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Predicting treatment outcome on three measures for post-traumatic stress disorder

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Abstract The aim of the present study was to investigate predictors of treatment outcome for Post-traumatic Stress Disorder (PTSD) after treatment completion and at 15-months follow-up (n = 48), in a trial of Eye Movement Desensitisation and Reprocessing (EMDR) versus Imaginal Exposure and Cognitive Restructuring (E+CR). Factors associated with treatment outcome were investigated using regression analyses with the mean change scores in three assessor and self-rated PTSD symptomatology measures, including the Clinician-Administered PTSD Scale (CAPS), the Impact of Events Scale (IES) and the PTSD Symptom Checklist (PCL) from pre- to post-treatment and pre-treatment to follow-up as the dependent variables and demographics, trauma, clinical and personality measures as independent variables. Irrespective to outcome measures and assessment points it was found that four variables were able to predict significantly treatment outcome. These included baseline PTSD symptomatology, number of sessions, gender and therapy type. Overall, our results showed that it is difficult to use pre-treatment variables as a powerful and reliable tool for predicting treatment outcome, as significant predictors were found to be sample-specific and outcome measure-specific. Clinical relevance of the present results and directions for future research are discussed.

Key words post-traumatic stress disorder · predictors · treatment outcome

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Introduction

To date, a number of treatments have been developed for the treatment of Post-traumatic Stress Disorder (PTSD). These include pharmacotherapies, such as selective serotonin re-uptake inhibitors, and psychosocial treatments, predominantly of a cognitive behavioural orientation, such as Exposure Therapy, Cognitive Therapy and Combination Therapies or Eye Movement Desensitisation and Reprocessing (EMDR) (Foa 2000). In a meta-analytic study, Van Etten and Taylor (1998) re-analysed 61 pharmacological and psychological therapies for PTSD, of various methodological designs. It was concluded that the most effective psychosocial therapies are Cognitive Behaviour Therapy and EMDR, also superior to pharmacotherapies, such as carbamazepine, and selective serotonin reuptake inhibitors, such as fluoxetine and sertraline. Trauma focused cognitive behavioural interventions and EMDR are also recommended as effective psychological treatments for PTSD in the recent NICE guidelines (NICE 2005).

There are appears to be good evidence that a number of psychological treatments can result in significant improvements in PTSD (e.g. Bradley et al. 2005). However, regardless of the treatment followed, treatment efficacy could be enhanced by identifying pre-treatment factors, which could act as predictors of patient post-treatment response (Sharp and Power

1999). For a number of reasons it is important to identify factors of treatment efficacy. Firstly, a number of effective treatments for PTSD are presently available and it is unclear which treatment works best for whom (Ford and Kidd 1998). By knowing factors of treatment outcome, therapists may be able to refine treatment delivery and planning, in order to meet the treatment needs of a specific patient. Furthermore, by identifying predictors of treatment outcome, certain treatments could be indicated for patients with certain characteristics, found to positively contribute to treatment outcome. In so doing, response to treatment could be maximised and consequently, patient dropout minimised.

A number of studies have investigated predictors of psychological treatment outcome in PTSD patients. Ehlers et al. (1998) identified two cognitive dimensions that are related to inferior response to exposure therapy in rape victims (n = 20). Based on analysis of blind ratings of transcripts of exposure treatment sessions they found that poorer outcome is associated with memories that reflect mental defeat and feelings of alienation. Tarrier et al. (2000) have also studied predictors of treatment (Cognitive Therapy vs. Imaginal Exposure) outcome in chronic PTSD patients (n = 62). They found that eleven variables including characteristics of the patient, the trauma and type of treatment, were associated with pre- to post-treatment change in PTSD CAPS (Blake et al. 1990) severity scores. Three variables (duration of therapy, gender and suicide risk) were selected into a step-wise multiple regression, which explained 36.5% of the post-treatment (after 16 sessions) outcome. Moreover, at 6-month follow-up, three variables, including number of missed therapy sessions, residential status and co-morbid Generalised Anxiety Disorder, accounted for 36.9% of the outcome. Forbes et al. (2003) have also studied co-morbidity correlates of CBT treatment outcome, in a sample of 134 Vietnam veterans, with combat-related PTSD. They found that levels of depression, anger and alcohol consumption were significant predictors of symptom change at 9-month post-treatment follow-up. Further analyses indicated that levels of baseline anger were the strongest predictor of symptom change. Van Minnen et al. (2002) have also investigated predictors of treatment outcome for PTSD patients, with mixed traumas, in two samples (n = 59 and n = 63), treated with prolonged Imaginal Exposure Therapy. Analysis of prospective predictors was performed separately for each treatment group. It was found that treatment outcome, in both treatment conditions, was associated with benzodiazepine use, whereas demographic variables, comorbid anxiety and depression, personality and trauma characteristics and therapy variables were unrelated to treatment outcome. The main outcome measure in this study was the PTSD Symptom Scale Self-Report (PSS-SR; Foa et al. 1993). Taylor (2003) investigated predictors of treatment dropout and treatment effectiveness for exposure therapy, relaxation training and EMDR (n = 60). They found that low patient ratings of treatment credibility predicted treatment dropout, regardless of treatment type. Severity of symptom re-experience predicted poor outcome for relaxation training but not for the other therapies. Finally, Ehlers et al. (2005), in a study of the effectiveness of cognitive therapy for PTSD (n = 57), found that patient characteristics such as comorbidity, type of trauma, history of previous trauma, or time since the traumatic event did not predict treatment response. However, low educational attainment and low socioeconomic status were related to better outcome. The outcome measure in this study was the self-reported Post-traumatic Diagnostic Scale (PDS; Foa et al. 1997).

The present study

It could be concluded from the above that previous relevant studies on predicting treatment outcome for PTSD have employed different methodologies, have studied different variables as potential predictors of treatment outcome and have also used a number of clinician and self-rated measures to assess treatment outcome. To our knowledge, there has been no study that employed both assessor-rated and self-rated PTSD measures to study predictors of treatment outcome in a single study. It would be of interest to test whether the same variables predict treatment outcome on different measures of PTSD. Considering the limitations of previous relevant studies, the present research aimed to study pre-treatment predictors of treatment outcome, at post-treatment, and at 15-month follow-up, in a trial which compared EMDR versus Exposure and Cognitive Restructuring (E+CR) (Power et al. 2002). It was concluded that there were significant and substantial pre- and post-reductions for EMDR and E+CR, but no change for the Waiting List group. Since the two psychological treatments (EMDR or E+CR) did not have a better or worse outcome in the majority of self and clinician-rated outcome measures (Power et al. 2002) in our trial, both at end- treatment and follow-up, we have merged these two treatment groups into one to investigate factors associated with treatment outcome in all study participants. Nevertheless, treatment group was investigated in our analysis as a possible predictor of treatment outcome. Treatment outcome was investigated using both assessor-rated and self-rated PTSD outcome measures.

Method

Design

This was a randomised controlled trial, in which following initial assessment to establish diagnosis, inclusion/exclusion criteria, plus completion of self-report and assessor measures, patients were

randomly allocated to one of the study groups. Randomisation was made by means of a predetermined schedule unbeknown to the assessors, therapists or patients. Outpatient referrals were taken from general practitioners and psychiatrists within central Scotland and were considered suitable for study inclusion, if they met the following criteria: willing to participate voluntarily and give written consent; able to satisfy DSM-IV criteria for PTSD; if on medication, had been on a stable dose for at least 6 weeks; aged between 18 and 65 years. Patients were excluded if they exhibited any of the following: past or present psychotic illness; history of alcoholism or drug abuse within last 6 months as defined by DSM-IV; suicidal ideation or intent as assessed at clinical interview; psychotherapy commitments outwith the study. Participants in EMDR and E+CR groups completed a pre-treatment, a post-treatment and a 15-month follow-up assessments.

Treatment

Active treatment groups received up to twelve weekly sessions of ninety minutes duration. EMDR was provided in accordance with the procedures outlined by Shapiro (1991, 1995). In brief, the EMDR procedure requires the patient to focus upon a disturbing image or memory and related cognitions and emotions, while the therapist induces bilateral stimulation either by visual tracking, auditory stimulus or tactile stimulation. E+CR was provided in accordance with a treatment manual for E+CR for PTSD as used by Marks et al. (1998). E+CR intervention sessions initially took the form of imaginary exposure, whereas later sessions incorporated in vivo exposure, where appropriate, plus evaluation and modification of negative thoughts, underlying assumptions and trauma related beliefs.

Sample

A total of 48 completers included in the sample. Mean age of participants was 40.6 (SD = 11.4). Males constituted 58.3% (n = 28) and females 41.7% (n = 20) of total sample. Sample demographic, trauma, clinical and personality variables are presented in Table 1.

Table 1 Mean (SD) and range or n (%) of predictor variables

Variable	Mean (SD) or n (%) (n = 48)	Range (n = 48)
Demographics		
Age	40.6 (11.4)	18–61
Gender		
Males	28 (58.3)	
Females	20 (41.7)	
Marital status		
Married	31 (64.6)	
Single	8 (16.7)	
Separated/Widowed/Divorced	9 (18.7)	
Occupation		
Professional	8 (17.8)	
Semi-skilled	16 (35.5)	
Manual	9 (20.0)	
Unemployed	7 (15.6)	
Other	5 (11.1)	
Trauma variables		
Type of trauma		
Accident	14 (29.2)	
Crime	19 (39.5)	
Other	15 (31.3)	
Time since trauma (weeks)	169.2 (303.9)	8–1536
Clinical variables		
Therapy type		
EMDR	27 (56.3)	
E + CR	21 (43.7)	
Number of sessions	7.1 (3.0)	2–12
Psychotropic medication		
Yes	36 (75.0)	
No	12 (25.0)	
Scales		
HADS (Anxiety)	14.5 (3.0)	8–20
HADS (Depression)	11.3 (3.4)	5–19
Personality variables		
Positive Affect.	25.5 (5.6)	15–38
Negative Affect.	35.1 (6.5)	17–47

Measures

Treatment outcome was assessed by three standardised scales. These were chosen on the basis of providing simple but clinically meaningful indication of treatment outcome. Assessments at pre- and post-treatment were conducted by two independent assessors respectively, who were blind to treatment conditions. Assessments at follow-up were made by therapists who were not blind to treatment conditions. Predicting measures included one assessor-rated measure and two self-report measures, described as follows:

Assessor outcome measure:

a. Clinician-Administered PTSD Scale (CAPS) (Blake et al. 1990). This is comprised of 17 symptoms, each assessed according to frequency and intensity over the past week. Each symptom rated on a 0–4 scale. The 17 symptoms cluster into three subscales; CAPS-B, Re-experience; CAPS-C, Avoidance; CAPS-D, Arousal.

Self-report outcome measures:

b. Impact of Events Scale (IES) (Horowitz et al. 1979). This comprised 15 questions, each rated on a four-point scale and subdivided to provide two ratings of PTSD intrusion and avoidance symptomatology.
c. SI-PTSD Symptom Checklist (PCL) (Davidson et al. 1989). This comprises 17 self-rated questions assessing intrusive, avoidant and hyperarousal symptoms of PTSD, each rated on a 0–4 scale.

Predictor measures:

a. Demographic variables included age, gender, marital status and occupational status.
b. Trauma variables included type of trauma and time from trauma to study entry in weeks.
c. Clinical variables included therapy type, number of sessions and use of psychotropic medication at study entry. Comorbid anxiety and depression were assessed by The Hospital Anxiety and Depression Scale (HADS) (Zigmond and Snaith 1983). This 14-item measure assesses the presence and frequency of anxiety and depression symptoms, each on a four-point scale. The scale provides two subscale scores for anxiety and depressive symptoms.
d. Baseline scores of CAPS, IES and PCL have also been studied as potential predictors of treatment outcome.
e. Personality measures included the Positive and Negative Affect Schedule (PANAS) (Watson et al. 1988). PANAS is a standardised measure, which consists of 20 adjectives, 10 assessing positive affect (e.g. excited) and 10 assessing negative affect (e.g. upset). These adjectives describe different feelings and emotions. Participants respond in a five-point scale, ranging from "very slightly" to "extremely". Participants were asked to rate their affect over the last two weeks prior to assessment.

Statistical analysis

Factors associated with treatment outcome were investigated using regression analyses with the mean change scores in the CAPS total, IES total and PCL total from pre- to post-treatment and pre-treatment to follow-up as the dependent variables and demographics, trauma, clinical and personality measures as independent

Table 2 Pre-, post and follow-up means (SD's) and pre to post-treatment and pre- to follow-up mean (SD's) differences for predicting variables

Variable	Pre-treatment mean (SD)	Post-treatment mean (SD)	Follow-up mean (SD)	Mean (SD) change pre- and post-treatment			Mean (SD) change pre-treatment to follow-up		
				Mean (SD) 95% C.I.	*t* (47)	*P*	Mean (SD) 95% C.I.	*t* (38)	*P*
CAPS Total	85.1 (16.6)	26.3 (24.1)	N/A	58.3 (24.4) 50.9, 65.7	15.9	.000	N/A	N/A	N/A
IES Total	34.0 (4.7)	15.0 (12.4)	16.3 (13.1)	19.0 (13.3) 15.1, 22.9	9.9	.000	18.1 (14.2) 13.5, 22.7	7.9	.000
PCL Total	48.8 (9.2)	20.8 (17.9)	23.9 (18.9)	28.0 (19.1) 22.5, 33.6	10.2	.000	24.8 (19.3) 18.4, 31.1	7.9	.000

variables. Pre-, post- and follow-up and pre- to post-treatment and pre-treatment to follow-up mean (SD's) change scores for each of the dependent measures are presented in Table 2. CAPS was not administered at follow-up. Pre- to post-treatment and pre-treatment to follow-up mean differences were found statistically significant ($P = 0.000$) for all dependent measures. However, post-treatment to follow-up mean differences were not statistically significant for both IES total ($t = -0.1$, $P = 0.987$) and PCL total ($t = -0.9$, $P = 0.346$). Separate regression analyses were used to investigate predictors of treatment outcome for each of the dependent variables. In order to control for interaction effects between predictors all variables entered regression analysis simultaneously. Results from this analysis for each of the dependent variables are presented in Tables 3–5. Subsequent univariate analysis was also conducted to investigate further the association between dependent and significant predictor variables.

Results

Predictors of CAPS total change score

As shown in Table 3, for pre- to post-treatment CAPS total mean change score the following three variables were significantly related to the outcome variable: number of sessions ($t = -2.8$, $P = 0.009$), baseline CAPS total score ($t = 5.4$, $P = 0.000$) and HADS-A ($t = -2.5$, $P = 0.020$). Demographics, trauma, clinical and personality variables were found to significantly predict the dependent variable ($F = 3.9$, $P = 0.001$) and explain 51.4% of its variance. Subsequent correlation analysis was conducted to investigate the association between CAPS total pre- to post-treatment change score and number of sessions, baseline CAPS total score and HADS-A. It was found that a higher pre- to post-treatment CAPS total change score was significantly associated with less number of sessions ($r = -0.338$, $P = 0.025$) and a lower baseline CAPS total score ($r = -0.372$, $P = 0.013$). The association between post-treatment CAPS total change score and baseline HADS-A was not statistically significant ($r = 0.102$, $P = 0.512$).

Table 3 Predicting post-treatment outcome on CAPS total

Predictor	Predicting variable: pre- to post-treatment CAPS total change score	
	Beta	*t*
Age	−0.08	−0.6
Gender	0.22	1.7
Marital status	0.15	1.0
Occupation	−0.15	−1.1
Type of trauma	−0.17	−1.2
Time since trauma	0.04	0.3
Therapy type	−0.27	−1.9
Number of sessions	−0.41	−2.8**
Psychotropic med.	−0.04	−0.3
CAPS total (baseline)	0.87	5.4***
HADS-A	−0.41	−2.5*
HADS-D	−0.24	−1.3
Positive Affect.	0.07	0.4
Negative Affect.	0.09	0.7
	AdjR^2 = 0.514, F = 3.9***	

* $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$

Predictors of IES total change score

As shown in Table 4, for pre- to post-treatment IES total mean change score the following five variables were significantly related to the outcome variable: gender ($t = -2.4$, $P = 0.021$), therapy type ($t = -2.2$, $P = 0.037$), number of sessions ($t = -2.2$, $P = 0.039$),

Table 4 Predicting post- and follow-up treatment outcome on IES total

Predictor	Predicting variable: pre to post-treatment IES total change score		Predicting variable: pre-treatment to follow-up IES total change score	
	Beta	*t*	Beta	*t*
Age	−0.12	−0.8	−0.07	−0.3
Gender	0.33	2.4*	0.33	1.7
Marital status	0.21	1.4	0.05	0.2
Occupation	−0.22	−1.6	−0.07	−0.4
Type of trauma	−0.09	−0.6	−0.12	−0.5
Time since trauma	0.09	0.6	0.11	0.5
Therapy type	−0.33	−2.2*	−0.12	−0.7
Number of sessions	−0.32	−2.2*	−0.42	−2.2*
Psychotropic med.	−0.22	−1.4	−0.04	−0.2
IES Total (baseline)	0.58	3.9***	0.53	2.7*
HADS-A	−0.51	−2.8**	−0.41	−1.6
HADS-D	−0.30	−1.5	−0.06	−0.3
Positive Affect.	−0.31	−1.5	0.04	0.2
Negative Affect.	0.06	0.4	0.01	0.1
	AdjR^2 = 0.418, F = 3.2**		AdjR^2 = 0.330, F = 2.2 (n.s)	

* $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$, n.s. = not significant

baseline IES total ($t = -3.9$, $P = 0.001$) and HADS-A ($t = -2.8$, $P = 0.009$). Demographics, trauma, clinical and personality variables were found to significantly predict the dependent variable ($F = 3.2$, $P = 0.004$) and explain 41.8% of its variance. Subsequent univariate analysis was conducted to investigate the association between IES total change score and significant predictors. It was found that females (mean = 24.1, SD = 12.2) presented with a significantly higher pre- to post-treatment IES change score compared to males (mean = 15.4, SD = 13.1) ($t = -2.3$, $P = 0.024$). The EMDR group (mean = 23.3, SD = 12.7) also produced a higher IES total change score compared to E+CR group (mean = 23.5, SD = 12.2) ($t = -2.7$, $P = 0.009$). A higher pre- to post-treatment IES total change score was also found to be significantly associated with less number of sessions ($r = -0.408$, $P = 0.004$) and a higher baseline IES total score ($r = 0.354$, $P = 0.014$). Baseline HADS-A was not found to be significantly associated with the pre- to post-treatment IES total change score ($r = 0.003$, $P = 0.982$).

For pre- to follow-up IES total mean change score the following two variables were significantly related to the outcome variable: number of sessions ($t = -2.2$, $P = 0.035$) and baseline IES total ($t = 2.7$, $P = 0.014$). Demographics, trauma, clinical and personality variables were not found to significantly predict the dependent variable ($F = 3.2$, $P = 0.004$). Subsequent correlation analysis was conducted to investigate the association between pre- to post-treatment IES total change score and significant predictors. A higher pre- to follow-up IES total change score was found to be associated with less number of sessions ($r = -0.489$, $P = -0.002$) and a higher baseline IES total score ($r = 0.406$, $P = 0.010$).

Predictors of PCL total change score

As shown in Table 5, for pre- to post-treatment PCL total mean change score only baseline PCL total was found to be significantly related to the outcome variable ($t = 3.0$, $P = 0.005$). Demographics, trauma, clinical and personality variables were found to significantly predict the dependent variable ($F = 2.3$, $P = 0.028$) and explain 29.7% of its variance. Subsequent correlation analysis was conducted to investigate the association between pre- to post-treatment PCL total change score and baseline PCL total. These two variables were found significantly and positively associated ($r = 0.360$, $P = 0.010$).

For pre- to follow-up PCL total mean change score only gender was significantly related to the outcome variable ($t = 2.3$, $P = 0.031$). However, predictor variables were not found to significantly predict the dependent variable ($F = 2.0$, $P = 0.081$). Subsequent univariate analysis was conducted to investigate the relationship between PCL total change score and gender. Females (mean = 35.1, SD = 16.8) presented with a significantly higher pre- to post-treatment IES mean change score compared to males (mean = 16.4, SD = 17.3) ($t = -3.4$, $P = 0.002$).

Table 5 Predicting post- and follow-up treatment outcome on PCL total

Predictor	Predicting variable: pre to post-treatment PCL total change score		Predicting variable: pre-treatment to follow- up PCL total change score	
	Beta	*t*	Beta	*t*
Age	−0.13	−0.8	−0.11	−0.5
Gender	0.30	2.0	0.46	2.3*
Marital status	0.18	1.1	−0.06	−0.3
Occupation	−0.18	−1.1	−0.23	−1.1
Type of trauma	−0.03	−0.2	−0.05	−0.2
Time since trauma	0.11	0.7	0.17	0.8
Therapy type	−0.26	−1.5	−0.33	−1.3
Number of sessions	−0.12	−0.7	−0.21	−1.0
Psychotropic med.	−0.02	−0.1	−0.07	−0.3
PCL total (baseline)	0.64	3.0*	0.10	0.3
HADS-A	−0.23	−1.2	−0.16	−0.6
HADS-D	−0.41	−1.7	−0.10	−0.4
Positive Affect.	−0.08	−0.3	0.09	0.3
Negative Affect.	−0.14	−0.8	0.01	0.1
	AdjR^2 = 0.297, F = 2.3*		AdjR^2 = 0.296, F = 2.0 (n.s.)	

* $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$, n.s. = not significant

Discussion

The aim of the present study was to study predictors of treatment outcome, using three outcome measures, at treatment completion and at 15-months follow-up, in a trial of EMDR versus E+CR for the treatment of PTSD. The overall pattern of results is one of relatively similar predictors across outcome measures and assessment points. In specific, it was found that four variables were able to predict significantly treatment outcome. These included baseline PTSD symptomatology, number of sessions, gender and therapy type.

The most consistent finding from regression analysis is that, irrespective to outcome measures and assessment points, baseline PTSD symptomatology is a significant treatment outcome predictor. Subsequent correlation analysis revealed that in clinically administered CAPS total lower baseline scores are associated with better treatment outcomes. These results are in line with previous research in the area (e.g., Taylor 2003). However, for self-administered IES total and PCL total, it was found that higher baseline scores were associated with better treatment outcome. Although, this finding is difficult to interpret solely on the basis of the present data, a number of reasons could explain this association, i.e. the nature of self-reported data in particular. One may argue for example that patients with worst pre-treatment symptomatology may tend to over-estimate their

progress during therapy. Although, this hypothesis needs to be tested further, our results suggest that self-reported PTSD measures should be used as diagnostic measures with caution. Joseph (2000), for example, by reviewing relevant evidence on the psychometric properties of IES, also concluded that this should not be used as a PTSD diagnostic measure. Another interesting finding of the present research was that a smaller number of sessions significantly predicted better treatment outcome for both CAPS total and IES total. Unfortunately, very few relevant studies have studied therapy factors as prospective predictors of treatment outcome (e.g. Tarrier et al. 2000). To our knowledge, the present is the first study that incorporated "number of treatment sessions" as a prospective predictor of treatment outcome. Therefore we are unable to discuss such a finding in comparison to previous research. However, patients in the present study were given the choice to terminate their treatment at any point should improvement occurred. Therefore, patients who had fewer treatment sessions might had been originally less complex cases, had improved faster and terminated their treatment earlier, as opposed to more complicated cases who continued treatment for longer. This hypothesis was also confirmed by the significant positive association between baseline CAPS total and number of sessions ($r = 0.345$, $P = 0.015$), indicating that the more severe the symptomatology at baseline the more the number of sessions patients had. The correlations between number of sessions and baseline IES total and PCL total, although positive, they were not significant. However, similarly to the present study, Tarrier et al. (2000) have also found that female patient gender is one of the best predictors of treatment outcome. They attributed their finding to "men being less expressive of their psychological difficulties and more difficult to engage in psychological therapies" than women. For pre- to post-treatment IES mean change score, EMDR patients also appeared to have had better treatment outcome than E+CR patients. This result also contradicts results from the main outcome study (Power et al. 2002), where it was found that overall none of the two active treatments was superior over the other as regards reduction of PTSD symptomatology at post-treatment and follow-up. Nevertheless, a greater reduction in patient self-reported depression ratings and improved social functioning for EMDR in comparison to E+CR at post-treatment was detected. The superiority of EMDR over E+CR in patient self-reported depression was also maintained at follow-up (Power et al. 2002).

It may also be important to discuss that some differences in significant predictors across measures and assessment points were also apparent. One may argue that results based on CAPS are more valid compared to the results from IES and PCL, as the former is a clinician-rated instrument. However, self-rated instruments for PTSD are widely used in treatment effectiveness studies and considering the differences in the results between these three measures, it is recommended that a mixture of assessor-rated and self-rated measures should be employed in relevant research. Although, psychometric properties of PTSD scales are beyond the scope of the present study, our results suggest that future research should focus on studying and comparing the sensitivity and specificity of different instruments for PTSD. Furthermore and in line with previous research (e.g., Ehlers et al. 2005) a number of factors, such as trauma characteristics, have not been found to be associated with treatment outcome. This result might have certain implications for clinical practice as it is often assumed that certain treatments may not be suitable for patients with certain characteristics (i.e., co-morbidity). Nevertheless, our analysis revealed no empirical reasons for excluding patients from the treatment on the basis of these factors.

In conclusion, our study showed that it is difficult to use pre-treatment variables as a powerful and reliable tool for predicting treatment outcome. Considering differences between the present and previous generic research in the area, it appears that significant predictors in our study were sample-specific and outcome measure-specific. In addition, our results should be interpreted with caution considering the limitations of the present research, i.e., sample size, lack of administration of CAPS at follow-up and use of stringent exclusion criteria. However, although the use of more pragmatic inclusion criteria (i.e., patients with substance use) may enhance generalisability of the results it may make it unclear as to whom these exactly apply. It is suggested that future research, instead of focussing on the association between pre-treatment characteristics and treatment outcome, may be worth looking at the therapeutic processes alone or in combination with pre-treatment factors. Such interactions may give us a clearer indication of which patients are more likely to present with poorer treatment outcome.

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