder with agoraphobia

In an attempt to answer the question of whether CBT is efficacious in the treatment of PDA, this section will analyse the available literature in two ways. Firstly, the different

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Table 1. Summary of CBT studies on panic disorder with agoraphobia

Study Number/Author	Design & subjects	Treatment groups	Outcome measures	F/up	Cognitive measure used?	Change in cognitive measure post/f-up	Outcome and comments
1. Ascher (1981)	9 females 1 male Group comparison Multiple baseline Sequential staggering of treatments	1. CBT (GE + PI) 2. CBT (PI)	Behavioural	None	No	NA	CBT effective 2 > 1
2. Ascher, Schotte, & Grayson (1986)	13 females 2 males Randomized group comparison	1. CBT (PI) 2. CBT (PI + English patient) 3. CBT (EP)	Behavioural	None	No	NA	CBT effective 2 > 1 > 3
3. Barlow, Mavissakalian, & Hay (1981)	6 females and husbands Group comparison	1. CBT (CR + CC + GE) with husbands	Fear/avoidance; Marital state	6–16 months	No	NA	CBT effective
4. Barlow, O'Brien, & Last (1984)	28 females and husbands Randomized group comparison	1. CBT (CST + PI + CR + GE) with husbands 2. CBT (CST + PI + CR + GE) without husbands	Panic; Fear/avoidance; Severity/intensity; General symptoms; Behavioural; Depression; Marital state; Composite	None	No	NA	CBT effective 1 > 2
5. Beck, Stanley, Baldwin, Deagle, & Averill (1994)	52 females 18 males Randomized group comparison	1. CBT (CR) 2. CBT (RT) 3. Minimal contact control	Panic; Fear; Severity/ intensity; Anxiety; Social anxiety; Cognitive; Physiological; Depression;	1, 3 and 6 month	Yes	1. +/ + 2. +/ + 3. -	CBT effective. 1 and 2 > 3. Support for 1 > 2 on specific cognitive changes, although not strongly
6. Bouchard et al. (1996)	24 females 4 males Random group comparison	1. CBT (interceptive & exteroceptive exposure) 2. CBT (CR)	Panic; Fear/avoidance; Anxiety; Cognitive; Self-efficacy; Depression; Endstate funct.	6 month	Yes	1. +/ + 2. +/ +	CBT effective 1 and 2 produce change over time. 1 = 2
7. Chambless, Goldstein, Gallagher, & Bright (1986)	30 females 5 males Group comparison controls	1. CBT (PI + TS + CR + GT + YB + SR + FST + GE) 2. WLC	Panic; Fear/avoidance; Anxiety; Social anxiety; Cognitive; Depression; Marital state; Assertiveness	6 month	Yes	1. +/ + 2. NA/NA	CBT effective 1 > 2
8. Chambless & Williams (1995)	65 females 10 males African American vs White (post hoc design)	Post hoc with various CBT treatments. All included GE	Panic; Fear/avoidance; Severity/intensity; Behavioural; Depression	6 month	Yes	+	CBT (*in vivo* exposure) effective. Black patients improved less on measures of phobia
9. de Beurs, Lange, van Dyck, & Koele (1995)	$N = 32$ (sex not specified)	1. CBT (BT + GPE)	Panic; Fear/avoidance; General symptom; Behavioural; Depression	3 and 6 month	No	NA	CBT effective. Higher pre-treatment agoraphobic complaints, use of psychotropic medication & longer duration of disorder associated with poorer outcome

10. de Beurs, Van Balkom, Lange, Koele, & van Dyck (1995)	*N* = 96 (sex not specified) Randomized group comparison	1. Fluvoxamine + GPE 2. Placebo + GPE 3. CBT (BT + GPE) 4. GPE	Panic; Fear/avoidance; Severity/intensity; General symptom; Depression; Endstate funct.	No	Yes	1. + 2. + 3. + 4. +	1, 2, 3, 4 effective 1 > 2, 3, 4 2, 3 and 4 equally effective
11. de Beurs, Lange, Koele, & van Dyck (1993)	*N* = 28 (sex not specified)	1. CBT (BT + GPE)	Panic; Fear/avoidance; Behavioural; Endstate funct.	None	No	NA	CBT effective
12. de Voge, Minor, & Karoly (1981)	1 male Single case Sequential adding of treatments	1. CBT (RT + SST + CR + IF)	Severity/intensity	16 month	Yes	1. +/ NR	CBT effective
13. Emmelkamp, Kuipers, & Eggeraat (1978)	20 females and males Randomized cross-over Group comparison	1. CBT (CR) 2. PE	Fear/avoidance; Anxiety; Behavioural; Locus of control; Depression; Assertiveness	1 month	No	NA	1 and 2 effective 2 > 1
14. Emmelkamp & Mersch (1982)	22 females 5 males Group comparison	1. PE 2. CBT (CR) 3. CBT (SST + PE)	Fear/avoidance; Anxiety; Behavioural; Locus of control; Depression; Assertiveness	1 month	No	NA	1, 2 and 3 effective 1 and 3 > 2 at post-treatment 1 = 2 = 3 at F/Up
15. Fava, Zielezny, Savron, & Grandi (1995)	*N* = 93 (sex not specified)	1. CBT (exposure *in vivo* only)	Panic; Fear/avoidance	2–9 years	No	NA	81 became panic free by post-treatment. Continued remission rates = 96.1% for > 2 years, 77.6% > 4 years and 67.4% > 7 years
16. Hoffart (1995)	*N* = 52 (sex not specified) Randomized group comparison	1. CBT (CT) 2. CBT (Guided Mastery)	Panic; Fear/avoidance; Severity/intensity; Anxiety; Social anxiety; Behavioural; Cognitive; Self-efficacy; Depression; Endstate funct.	No	Yes	1. + 2. +	CBT effective. 1 produced greater change on ACQ than 2. Sig. more patients in 1 attained a high endstate functioning on fears. However, while no overall sig. difference between 1 and 2 on continuous outcome measures, analyses showed CT to improve more consistently across measures
17. Keijsers, Hoogduin, & Schaap (1994)	44 females 16 males	1. CBT (SIT + GE)	Panic; Fear/avoidance; Anxiety; Cognitive; Depression; Marital state	2 month	Yes	+ /+	CBT effective. Catastrophic cognitions best predictor of poor outcome. Patients affected by maladaptive cognitions improved less with behavioural intervention
18. Last, Barlow, & O'Brien (1984)	5 females 1 male Matched to severity of disorder Multiple baseline	1. GE 2. CBT (SST + GE)	Fear/avoidance; Severity/intensity; Behavioural; Cognitive; Physiological	1 month	Yes	1. Variable/variable 2. Variable/variable	Treatment effectiveness variable across patients
19. Mackay & Liddell (1986)	11 females 3 males Half of the patients matched for mode of responding to treatment	1. CBT (CT + E) matched group 2. CBT (CT + E) non-matched group 3. RT + E matched group 4. RT + E non-matched group	General symptom; Cognitive	6 month	Yes	NR/+	1, 2, 3 and 4 effective. 1 and 4 > 2 and 3; 1 > 2; 4 > 3 post-treatment 3 and 4 > 1 and 2 at F/Up

Table 1. Continued

Study Number/Author	Design & subjects	Treatment groups	Outcome measures	F/up	Cognitive measure used?	Change in cognitive measure post/f-up	Outcome and comments
20. Marchione, Michelson, Greenwald, & Dancu (1987)	14 females Randomized group comparison	1. GE 2. RT + GE 3. CBT (CT + GE)	Panic; Fear/avoidance; Severity/intensity; Anxiety; General symptom; Behavioural; Cognitive; Physiological; Depression; Composite	No	Yes	1. NS/ NR 2. +/ NR 3. +/ NR	1, 2 and 3 effective 2 and 3 > 1
21. Marks et al. (1993)	117 females 27 males Randomized	1. Alprazolam + guided exposure 2. Alprazolam + relaxation 3. Placebo + guided exposure 4. Placebo + relaxation	Panic; Fear/avoidance; Severity/intensity; Anxiety; Depression	6 month	No	NA	1, 2, 3 and 4 all improved throughout. 1 improved gains during tx, but impaired improvement thereafter. Exposure had twice the effect size of alprazolam and tx gains maintained at follow-up, unlike alprazolam. Relapse likely after alprazolam stopped
22. Mavissakalian, Michelson, Greenwald, Kornblith, & Greenwald (1983)	24 females and males Randomized group comparison	1. CBT (SST + E) 2. CBT (PI + E)	Fear/avoidance; Severity/intensity; Anxiety; Behavioural; Cognitive; Depression	1 and 6 month	Yes	1. +/ NR 2. +/ NR	1 and 2 effective 2 > 1 at post-treatment; 2 = 1 at F/Up
23. Michelson, Mavissakalian, & Marchione (1985)	27 females 4 males Randomized group comparison	1. GE 2. CBT (PI + SDP) 3. RT + SDP	Panic; Fear/avoidance; Severity/intensity; Anxiety; Behavioural; Physiological; Locus of control; Depression; Assertiveness; Composite	3 month	No	NA	1, 2 and 3 effective 1 > 3 > 2
24. Michelson, Mavissakalian, Marchione, Dancu, & Greenwald (1986)	27 females 4 males Randomized group comparison	1. GE 2. CBT (PI + SDP) 3. RT + SDP	Fear/avoidance; Severity/intensity; Behavioural; Depression; Composite	3 month	No	NA	1, 2 and 3 effective
25. Michelson, Mavissakalian, & Marchione (1988)	57 females 16 males Randomized group comparison	1. GE 2. CBT (PI + SDP) 3. RT + SDP	Panic; Fear/avoidance; Severity/intensity; Anxiety; General symptom; Behavioural; Locus of control; Depression; Marital state; Assertiveness; Composite	3 month	No	NA	1, 2 and 3 effective 1 = 2 = 3
26. Michelson et al.	6 females 4 males	1. CBT (CT + RT)	Panic; Fear/avoidance;	No			

27. O'Brien (1979)	1 female 1 male Single cases	1. CBT (TS)	Severity/intensity	12 month	No	NA	CBT effective
28. Ollendick (1995)	3 female adolescents 1 male adolescent Multiple base line single cases design	1. CBT (SIT + GE + CT)	Panic; Fear/avoidance; Anxiety; Self-efficacy; Depression	6 month	No	NA	CBT effective with adolescents with PDA
29. Ost, Westling, & Hellstrom (1993)	30 females 15 males Randomized	1. GE 2. RT 3. CT (self-talk + attribution training + CR)	Fear/avoidance; Anxiety; Behavioural; Cognitive; Depression	12 month	Yes	1. +/+ 2. +/+ 3. +/+	CBT effective. 1, 2 and 3 all improved by post tx and maintained improvement at follow-up
30. Salkovskis, Clark, & Hackmann (1991)	$N = 7$ (sex not specified) Multiple baseline	1. Focal CT 2. Non-focal CT	Panic; Cognitive	4 week	Yes	1. +/+ 2. −/NA	Cognitive techniques aimed at misinterpretations of bodily sensations reduce panic, yet cognitive procedures not targeting this don't
31. Salkovskis, Jones, & Clark (1986)	9 females 1 male Matched group	1. CBT (RASS + BT)	Panic; Depression	6 month	No	NA	CBT effective
32. Sharp et al. (1996)	115 females 32 males Randomized group comparison	1. Fluvoxamine 2. Placebo 3. F + CBT 4. P + CBT 5. CBT	Panic; Fear/avoidance; Severity/intensity; Anxiety; Depression	6 month	No	NA	CBT effective. All active tx groups improved. CBT groups preserved tx gains better over time. F + CBT improved quicker
33. Swinson, Fergus, Cox, & Wickwire (1995)	37 females 5 males Randomized	1. Telephone CBT (GE) 2. WLC	Fear/avoidance; Severity/intensity; Anxiety; General symptom; Depression	3 month and 6 month	No	NA	CBT effective. Exposure based treatment (1) improved (and maintained at f/up). Wait list did not improve and then once treated with 1 improved
34. Taylor, Woody, Koch, McLean, & Anderson (1996)	16 females 6 males Group design by suffocation panickers or non suffocation panickers (PD criteria the only necessity)	1. CBT	Panic; Fear/avoidance; Anxiety	3 month	No	NA	CBT effective at post-treatment and follow-up for both suffocation and nonsuffocation panickers
35. Williams & Rappoport (1983)	20 females Randomized group comparison	1. CBT (CTT + GE) 2. GE	Anxiety; Behavioural; Cognitive	3 to 5 months	Yes	1. +/NR 2. +/NR	CBT effective

Key: ACQ = agoraphobic cognitions questionnaire; BT = breathing training; CC = covert rehearsal of coping with anxiety; CR = cognitive restructuring; CT = cognitive therapy; CTT = coping thoughts training; CST = coping self-statement training; E = exposure; EP = enhancement procedures; F = fluvoxamine; FST = family systems therapy; F-Up = follow-up; GE = graduated exposure; GPE = graduated prolonged exposure; GT = gestalt therapy; IF = interpersonal feedback; NA = not applicable; NR = not reported; OESF/I = operationalized measures of endstate functioning and improvement; P = placebo; PE = prolonged exposure; PI = paradoxical intervention; RASS = reattribution of somatic symptoms; RT = relaxation training; SDP = self-directed practice; SIT = stress inoculation training; SR = self-reinforcement; SUSs = subjective units of discomfort scale; TS = thought stopping; WLC = wait list control; YB = yogic breathing.

Table 2. Statistical improvement, within domains, by study

Measures	Improved by post-tx and/or follow-up	No improvement
Panic	4, 5, 6, 7, 8, 9, 10, 11, 15, 16, 17, 20, 21, 23, 25, 26, 28, 30, 31, 32, 34	
Fear and avoidance	3, 4, 5, 6, 7, 8, 9, 10, 11, 13, 14, 15, 16, 17, 18, 20, 21, 22, 23, 24, 25, 26, 28, 29, 32, 33, 34	
Severity/intensity	5, 8, 10, 12, 16, 18, 20, 21, 22, 23, 24, 25, 26, 27, 32, 33	
General anxiety	5, 6, 7, 14, 16, 17, 21, 22, 23, 25, 26, 28, 29, 32, 33, 34, 35	13, 20
Social anxiety	7, 16, 26, 29	5
General symptomatology	4, 5, 9, 10, 19, 20, 25, 26, 33	20
Behavioural	1, 2, 8, 9, 10, 11, 13, 14, 16, (18), 20, 23, 25, 29, 35	22
Cognitive	5, 6, 7, 8, 10, 16, 17, 26, 29, 20, 22, 26, 29, 30, 35	18
Physiological	5, 18, 20, 23, 26	5, 18
Locus of control	6, 13, 14, 16, 23, 25, 28	
Depression	4, 5, 6, 7, 8, 9, 10, 13, 14, 16, 17, 20, 21, 22, 23, 24, 25, 26, 28, 29, 31, 32, 33	
Marital state	3, 17, 25, 26	3
Assertiveness	7, 14, 23, 25	13
Endstate functioning	4, 5, 6, 10, 11, 16, 20, 23, 24, 25	

Note: Where a study found significant reduction within a domain on one measure and not on another, it has been entered in both categories of improved and not improved. Any study in brackets ( ) signifies mixed results.

types of outcome measures that have been employed by the studies in Table 1 will be reviewed, in order to determine whether CBT was associated with any significant change in these. Secondly, a meta-analysis of those studies in Table 1 reporting data on the Fear Questionnaire will be conducted. To the extent that CBT is an effective treatment of PDA, one would expect the results of both of these analyses to converge towards supporting such a conclusion.

Analysis of outcome measures

A number of outcome measures (domains) were employed by the studies in Table 1. These will be discussed in terms of whether CBT was associated with any significant change in each of them or not. Table 2 lists the results of the studies that report outcome data on the various domains.

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Panic measures

Of the 35 studies reported in Table 1, 60% reported outcome from measures of panic. Of these 100% reported improvement by post-treatment and/or follow-up (see Table 2). Hence CBT has consistently been associated in the PDA literature with significant and positive changes on a variety of panic measures both at post-treatment and for up to 6 months follow-up, and in one study, 9 years follow-up.

Fear and avoidance measures

A host of measures of fear and avoidance have been utilized in the assessment of PDA, including the Fear Questionnaire, the Mobility Inventory, and the Phobic Anxiety and Avoidance Scale. Seventy-seven percent of the studies reviewed utilized measures of fear and avoidance, and of these 100% reported improvement by post-treatment and/or follow-up. Overall, it can therefore be said that CBT treatment of PDA has been consistently associated in the literature with significant post-treatment and follow-up improvements of up to 16 months on fear and avoidance as measured by most of the major assessment instruments employed in this area.

Severity/intensity measures

Measures of severity and intensity have most commonly included SUD scales and the Global Assessment of Severity Scale, amongst others. Forty-six percent of the studies reviewed reported outcome for this domain, of which 100% reported improvement by post-treatment and/or follow-up. Of those studies that included follow-up data, only the Mavissakalian et al. (1983) study did not find improvements during post treatment to follow-up analysis. With the exception of this one study, CBT therefore appears to be associated with improved changes in severity and intensity measures of PDA both at post treatment and follow-up periods ranging up to 16 months.

General anxiety measures

Fifty-four percent of the studies utilized measures of general anxiety, of which 90% report statistical improvement. Two studies (Marchione et al., 1987, and Emmelkamp et al., 1978) did not find statistical improvement. In the Marchione et al. (1987) study perusal of the data by the authors showed that CBT did produce substantive therapeutic gains pre- to post-treatment on the Taylor Manifest Anxiety Scale. However, these changes did not achieve conventional levels of statistical significance. The reason for this was, in part, attributed by the authors to the small sample size used in their study. Also, with regards to anxious mood, Emmelkamp et al. (1978) initially found that CBT which included prolonged exposure as a treatment component of PDA was not associated with statistically significant improvements on the Anxiety Mood Scale (AMS) at post-treatment. In a later study, however, Emmelkamp and Mersch (1982) did find CBT to be associated with post-treatment improvements on the AMS, irrespective of whether it incorporated a prolonged exposure component or not. In general, therefore, apart from the studies by Emmelkamp et al. (1978) and Marchione et al.

(1987), the literature to date does provide evidence that CBT treatment of PDA can lead to significant improvements on a variety of measures of general clinical anxiety. Furthermore, these improvements have been observed up to 6 months follow-up.

Social anxiety measures

Measures of social anxiety have included the Fear of Negative Events Questionnaire, the Social Avoidance and Distress Scale and the Social Phobia subscale of the Fear Questionnaire. Of the 35 studies cited, only 14% utilized a measure of social anxiety. Of these, 4 reported improvement and one reported no statistical effect. This study (Beck, Stanley, Baldwin, Deagle, & Averill, 1994) did display a reduction in the cognitive therapy group on the social phobia subscale of the Fear Questionnaire, but this did not reach statistical significance. Overall, it would appear that CBT generally decreases social anxiety at post-treatment and that this is maintained up to 12 months follow-up.

General symptomatology measures

Twenty-six percent of the studies cited utilized measures of general symptomatology (e.g. Hopkins Symptom Checklist, Subjective Symptoms Scale, Subjective Symptoms Checklist, Lehrer and Woolfolk Symptom Questionnaire, Symptom Checklist 90-R). Of these, all reported improvement to post-treatment and/or follow-up, with at least one of these measures. However, Marchione et al. (1987) reported inconsistent results, displaying improvement on the Subjective Symptoms Checklist but not on the Hopkins Symptom Checklist. Except for this study, CBT was associated with improvement on general symptomatology which was maintained to 6 month follow-up.

Behavioural measures

As can be seen from Table 2, 46% of the studies reported outcomes for behavioural measures, of which only one study (Last et al., 1984) reported mixed results and another (Mavissakalian et al., 1983) found no significant improvements. Hence, whilst there are some inconsistencies noted amongst studies to date concerning the impact of CBT used in PDA on behavioural measures, the majority have shown CBT to be associated with significant improvements on these measures both at post-treatment and at follow-up periods ranging up to 12 months.

Cognitive measures

Only 46% of the studies reported using cognitive measures, of which all except one (Last et al., 1984) reported positive results. Further discussion of outcome associated with CBT on these measures will follow later in the paper as they are relevant to the question of whether CBT supports cognitive models of PDA.

Physiological measures

Of those studies in Table 1, four (Last et al., 1984; Marchione et al., 1987; Michelson et al., 1985; Michelson et al., 1990) employed Heart Rate (HR) as a physiological outcome measure of PDA, and one (Beck et al., 1994) used HR, skin conductance and trapezious electromyographs (EMG). Results of these studies are somewhat inconsistent. In the Marchione et al. (1987) study of agoraphobics and the Michelson et al. (1990) study, CBT was associated with significant pre- to post-treatment improvements observed on most HR measures taken during a behavioural avoidance test. Michelson et al. (1985), in contrast, found that patients with PDA who underwent CBT actually experienced increases in physiological reactivity during treatment, and it was not until 3 months follow-up that significant improvements were noted for CBT on HR sitting and HR walking measures. In the Beck et al. (1994) study there was found to be no significant effects for HR and EMG, and conflicting statistical results by treatment group for skin conductance. The authors attribute this to pre-treatment differences between groups on this measure. Finally, Last et al. (1984), reporting data on two agoraphobic patients who underwent CBT, found that the magnitude of the HR measure for one patient was higher during post-treatment assessment, whereas for the second patient it was much lower when compared to pre-treatment. Hence, studies that have to date evaluated the impact of CBT on physiological measures of PDA are very limited in number, have focused primarily on heart rate responses and have led to somewhat inconsistent findings.

Locus of control

Seven studies (20%) from Table 1 included Locus of Control Scales in their assessment batteries. Statistically significant improvements in these scores were reported with CBT interventions across treatment and follow-up phases of up to 6 months. Hence, taken together, the results of these studies indicate that CBT can be associated with significant and positive changes in locus of control when used as a treatment of PDA.

Depression measures

Sixty-six percent of the studies in Table 1 measured depression, and by far the most commonly employed measure was the Beck Depression Inventory. All the studies reported a significant reduction in depression. Overall, when one considers this literature in relation to PDA, it can be concluded that CBT has consistently been associated with reductions in depression as measured by the major scales currently employed by researchers. Further, these reductions have been evidenced at post-treatment and follow-up phases of up to 12 months.

Marital state measures

It can be seen from Table 1 that four studies (Barlow, Mavissakalian, & Hay, 1981; Barlow et al., 1984; Chambless, Goldstein, Gallagher, & Bright, 1986; Michelson et al., 1988) evaluating CBT with PDA have employed measures of marital state. Two studies

(Barlow et al., 1984; Michelson et al., 1988) included the Marital Adjustment Scale in their assessment measures. Significant improvements were associated with CBT on this scale in the Michelson et al. (1988) study on both post and 3 month follow-up scores. In the Barlow et al. (1984) study no specific results were mentioned for this scale. However, a statement made by the authors implied that improvements did occur pre- and post-treatment when CBT was employed.

Two studies (Barlow et al., 1981, 1984) used the Marital Happiness Scale (MHS). Using a CBT treatment with agoraphobics, Barlow et al. (1981) found that two patterns of relationship emerged with regards to marital happiness and severity of phobia. For four of the couples treated in their study, as phobia improved marital happiness increased. For two couples though, the inverse relationship was noted whereby improvement in phobia was correlated with decreases in marital happiness. No specific results were mentioned by the Barlow et al. (1984) study relating to the MHS. However, a statement made by these authors implied that improvements did occur pre- to post-treatment when CBT was similarly employed with agoraphobics.

Finally, Chambless et al. (1986) utilized the Marital Dissatisfaction Questionnaire (MDQ) in attempting to search for predictor variables of CBT treatment outcome for PDA. These authors found that patients with higher pre-treatment scores on the MDQ were no less likely to improve in their programme than patients with lower pre-treatment scores on the MDQ. However, since post-treatment and follow-up measures were not obtained, it is not possible to say in this study whether the CBT may have had an impact on marital dissatisfaction scores across time.

Overall, the impression that one acquires from perusing this area of the literature is that CBT treatment of PDA does generally appear to impact on marital state, but that this may not always be in the positive and clinically therapeutic direction.

Assertiveness measures

As can be seen from Table 1, five studies (Chambless et al., 1986; Emmelkamp et al., 1978; Emmelkamp & Mersch, 1982; Michelson et al., 1985, 1988) have considered the impact that CBT has on assertiveness as part of their investigations on PDA. Each of these studies, apart from Emmelkamp et al. (1978), found significant associations between a CBT intervention and improvements in assertiveness. Chambless et al. (1986) reported significantly improved change in their patients with PDA during a 6 month period following an intensive 2-week CBT treatment programme on the Gambrill and Rickey Assertiveness Inventory. Similarly, Emmelkamp and Mersch (1982) found significant changes on the Adult Self-Expression Scale following CBT treatment of PDA and at one month follow-up. In the Michelson et al. (1985, 1988) studies patients with PDA showed improvements on the Wolpe–Lazarus Assertiveness Inventory at post-treatment and at 3 months follow-up. Needless to say, the studies that have employed assertiveness measures in their research of PDA are few in number. Nevertheless, the results of those that have been conducted to date suggest that, on the whole, CBT can be associated with improved changes in assertiveness scores both at post-treatment and at follow-up periods of up to 6 months.

Endstate functioning and improvement

Table 1 shows that 10 studies have used *a priori* operationalized composite measures of Endstate Functioning and Improvement as indices of outcome for CBT treatment of PDA. These have included the Operationalized Measure of Endstate Functioning, the Operationalized Measure of Endstate Improvement and the Composite Measure. Operationalized definitions of endstate functioning and improvement have the merit of combining several measures in different response systems to produce a more composite score on which to base treatment outcome. Using this approach, the classification of high endstate functioning and improvement would represent superior clinical status with negligible or no phobic symptoms. From Table 2 one can see that CBT has been consistently associated with, at minimum, moderate numbers of patients with PDA acquiring high endstate functioning and improvement when such measures have been employed following treatment and at follow-up periods of up to 6 months.

Other outcome measures

In addition to those outcome measures already discussed above, several studies from Table 1 have reported using measures such as Valium Intake (VI), Car Mileage (CM), Daily Self Appraisal Interviews (DSAI) and Rate of Hospital Admissions (RHA) (de Voge et al., 1981) as well as Biographical Data Sheets (BDS) (Chambless et al., 1986), Home Visit Observations (HV) (Barlow et al., 1984) and Behavioural Diaries (BD) (Barlow et al., 1984; Michelson et al., 1986). It is not possible to state the impact of CBT on the BDS, HV and BD due to the nature of these measures and the way they were reported in their respective studies. The results on the measures used by de Voge et al. (1981) (VI, CM, DSAI and RHA), however, are noteworthy. That is, CBT used to treat a severe agoraphobic patient was found to produce desirable changes in VI, DSAI and CM (or avoidant behaviour). Furthermore, these changes were accompanied by fewer hospitalizations of the patient during a 16 month follow-up period.

Summary

To summarize, therefore, the above discussion would suggest that CBT does lead to positive and concurrent changes on several measures that have been employed by available studies in the area of PDA. Specifically, CBT when used as a treatment of PDA has been associated with significant and positive changes on measures of panic, fear and avoidance, approach behaviours, severity and intensity of condition, endstate functioning and improvement, clinical anxiety, depression, assertiveness and locus of control. CBT has also been associated with changes in marital state. However, these changes have not always been in the positive and clinically therapeutic direction. Furthermore, the noted changes on the measures described have been shown to occur both at post-treatment and at follow-up periods ranging up to 16 months. Finally, the above discussion also highlights several measures that have been employed in the literature to date on which the impact of CBT, when employed with PDA, still remains unclear.

Analysis 3: meta-analysis of studies in Table 1

An alternative method of determining the effectiveness of an intervention has been suggested by Nietzel and Trull (1988). This method provides a useful tool for quantifying the clinical significance of treatment outcomes by comparing the pre, post and follow-up scores with normative scores obtained from "normal" individuals (Trull, Nietzel, & Main, 1988; Nietzel & Trull, 1988). For the purposes of our meta-analysis, normative data previously reported by Nietzel and colleagues for the Fear Questionnaire (FQ), for both a college group and community sample, was employed. This was due to the FQ's reportedly frequent use in the agoraphobia outcome literature, its demonstrated psychometric properties and its endorsement by a number of leading agoraphobia researchers. In order to compare the results of clinical outcome studies with the normative distributions, a standardized effect size score is computed for the relevant treatment group in each study using the formula $(Mt - Mn1)/SDn1$ and $(Mt - Mn2)/SDn2$, where Mt is the mean post-treatment Agoraphobia or Total Phobia subscale score of the FQ; Mn1 and Mn2 are the mean FQ norms for the college and community samples respectively; and SDn1 and SDn2 are the corresponding standard deviations for these two normative samples. Similarly, effect sizes that contrast the normative groups with treated groups pre-test and follow-up scores are also computed.

Of the studies identified in Table 1, 11 reported the FQ agoraphobia subscale scores in their text, and 7 reported total FQ scores. Effect sizes for the CBT group in these studies were calculated for pre-test, post-test and follow-up results on the FQ using the norms of Nietzel and Trull (1988). These are reported in Table 3 (for the Agoraphobia subscale) and in Table 4 (for the Total Phobia subscale).

Mean effect sizes of studies reported in Table 3 were calculated for pre, post and follow-up phases of treatment (controls not included). These are shown in Figure 1 plotted against the distributions for the normative groups obtained by Nietzel and Trull (1988) for the FQ Agoraphobia subscale. It can be seen that, on the FQ Agoraphobia subscale, patients on the average moved from 3.88 to 1.70 standard deviations of the collegiate mean at post-treatment and to 1.70 standard deviations at follow-up. They also moved from 1.37 to 0.17 standard deviations of the general population mean at post-treatment and to 0.24 standard deviations at follow-up. Hence, CBT was associated with improvements on FQ Agoraphobia scores from pre- to post-treatment and follow-up as demonstrated in both analyses. Jacobson, Follette and Revensdorf (1984) suggest that scores within two standard deviations of the "normative" groups be considered clinically significant. It can therefore be concluded (based on Figure 1) that the CBT treatment resulted in post-treatment and follow-up scores which are substantially clinically significant, and similar to FQ Agoraphobia subscores found in the general (community) population. In contrast, the CBT treatment results were only marginally clinically significant when compared to FQ Agoraphobia subscores found in a college population.

The mean effect sizes of studies reported in Table 4 were calculated and are shown in Figure 2, plotted against the distributions for the normative groups obtained by Nietzel and Trull (1988) for the FQ Total subscale. It can be seen that, on the FQ Total subscale, patients on the average moved from 2.11 to 0.38 standard deviations of the collegiate mean at post-treatment and to 0.29 standard deviations at follow-up.

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Table 3. Pre, post and follow-up means and effect size scores for the FQ agoraphobia subscale scores for studies in the meta-analysis

Study	Pre-test mean	Effect size 1	Effect size 2	Post-test mean	Effect size 1	Effect size 2	F/up mean	Effect size 1	Effect size 2
Barlow et al. (1984)	27.00	4.60	1.76	17.90	2.67	0.70	—	—	—
Beck et al. (1994)	(1) 13.07	1.65	0.15	5.73	0.09	–0.71	—	—	—
	(2) 11.50	1.32	–0.03	10.06	1.01	–0.21			
	(3) 9.77	0.95	–0.24	9.62	0.92	–0.26			
Chambless et al. (1986)	26.39	4.47	1.69	12.09	1.44	0.03	10.09	1.01	0.56
de Beurs et al. (1995)	32.90	5.87	2.45	22.20	3.74	1.29	—	—	—
Marchione et al. (1987)	29.80	5.19	2.09	10.6	1.12	–0.14	—	—	—
Mavissakalian et al. (1983)	(1) 22.0	3.55	1.18	17.7	2.64	0.68	12.30	1.49	0.05
	(2) 23.0	3.77	1.30	13.6	1.77	0.21	13.00	1.64	0.14
Michelson et al. (1988)	28.0	4.83	1.88	8.60	0.70	–0.38	10.90	1.19	–0.11
Michelson et al. (1990)	12.11	1.43	0.03	3.56	–0.38	–0.96	—	—	—
Ost et al. (1993)	(1) 25.20	4.23	1.56	12.60	1.55	0.09	11.80	1.38	0.00
	(2) 27.27	4.67	1.80	11.53	1.33	–0.03	12.40	1.78	0.07
	(3) 26.80	4.57	1.74	15.80	2.23	0.47	14.60	1.98	0.33
Swinson et al. (1995)	(1) 25.50	4.30	1.59	17.30	2.55	0.64	15.69	2.19	0.45
	(2) 27.65	4.76	1.84	27.18	4.66	1.79			
Williams & Rappoport (1983)	(1) 22.60	3.68	1.25	16.80	2.45	0.58	15.80	2.23	0.46
	(2) 24.10	3.97	1.43	16.00	2.25	0.48	15.40	2.13	0.42

Note: Effect size 1 is the means of the studies compared with Trull and colleagues (1988) college norms for the FQ agoraphobia subscale, and effect size 2 is the means of the studies compared to the general (community) population norms for the FQ agoraphobia subscale.

Table 4. Pre, post and follow-up means and effect size scores for the FQ total scale scores for studies in the meta-analysis

Study	Pre-test mean	Effect size 1	Effect size 2	Post-test mean	Effect size 1	Effect size 2	F/up	Effect size 1	Effect size 2
Marchione et al. (1987)	67.60	3.01	1.67	22.20	–0.42	–1.12	—	—	—
Mavissakalian et al. (1983)	(1) 51.9	1.83	0.71	45.1	1.31	0.29	36.9	0.69	–0.22
	(2) 47.4	1.49	0.43	29.1	0.10	–0.70	27.9	0.01	–0.77
Michelson et al. (1988)	59.50	2.40	1.17	26.10	–0.12	–0.88	29.30	0.12	–0.69
Michelson et al. (1990)	63.00	2.66	1.39	32.78	0.38	–0.47	—	—	—
Ost et al. (1993)	(1) 52.27	1.85	0.73	32.87	0.39	–0.47	30.00	0.22	–0.64
	(2) 52.07	1.84	0.72	28.40	0.05	–0.74	27.80	0.01	–0.78
	(3) 51.47	1.79	0.68	32.33	0.35	–0.50	28.47	0.06	–0.74
Salkovskis et al. (1986)	53.20	1.92	1.17	28.44	0.06	–0.74	25.11	–0.20	–0.16
Williams & Rappoport (1983)	(1) 56.10	2.14	0.96	41.00	1.00	0.03	41.01	1.01	0.04
	(2) 57.80	2.27	1.07	41.40	1.03	0.06	36.60	0.67	

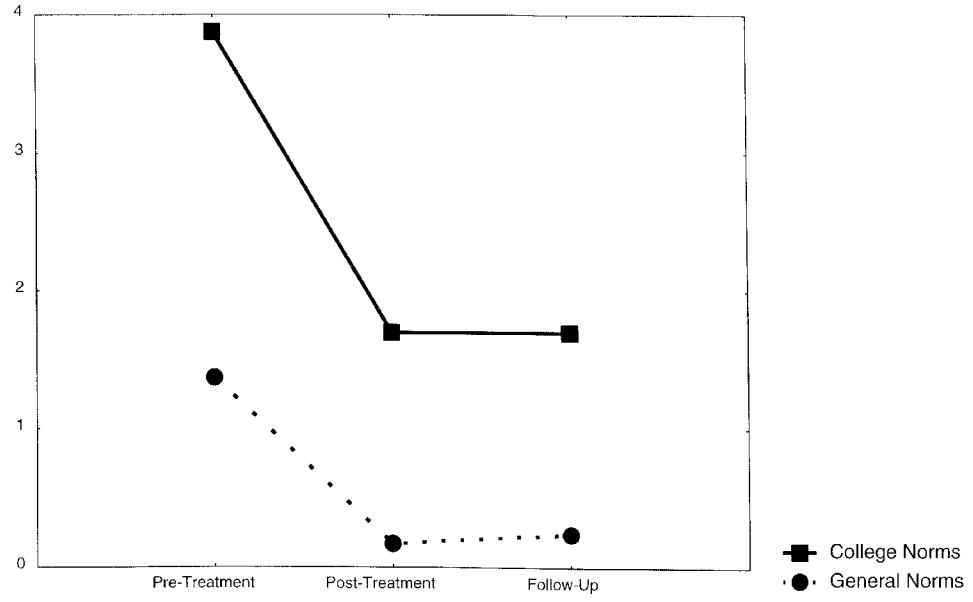

Figure 1. Mean effect sizes for the agoraphobia subscale of the fear questionnaire plotted and pre- and post-treatment and follow up

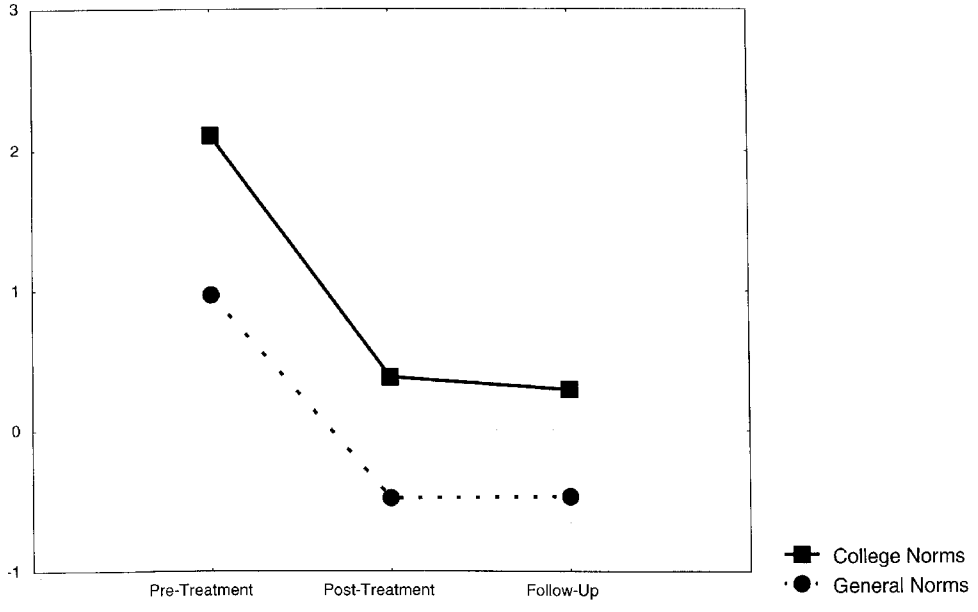

Figure 2. Mean effect sizes for the total phobia subscale of the fear questionnaire plotted at pre- and post-treatment and follow-up

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They also moved from 0.97 to –0.48 standard deviations of the general population mean at post-treatment and to –0.47 standard deviations at follow-up. It can therefore be concluded (based on Figure 2) that the CBT treatment resulted in improved post-treatment and follow-up scores which are clinically significant and similar to FQ Total scores found in college and general populations. Further, these improvements were well maintained at follow-up.

When comparing Figure 1 with Figure 2, it further becomes apparent that the efficacy of CBT treatment is more pronouncedly demonstrated when the FQ Total subscale (as opposed to the FQ Agoraphobia subscale) is used as a measure of change. One possible explanation for this is that while CBT may be producing some measurable change on the FQ Agoraphobia subscale, it may also be having an impact on the Social Phobia and Blood/Injury Phobia ratings of this questionnaire. Various authors have either highlighted or alluded to the important role that catastrophic cognitions also play in social phobia (e.g. Arnkoff & Glass, 1989; Buttler, 1989) and in blood and injury phobias (Rachman & Maser, 1988). Hence, one would expect CBT to be effective in modifying catastrophic cognitions associated with these two phobias as well as with PDA. This being the case, the greater effectiveness noted with CBT on the FQ Total measure (compare Figures 1 and 2) may well be reflecting the additive impact that this treatment may have had on the social and blood/injury phobia subscales that make up the FQ Total score. Significant changes in FQ Social and Blood/Injury subscores were in fact reported by some of the studies (e.g. Michelson et al., 1988) employed in the meta-analysis we conducted. Hence, there is some support for the hypothesis that CBT, when employed in the treatment of PDA, may not only be affecting agoraphobic catastrophic cognitions but may also indirectly be having an impact on social and blood/injury catastrophic cognitions at the same time.

Summary

The above results would suggest that CBT used in the treatment of PDA is effective in reducing self-reported agoraphobic symptoms as measured by the FQ. Furthermore, it would appear that the extent of clinical efficacy demonstrated by CBT when using this outcome measure will vary depending on the type of comparison norms that are used and the nature of the FQ subscales being utilized. Using Jacobson et al.'s (1984) criteria of falling within two standard deviations of a normal population's mean, the clinical efficacy of CBT with PDA was substantially demonstrated with community and collegiate norms, as reference groups at post-treatment and follow-up on the FQ Total scale. However, on the FQ Agoraphobia subscale, this criterion was substantially satisfied with the community norms but only marginally so with the collegiate norms. Additionally, the clinical efficacy of CBT was more pronouncedly noted on the FQ Total scale than on the FQ Agoraphobia subscale.

Overall summary and conclusion

This section of the paper has sought to determine whether CBT is efficacious in the treatment of PDA. Two analyses were conducted on the available literature. Firstly, the literature was reviewed specifically in terms of the association between CBT and

the different outcome measures that have been employed. Secondly, a meta-analysis was conducted on the studies that utilized the Fear Questionnaire as an outcome measure. In general, the results of these two analyses would seem to converge and lead to the conclusion that CBT is an effective treatment of PDA, at least in the short-term. The next section will briefly discuss the current status with regards to the long-term efficacy of CBT with PDA.

Long-term efficacy of CBT with panic disorder with agoraphobia

Twenty-six of the studies from Table 1 included follow-up assessments. These ranged from 1 to 16 months after termination of treatment, and one study of 9 years follow-up. The most frequently used length of follow-up was 6 months. Thus it would be difficult to make any definitive conclusions about the *long-term* maintenance of effectiveness of CBT in treating PDA. There is a need for future research studies to investigate the long-term outcome of CBT at lengthy follow-up intervals. The one study, in Table 1, to investigate long-term follow-up treated with exposure *in vivo* only (Fava, Zielezny, Savron, & Grandi, 1995), yet found 67.4% of those treated to continue remission for over 7 years. Closer inspection of the results of the Emmelkamp and Mersch (1982) study is interesting also in that they suggest that CBT efficacy may become more obvious over extended periods of assessment rather than during shorter periods. This is evidenced in their study of PDA patients by the way in which exposure *in vivo* and a combined procedure (self-statement training plus exposure *in vivo*) were superior to cognitive restructuring at post-test, but at one month follow-up the differences in the treatments disappeared due to continuing improvement in the cognitive restructuring condition. In a similar manner, the study by Mavissakalian et al. (1983) also provides evidence suggesting that self-statement training requires a similar "catching-up" period when compared to a Paradoxical intervention. Hence, in addition to the research needed to determine the long-term efficacy of CBT with PDA, research is also necessary to ascertain the minimum period required for CBT to demonstrate its effective results in the treatment of PDA.

Does CBT support cognitive models of panic disorder with agoraphobia?

Demonstrations of CBT's efficacy are insufficient to infer a support for the cognitive models and processes of PDA (Oei & Shuttlewood, 1996, 1997). To do this at least three things must also be shown. Firstly, it must be shown that CBT is not only effective but that it also leads to change in the person's cognitions. Secondly, it needs to be demonstrated that effective CBT uniquely produces cognitive change in comparison to other therapies. Thirdly, it needs to be demonstrated that it is the change in cognitions that has produced any demonstrated improvement.

Table 1 shows that out of 16 studies that included an independent measure of cognition, 15 met the first criterion of demonstrating the efficacy of CBT with PDA and linking this to a significant change in the cognitive measure. The remaining studies reviewed in Table 1 did not include an independent measure of cognition. Mackay and Liddell (1986), although they did incorporate a "cognitive" measure of self-efficacy into their assessment battery, did not comment sufficiently on its results to enable useful

conclusions to be drawn. Whilst the study by Last et al. (1984) did not demonstrate clear and consistent changes in cognitions, the other studies that employed cognitive measures (see Table 2) did demonstrate such changes. For example, in the Marchione et al. (1987) study, patients with PDA were instructed to verbalize their internal dialogue during a behavioural test. These verbalizations were subsequently classified and analysed in terms of whether they were self-defeating statements, coping statements, or neutral/task-irrelevant statements. CBT was found to be associated with significant reductions in the percentage of negative statements and with significant increases in the frequency of positive statements from pre- to post-treatment. Such a trend was mostly found in the other studies too.

It must be noted, however, that changes in cognitive measures employing tape-recorded verbalizations and/or thought lists may be due to experimental artefacts such as therapist reinforcement (see for example, Oei et al., 1989; Oei & Free, 1995). In addition, Oei et al. (1989, 1995) and Khawaja and Oei (1998) argue that the cognitions to be measured should be the theoretical constructs that are postulated to influence the abnormal behaviour. In PDA the cognitions must be of a catastrophic nature (Khawaja & Oei, 1998). Chambless et al. (1986) did in fact attempt to measure changes in such cognitions related to PDA using the Agoraphobic Cognitions Questionnaire and the Body Sensations Questionnaire or the Catastrophic Cognition Questionnaire (CCQ) (Khawaja, Oei, & Baglioni, 1994). Both of these questionnaires are designed to measure "fear of fear" among agoraphobics (Chambless, Caputo, Bright, & Gallagher, 1984), a concept that, when linked with catastrophic cognitions, is argued to mediate the escalation of anxiety to panic as occurs in PDA (Clark, 1988). The CCQ measured catastrophic cognition directly. In their study, Chambless et al. (1986) demonstrated significant changes on both the Agoraphobic Cognitions and Body Sensations questionnaires following successful CBT intervention with their panic disordered patients. In doing so, these authors provide strong supportive evidence for a link between CBT and a cognitive processes model of PDA.

In terms of the second criterion required in support of a cognitive processes model of PDA, effective CBT must be shown to produce cognitive change unique from other therapies. Two studies of PDA reviewed in Table 1 (Marchione et al., 1987; Williams & Rappoport, 1983) demonstrated that, in addition to CBT, behavioural therapies (such as exposure) on their own, or in combination with other procedures, can also produce cognitive changes. Such results have led some authors (e.g. Williams & Rappoport, 1983) to propose that cognitive changes more likely occur following behavioural change. Authors such as Williams and Rappoport (1983) discuss this in terms of Bandura's (1977) self-efficacy theory which holds that fear is rooted in thought, but that the means by which thought is changed is through performance-based treatments. Clearly this issue requires more clarification through further research. It would also be useful to determine whether the inclusion of a cognitive component to the behavioural therapy would serve as having an additive effect on the extent of cognitive change produced. In actual fact, Marchione et al. (1987) and Williams and Rappoport (1983), to mention but two, did compare the addition of a cognitive component along with behavioural therapy to the effects of behavioural therapy alone. In both of these studies the combined cognitive and behavioural procedure was found to be superior to the behavioural procedure alone in terms of changing positive coping thoughts but not fearful thoughts.

Thus, while other therapies such as exposure appear to produce cognitive changes on their own, the CBT appears to *add* to these effects. This conclusion, however, is based on the results of only a few studies and thus should be accepted with caution at this stage.

Finally, the third criterion for a cognitive processes model of PDA requires that cognitive change be the active ingredient that leads to any improvement in the disorder. It is evident from the discussion thus far that in a minority of studies that have monitored cognitions, changes in these cognitions have in fact coincided with recovery from the PDA. This correlative link between cognitive change and recovery from PDA suggests some support for cognitive explanations of the disorder. This link has been further supported by more recent experimental studies, not included in this review, such as that by Salkovskis, Clark, Hackman, Wells and Gelder (in press). However, it should be noted that other plausible aetiological factors need to be excluded before it can be concluded that cognitive change itself is the mechanism of action in CBT. For example, a study by Bandura, Taylor, Williams, Mefford and Barchas (1985) suggests that the construct of self-efficacy may in fact interact with epinephrine and norepinephrine to produce fear reduction in patients with spider phobia. The implication of this study, when generalized to the condition of PDA, is that physiological variables may contribute an interactive role in the maintenance of and recovery from this condition. This suggestion is quite consistent with the proposed "circular processes" model of depression by Free and Oei (1989) implicating *both* psychological and physiological aetiological contributions to the Mood Disorders. None of the studies reviewed in Table 1 have evaluated physiological as well as psychological processes models of PDA in their research. It would therefore be impossible to conclude that any noted recovery in the PDA condition was due to cognitive change alone.

In summary, the question of whether CBT supports cognitive processes models of PDA still remains unclear. At this stage, we can say that the efficacy of CBT has been well demonstrated and that there are a reasonable number of studies reviewed that have linked this to an independent measure of cognitive change. While this in itself provides some support for the cognitive processes models of PDA, the issue remains complicated in that the data are correlational in nature and that CBT does not appear to produce cognitive change in isolation from other procedures such as exposure. Furthermore, the studies reviewed in this paper have not adequately evaluated the likely contributions of other plausible aetiological and maintaining factors in their research of PDA.

Conclusion

This review sought first to examine whether CBT is an efficacious treatment for PDA. Secondly, it sought to determine whether the CBT literature to date supports cognitive models of PDA. With respect to the first question, 35 empirical studies in the area were analysed descriptively and quantitatively by meta-analysis. The results of the analyses converged in support of the conclusion that CBT is therapeutically effective in the treatment of PDA. With regards to the second question, 16 (46%) of the empirical studies reviewed included cognitive measures in their assessments, of which 15 were able to link significant and positive changes on these measures to the CBT intervention

employed to treat the PDA. However, some of the studies (e.g. Marchione et al., 1987; Williams & Rappoport, 1983) have shown positive change in the cognitive measures when behavioural therapies (such as exposure) have been used on their own or in combination to treat PDA. Consequently, the mechanisms by which CBT achieves its effects on this debilitating condition remain somewhat unclear. While this review provides some evidence to suggest that cognitive processes can play an important role in the development and maintenance of PDA, they may not by themselves be sufficient to explain the condition. The empirical studies reviewed have not adequately evaluated how such cognitive processes may in fact combine with and/or interact with other mechanisms that in themselves may also contribute an important role. There is, therefore, at this stage, a pressing need for further research that not only evaluates the importance of cognitions in the successful outcome of CBT for PDA, but which also takes into account the possible role of these other mechanisms in achieving such an outcome.

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