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Cognitive Processes in Delusional Disorders

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Background. Studies of schizophrenics with persecutory delusions have shown cognitive biases in subjects who are deluded. It has been suggested that their delusions defend against depression. This study challenges the assumption that delusional disorder (DD) patients are covertly depressed.

Method. Clinical and demographic data, and responses to questionnaires designed to assess schizotypy, depression, dysfunctional attitudes, attributional and attention biases were collected from 29 patients satisfying DSM–III–R criteria for DD. These were compared with 20 matched normal controls and results from published studies of schizophrenics.

Results. DD subjects did not show abnormal levels of overt or covert depression or schizotypy. They showed high levels of dysfunctional attitudes ($P<0.0001$), a distinctive attributional style ($P=0.01$), and increased attention to threat-related stimuli ($P=0.01$).

Conclusions. DD is a distinct disorder predicated upon sensitivity to threat and biases of attention and attribution. These findings may have implications for the cognitive therapy of these disorders.

The inclusion criteria and subtypes of delusional disorder (DD; DSM–III–R (American Psychiatric Association, 1987)) closely resemble older ideas of paranoia, but dropping the terms paranoid and psychosis suggest an intention to clearly demarcate this disorder from paranoid schizophrenia. The distinction remains unclear, however, relying principally upon a subjective assessment of the bizarreness of the delusions, prominence of associated hallucinations and duration of any affective symptoms. Individuals with DD are viewed, fundamentally, to harbour well-structured delusional systems without a deterioration of personality or prominent associated psychopathology. Historically such disorders have been associated with cognitive distortions as, for instance, in Kretschmer's 'sensitive delusions of reference' and Sérieux & Capgras' 'misinterpretative delusional states'. The role of affect in the genesis of delusions has always posed something of a problem. Recent studies of the cognitive style of deluded subjects have concluded that delusions represent defences against depression (Bentall, 1994). Bentall and colleagues (1994) have suggested that deluded patients consistently make more internal, global and stable attributions than controls, especially for negative events. These results were taken to support a view of paranoia as a form of 'camouflaged depression'. The other cognitive domain that has been looked at is automatic processing such as that seen in response to the emotional Stroop task. On this, deluded subjects show increased sensitivity to threat-related stimuli.

Previous reports have studied primarily paranoid schizophrenics, who, by definition, show more psychopathology than simply the presence of delusions. Accordingly, it is important to replicate these studies in patients with DD, whose delusions represent the predominant psychopathological features and in whom neuropsychiatric disturbances have not yet been demonstrated. Furthermore, results to date derive only from studies of subjects with persecutory delusions. It would seem important to look at the performance of subjects with other delusional contents so as to test the view that delusional form represents a single phenomenological entity regardless of varied content. If this is true, then the attributional biases demonstrated in patients with persecutory delusions should also be found in patients with other delusional contents. Failure to show generalisation to other delusional contents would suggest either that the attentional and attributional style results are of little aetiological value or that a distinct aetiology, based upon these cognitive styles, should be proposed for each delusional subtype.

Method

Twenty-nine patients currently meeting DSM–III–R criteria for DD were recruited from psychiatrists across north Wales in conjunction with a study of the efficacy of cognitive therapy for delusions. They were compared with 20 normal controls, drawn from similar social background and matched for

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age, sex and premorbid intelligence, as measured by the National Adult Reading Test (NART; Nelson 1982). Interviewing and testing of subjects by one investigator (CFF) took place in two or three one-hour sessions and tests were given in a standard order.

Subjects were assessed using the Maudsley Assessment of Delusions Schedule (MADS; Wessely *et al*, 1993), a standardised interview in which aspects of the abnormal belief are identified and rated; the Beck Depression Inventory (BDI; Beck & Beamesderfer, 1974), to measure co-morbid depression, known to affect many of the cognitive measures; and the Magical Ideation Scale (MIS; Eckblad & Chapman, 1983), a 30-item true/false scale, which measures the purported subjective experience of individuals prone to schizophrenia. The Dysfunctional Attitude Scale (DAS; Weissman, 1979) is a 40-item questionnaire developed for use with depressed patients. The participant is required to respond to a number of propositions (such as "I must be a useful, productive, creative person or life has no meaning"), on a 7-point scale, indicating degree of agreement or disagreement. The 12-item and Attributional Styles Questionnaire (ASQ; Peterson *et al*, 1982) comprises six hypothetical 'good events' (e.g. "You become very rich.") and six hypothetical 'bad events' (e.g. "A friend comes to you with a problem and you don't try to help."). Subjects are asked to imagine the situation happening to them and to write down a cause. They then rate each causal statement on three separate seven-point dimension sub-scales; internal–external (internality), global-specific (globalness) and stable–unstable (stability). Ratings were summed within each dimension to give a total score from 7 to 42 for the six good events and the six bad events. The higher the score, the more internal, global or stable the attribution.

When making ratings of internality, subjects are essentially making an attribution about an attribution – a metacognitive appraisal. It has been suggested that there is a discrepancy between the causal statement and the metacognitive rating of internality such that independent investigators, blind to diagnosis, would rate deluded subjects' causal statements for good events as less internal and bad events as more internal than the subjects themselves (Kinderman *et al*, 1992). To control for this, two external assessors (EA), blind to the diagnosis of the subjects rated the causal statements made and these were compared with subjects' ratings. Subjects who deviated systematically from the ratings of EAs, were identified by subtracting the total ASQ scores of the EAs from those of the DD and control subjects respectively. DD or control subjects whose scores exceeded those of both EAs by 8 or more points, were designated metacognitive high-scorers. A difference of eight represents at least a one point difference on two-thirds of the items.

Finally, subjects were tested using an Emotional Stroop task (EST), developed to measure preconscious processing of information and consequent attentional bias. The EST is a modified form of the original Stroop task, in that colour names are replaced by neutral or affect-laden words. It gauges a domain of automatic processing different from the metacognitive processing measured by the ASQ. Five A4 size stimulus cards were constructed with words selected for equivalent length and frequency in the English language (Bentall & Kaney, 1989). Each had ten rows of five words presented in random order and randomly in black, blue, green, red and yellow ink on a white background, so that each colour appeared ten times. The first card had strings of Os three, five, six, seven or nine characters long. Subsequent cards had five neutral (BUD, RECIPE, NUMBER, DIAMOND, COLLECTOR), depressive (SAD, DEFEAT, AFRAID, REJECT, HOPELESSLY), threat (SPY, THREAT, FOLLOW, WHISPER, PERSECUTE) or anxious words (DIE, PANIC, TERROR, FEARFUL, COLLAPSE). Subjects were told to say the colours on the cards as quickly and accurately as possible and were timed with a stop-watch.

Results

Demographic data and MADS

The 29 DD subjects were subdivided according to delusional content, based on DSM–III–R categories into 20 persecutory (PD) and nine non-persecutory (NP) subjects. The NP group included jealous (2), somatic (1), grandiose (5) and erotomanic (1) individuals. Clinical information and demographic data on these subjects are available, upon request, from the authors. There were no statistically significant differences in demographic variables between DD subjects and controls or between PD and NP subgroups.

Findings on the MADS are presented in Table 1. Total scores were identical for PD and NP subgroups. Within the total scores, the only significant difference was on the conviction subscale, where PD subjects scored slightly higher than NP subjects ($f[1,27] = 4.56$, $P = 0.042$).

BDI, DAS, & MIS

Group performance on each of these measures (Table 2) was compared using one-way analyses of variance (ANOVA) and Scheffé post-hoc tests (S).

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Table 1
MADS data

	DD (n=29)	PD (n=20)	NP (n=9)
Total score mean (s.d.)	40.1 (7.7)	40.1 (7.1)	40.1 (9.3)
Conviction mean (s.d.)	3.9 (0.4)	4.0 (0.2)	3.7 (0.5)
Belief maintenance mean (s.d.)	6.2 (1.3)	5.9 (1.2)	6.8 (1.3)
Associated affect mean (s.d.)	2.9 (1.1)	3.1 (0.9)	2.6 (1.2)
Action on beliefs mean (s.d.)	10.1 (4.4)	10.4 (4.0)	9.6 (5.4)
Idiosyncracy mean (s.d.)	4.2 (1.8)	4.3 (1.7)	4.0 (2.0)
Preoccupation mean (s.d.)	3.0 (0.6)	3.0 (0.6)	3.1 (0.8)
Systematisation mean (s.d.)	2.4 (0.7)	2.4 (0.7)	2.4 (0.7)
Insight mean (s.d.)	7.0 (3.1)	6.6 (3.2)	8.0 (3.0)

Scores from control subjects were of the same order as those reported from normal subjects in previous studies. The BDI score from the DD group was significantly greater than controls (f[1,48] = 12.408, P = 0.001), but below the level indicative of depressive 'caseness' (by convention 15). A group main effect was found (f[2,47] = 6.536, P = 0.003), which was explained by the difference between PD and NP groups and controls (S: P < 0.05). There was no difference between PD and NP groups.

The mean DAS score for the DD group was significantly higher than the control mean (f[1,48] = 23.176, P < 0.0001). A significant main effect was found (f[2,47] = 11.339, P = 0.001), between delusional subgroups and controls, with both subgroups differing from controls (S: P < 0.05). The DD subgroups did not differ from each other.

DD subjects gave higher MIS scores than controls (f[1,48] = 6.739, P = 0.013) but these were of the same order as American college students, where mean scores of 8.56 and 9.69 were reported for males and females respectively (Eckblad & Chapman, 1983). A significant main effect between PD, NP and control groups (f[2,47] = 3.579, P = 0.037), was explained solely by the difference between NP subjects and controls (S: P < 0.05).

ASQ

A 2 (group) × 2 (event-type) × 3 (attribution subscale) ANOVA was performed to examine group performance on the ASQ (Table 2). The DD group was thus compared with controls (Fig. 1*a*). Significant main effects of group (f[1,47] = 7.95, P = 0.01) and event type (f[1,47] = 50.69, P < 0.0001) were found, with DD scoring higher overall (27.8, s.d. 6.8) than controls (25.6, s.d. 6.1), and all subjects scoring significantly higher across internal, global and stable dimensions for good events (29.7, s.d. 5.7) compared to bad events (24.1, s.d. 6.2). The main effect of attribution subscale failed to reach significance (f[2,94] = 2.93, P = 0.058).

A non-significant group by event type interaction indicated that the two groups did not show a significantly different pattern of response for good *v.* bad events when the data was collapsed across attribution subscales. The group by attribution subscale interaction term was significant (f[2,94] = 8.84, P < 0.001) and post-hoc Tukey–Kramer honestly significant difference tests (TK) suggested that DD subjects make more stable attributions overall compared to controls (TK: P < 0.05), but not more internal or global. The event type by attribution subscale was also significant (f[2,94] = 6.50, P < 0.005). Most importantly, the

Table 2
BDI, DAS, MIS and mean attribution subscale scores

	DD (n=29)	PD (n=20)	NP (n=9)	Control (n=20)
BDI mean (s.d.)	6.1 (5.1)	5.7 (5.0)	7.1 (5.6)	2.0 (1.7)
DAS mean (s.d.)	148.2 (38.2)	148.5 (37.0)	147.6 (27.1)	105.3 (24.6)
MIS mean (s.d.)	7.4 (5.4)	7.0 (6.0)	8.4 (4.1)	3.9 (3.1)
ASQ				
Good events				
Internality mean (s.d.)	31.2 (5.3)	30.6 (5.9)	32.6 (3.6)	28.8 (5.4)
Globalness mean (s.d.)	30.5 (5.3)	29.6 (5.3)	32.6 (4.7)	29.9 (5.0)
Stability mean (s.d.)	30.0 (6.5)	29.9 (6.7)	30.2 (6.4)	27.0 (6.0)
Total mean (s.d.)	91.7 (13.2)	90.1 (14.2)	95.3 (10.3)	86.1 (12.3)
Bad events				
Internality mean (s.d.)	20.5 (7.1)	20.5 (6.0)	20.4 (9.5)	24.6 (2.9)
Globalness mean (s.d.)	26.7 (5.3)	27.3 (5.3)	25.3 (5.5)	24.5 (5.1)
Stability mean (s.d.)	28.0 (5.2)	28.4 (4.9)	27.1 (6.1)	19.3 (5.5)
Total mean (s.d.)	75.5 (11.7)	76.7 (10.2)	72.9 (14.7)	69.8 (6.2)

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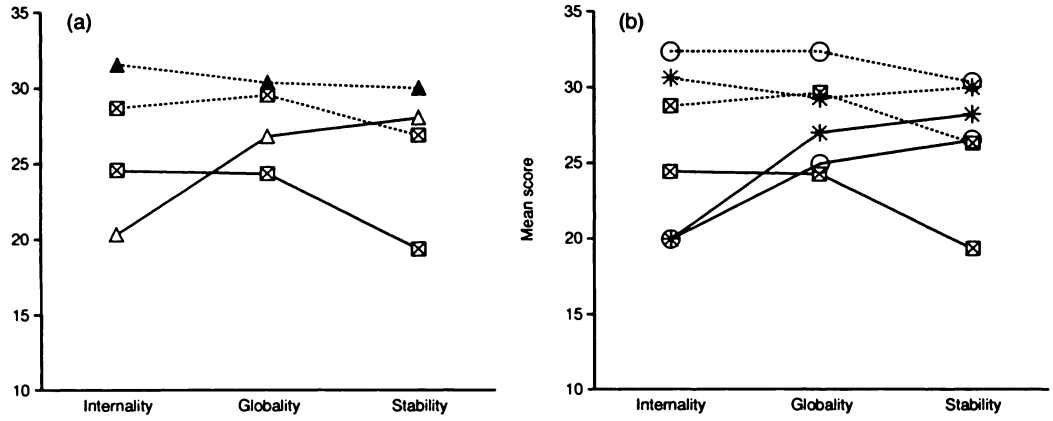


Fig. 1 Mean ASQ subscale scores by event type. (a) control *v.* DD subjects; (b) control *v.* PD and NP deluded subgroups. Key: ····⊠····, Control–good; ····✳····, PD–good; ····⊖····, NP–good; —⊠—, control–bad; —✳— PD–bad; —⊖— NP–bad; ····▲····, Deluded–good; —△—, deluded–bad.

three-way interaction term (group × event type × attributional subscale) was significant ($f[2,94] = 13.07$, $P < 0.0001$), explained by the DD subjects being more external (TK: $P < 0.05$), and stable (TK: $P < 0.05$) in their attributions for bad events than controls, but similar on globalness.

A 3(group) × 2(event type) × 3(attribution subscale) ANOVA was performed to determine whether the PD and NP groups showed the same attributional style as each other, in addition to both differing from controls (see Fig. 1*b*). There were significant main effects overall ($f[2,46] = 3.95$, $P = 0.026$), and for event type ($f[1,46] = 51.43$, $P = 0.0001$). The main effect for attribution subscale just failed to achieve significance ($f[2,92] = 2.88$, $P = 0.06$) and the group by event type interaction was also non-significant ($f[2,46] = 0.85$, $P = 0.44$). There was a significant group by attribution subscale interaction ($f[4,92] = 4.45$, $P = 0.0025$) with both PD and NP subjects being more stable in their overall attributions than controls (TK: $P < 0.05$).

Finally, a three-way interaction (group × event type × attribution subscale) was significant ($f[4,92] = 6.79$, $P = 0.0001$). Both the PD and NP groups were more stable in their attributions for bad events compared to controls (TK: $P < 0.05$) but on no other dimensions and did not differ from each other.

External assessors' (EA) ratings of causal statements made by the DD group and controls on the internality dimension did not differ significantly from the subjects' own ratings (table of values available from authors), suggesting that the evaluations of the deluded subjects were not concealing anything. Discrepancies were due almost entirely to different ratings of two items, winning the pools and being ill, items which are difficult to place on an internality dimension. Using a cut-off of eight points difference between subjects' and assessors' ratings of the causal statements, eight DD and one control subjects were designated metacognitive high-scorers (MCHS). Of the DD MCHS, six had persecutory delusions, one jealous and one somatic. When compared with the remainder of the DD subjects (designated metacognitive low-scorers (MCLS)) for demographic and test data no differences were found (table available from the authors).

To investigate the possibility that delusional responses represent a 'cognitive set', the internal reliability of individual subscales was examined using Cronbach's alpha. Generally, reliability was moderate (0.45–0.60), consistent with that found in the original validation of the questionnaire (Peterson *et al*, 1982). The internality dimension, found to be the least reliable when the questionnaire was devised, showed a high level of internal consistency (0.73) for bad events in the DD group compared with a low level in controls (−0.03).

EST

There was a significant main effect for both the OOOO ($f[2,44] = 9.565$, $P = 0.0004$) and neutral words ($f[2,44] = 8.840$, $P = 0.0006$), explained by the difference between PD subjects and controls (S: $P < 0.05$) (Table 3). However, a one-way ANOVA

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comparing NP subjects with controls showed that they, too, differed significantly on both OOOO ($f[1,27]=24.233$, $P<0.0001$) and neutral words ($f[1,27]=22.448$, $P=0.0001$). In view of this difference on the control measures, absolute times for the emotional words could not be used. Interference indices were therefore calculated for the depressive, threat and anxiety cards by subtracting from their times the time taken on the neutral cards to provide a standardised and comparable index of interference from the words. Threat words showed a main effect ($f[2,44]=8.190$, $P=0.001$) which was explained by both PD and NP subjects differing from controls (S: $P<0.05$). Significant main effects for the depressive ($f[2,44]=3.744$, $P=0.032$) and anxiety words ($f[2,44]=5.699$, $P=0.006$) were explained by higher interference in NP subjects than controls (S: $P<0.05$). Significant correlations between EST interference indices and the ASQ were found for threat words and bad events scores for internality (Spearman's $r=-0.275$, $P=0.001$) and stability ($r=0.496$, $P<0.001$).

Discussion

Delusional disorder as a distinct entity

We were able to recruit 29 subjects meeting criteria for DD but not affective disorders or schizophrenia. In line with long-standing views of paranoia, we found DD to be a disorder of older subjects. The mean age of DD subjects at the time of the study was 52 (s.d. 14.6), and the mean age of onset of the disorder was 36.3 years (s.d. 15.9). Patients with non-persecutory delusions could not be distinguished from those with persecutory delusions on the basis of demographic data or on the basis of BDI, MIS, DAS, ASQ, or EST results. Indeed, findings on the MADS indicate a comparable level of severity across delusional content. Some caution in interpreting the findings is called for, however, given the small cohort of patients with NP delusions.

Our data offer a number of arguments in favour of a distinction between DD and schizophrenia or affective disorders. Examination of the clinical summaries suggests that they showed few, if any, features of schizophrenia apart from delusions, and no evidence of a 'dementing' process or negative symptoms. While a high score on the MIS is not diagnostic of schizophrenia, the score from our DD group was low compared with that reported in schizophrenics (Kaney & Bentall, 1989). Equally, it would be difficult to argue that these subjects have a covert or atypical depressive disorder. The mean BDI score was below the threshold for depressive caseness and below that reported in paranoid schizophrenia (Kaney & Bentall, 1989). Indeed the data, particularly from attributional style, suggest that DD subjects are more grandiose than depressive. The DAS measures attitudes which delineate excessively rigid, perfectionistic criteria for evaluating self-worth. Such a style, it has been argued, may be pathogenetic for depression (Beck *et al*, 1974). Williams *et al* (1990), however found that DAS scores return to normal on remission of an episode of depression but remain elevated in subjects who remain depressed. On the basis of these findings they suggested that increased levels of dysfunctional attitudes may act to aggravate and maintain a depressive disorder rather than specifically to cause it. If this is the case then high DAS scores might be expected to aggravate and maintain any psychiatric condition. A parallel study has found similar DAS scores in chronic obsessive–compulsive disorder patients (Fear, 1995).

Our ASQ findings replicate those of previous studies in demonstrating excessively external and stable attributions for negative events and 'a tendency to make excessively internal attributions'

Table 3
Emotional Stroop task data

	DD (n=26)	PD (n=18)	NP (n=8)	Control (n=20)
Total times (seconds)				
OOOO mean (s.d.)	46.59 (20.50)	49.09 (23.35)	40.95 (11.17)	27.13 (3.96)
Neutral mean (s.d.)	53.79 (22.26)	56.31 (25.41)	48.13 (12.22)	33.32 (4.63)
Interference index (affective word card time minus neutral card time)				
Depression mean (s.d.)	1.20 (5.44)	0.13 (4.96)	3.63 (6.02)	−1.26 (2.44)
Threat mean (s.d.)	4.45 (5.08)	4.38 (5.14)	4.60 (5.31)	−0.90 (3.27)
Anxious mean (s.d.)	3.93 (7.70)	2.39 (6.27)	7.39 (9.82)	−1.09 (3.93)

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for positive events in deluded schizophrenic subjects (Kaney & Bentall, 1989; Candido & Romney, 1990). Thus this attributional style is found not only in schizophrenics with persecutory delusions but is present in patients with DD, whose phenomenology is purely delusional. The style is inherently grandiose; it is unclear whether this style generalises to all delusional contents. It did in the present study, but it can be noted that our NP group included five subjects with grandiose delusions who would be expected to have a grandiose attributional style.

While the BDI and ASQ should, arguably, recognise overtly depressive cognitions, the EST was employed to identify covert depressive biases. The results showed little evidence of interference from depressive words. This is consistent with findings reported by Bentall & Kaney (1989). The inferred absence of covert depressive cognitions is of particular note given the argument that delusions are formed to defend against depression (Bentall, 1994).

One argument for an association between depression and delusions is the phenomenon of post-psychotic depression. There are some patients who, anecdotally, would appear to become depressed when their delusions resolve. However, in Chadwick & Lowe's (1994) studies of cognitive therapy in deluded patients, a decrease in delusional intensity was accompanied by a lowering of BDI score. Indeed in one patient, the development of a new delusional belief was accompanied by a rise in BDI score.

Delusion-serving bias

It has been suggested that biased attending represents the principal mechanism through which delusional beliefs are maintained (Ullman & Krasner, 1969). Deluded individuals often actively search for information relevant to their beliefs, attending selectively to that which confirms their view of the world (Wessely *et al*, 1993); they also appear to attribute causes to the events which are noticed in a biased fashion. Our EST and ASQ results support the hypothesis that delusions comprise one primary form, developed through a mechanism which is independent of delusional content.

If these cognitive biases do not defend against depression, what is their role? One possibility is that deluded subjects fall at one end of a spectrum of constitutionally determined attributional styles, where the norm is to be somewhat self-serving, in a similar way to the recognised propensity to make attributions to persons rather than to situations, which is exhibited to a greater or lesser extent in some individuals (Ross & Anderson, 1982). The existence of this bias in an exaggerated form in some subjects would be a risk factor for the acquisition or maintenance of delusions. Thus a grandiose attributional style could be a personality trait rather than a defence, with misattribution of a triggering event as personally salient giving rise to attentional biases for threat, in their turn feeding the tendency to misattribute with personally salient material. A propensity to an above average number of dysfunctional attitudes may help to aggravate and maintain this.

Alternatively, a grandiose attributional style may arise with the development of DD – just as the depressive attributional style would appear to arise in depression (Healy & Williams, 1988). The EST findings suggest a covert perception of threat and this form of attributional style might be acting to defend against this. Such a mechanism for the development of delusions was proposed by Kretschmer to account for 'sensitive delusions of reference'.

Delusions as a 'cognitive set'

There are three possibilities, from our data, as to why delusions become as fixed as they do. First we found a change in the reliability of the subscales of the ASQ, in particular the internality dimension. This has been found to be the least reliable subscale of the ASQ when validated on normal controls, due perhaps to the situation-specific nature of attributions (Peterson *et al*, 1982). Our results also show low reliability for this dimension in controls. In DD subjects, however, reliability was moderately high on the internality dimension for bad events (0.73). This means that subjects were responding more consistently across a range of situations. Second, we found greater reliability on the stability dimension in both NP and PD groups than controls. This is the first report of these findings. It has obvious implications for explaining the fixity of delusional beliefs, and is supported by the correlation between the stability score for negative events on the ASQ and the threat score on the EST. Findings of increased consistency and stability for bad events are suggestive of a cognitive 'set', and may be indicative of the severity of the disorder. Our findings may, indeed, have relevance for cognitive approaches to the treatment of delusional beliefs since one function of cognitive therapy is to reduce over-generalisation, making people more situation-specific. Indeed changes in the consistency of an individual's responses across

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situations may determine the difference between a normal cognitive set and a delusional one.

Conclusion

There is still a grey area between what are clearly delusional disorders and what represent mild forms of schizophrenia. Until a rigorous method of distinguishing between the conditions can be established, research on DD will be fraught with questions as to the precise nature of the disorders studied.

We have presented evidence in support of the view that delusions represent a unitary form irrespective of their content. Larger samples of individual delusional subtypes will be needed to confirm this. The temporal relationship of the development of these biases to the development of delusions is unclear. It does seem that they represent a cognitive set whereby individuals with DD show a fixed repertoire of attributional response, particularly in relation to internal or external representation of blame for unpleasant situations in which they may find themselves. Further research is needed into the biases which underlie such conditions.

Clinical implications

- Delusional disorders are distinct from both affective disorders and schizophrenia
- Significant, cognitive biases were found in patients with DD, with an increased consistency of response which is suggestive of a 'cognitive set'
- The presence of a cognitive set points to a possible role for cognitive therapy in the management of DD

Limitations

- Although the largest study of cognitive processes in DD, sample sizes were small, especially when broken into delusional subtypes
- No direct comparison with schizophrenic or affective disorder subjects
- Uncertainty as to whether these findings represent state or trait features of DD

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References

American Psychiatric Association (1987) *Diagnostic and Statistical Manual for Mental Disorders* (3rd edn, revised) (DSM–III–R). Washington, DC: APA.

Beck, A. T. & Beamesderfer, A. (1974) Assessment of depression: The depression inventory. In *Psychological Measurements in Psychopharmacology* (ed P. Pichot). Basel: Karger.

Bentall, R. P. (1994) Cognitive biases and abnormal beliefs: towards a model of persecutory delusions. In *The Neuropsychology of Schizophrenia* (eds A. S. David & J. Cutting), pp. 337–360. London: Erlbaum.

Bentall, R. P. & Kaney, S. (1989) Content specific information processing and persecutory delusions: An investigation using the emotional Stroop task. *British Journal of Medical Psychology*, **62**, 355–364.

Candido, C. L. & Romney, D. M. (1990) Attributional style in paranoid vs. depressed patients. *British Journal of Medical Psychology*, **63**, 355–363.

Chadwick, P. D. J. & Lowe, C. F. (1994) A cognitive approach to measuring and modifying delusions. *Behaviour Research & Therapy*, **32**, 355–367.

Eckblad, M. & Chapman, L. J. (1983) Magical ideation as an indicator of schizotypy. *Journal of Consulting and Clinical Psychology*, **51**, 215–225.

Fear, C. F. (1995) Cognitive processes in obsessive–compulsive and delusional disorders. Unpublished MD thesis, University of Liverpool.

Healy, D. & Williams, J. M. G. (1988) Dysrhythmia, dysphoria and depression. *Psychological Bulletin*, **103**, 163–210.

Kaney, S. & Bentall, R. P. (1989) Persecutory delusions and attributional style. *British Journal of Medical Psychology*, **62**, 191–198.

Kinderman, P., Kaney, S., Morley, S., *et al* (1992) Paranoia and the defensive attributional style: Deluded and depressed patients' attributions about their attributions. *British Journal of Medical Psychology*, **65**, 371–383.

Nelson, H. E. (1982) *National Adult Reading Test (NART)*. London: Nfer-Nelson.

Peterson, C., Semmel, A., Von Baeyer, C., *et al* (1982) The attributional style questionnaire. *Cognitive Research and Therapy*, **6**, 287–298.

Ross, L. & Anderson, C. A. (1982) Shortcomings in the attribution process: On the origins and maintenance of erroneous social assessments. In *Judgement Under Uncertainty: Heuristics and Biases* (eds D. Kahneman, P. Slovic & A. Tversky), pp. 129–152. Cambridge: Cambridge University Press.

Ullmanø, L. P. & Krasner, L. (1969) *A Psychological Approach to Abnormal Behaviour*. Englewood Cliffs: Prentice Hall.

Weissman, A. N. (1979) The dysfunctional attitude scale: A validation study. *Dissertation Abstracts International*, **40**, 1389–1390.

Wessely, S., Buchanan, A., Reed, A., *et al* (1993) Acting on delusions. I: prevalence. *British Journal of Psychiatry*, **163**, 69–76.

Williams, J. M. G., Healy, D., Teasdale, J. D., *et al* (1990) Dysfunctional attitudes and vulnerability to persistent depression. *Psychological Medicine*, **20**, 375–381.

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