British Journal of Psychiatry (1994), **164**, 637–646

The Defensive Function of Persecutory Delusions
Evidence from Attribution Tasks

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Abnormalities of 'social' reasoning were investigated in patients suffering from persecutory delusions and in matched depressed and normal controls using transparent (obvious) and opaque (unobvious) tests of attributional style. Whereas depressed and normal subjects yielded similar causal inferences for both attributional measures, the deluded subjects showed a marked shift in internality, attributing negative outcomes to external causes on the transparent Attributional Style Questionnaire but, on the more opaque Pragmatic Inference Task, attributing negative outcomes to internal causes and thus showing a cognitive style resembling that of the depressed group. This finding, interpreted in terms of explicit versus implicit judgements, supports the hypothesis that delusions function as a defence against underlying feelings of low self-esteem.

A number of investigators have advocated studying symptoms of psychopathology in addition to broad syndromes (Persons, 1986; Sims, 1988; Costello, 1992). Of the positive symptoms of psychosis, some progress has been achieved in the understanding of hallucinations (Slade & Bentall, 1988) and thought disorder (Grossman & Harrow, 1990) but, despite a substantial psychological literature on the social and cognitive determinants of normal beliefs and prejudices, comparatively little empirical research has been carried out into delusions and delusion-like beliefs (Oltmanns & Maher, 1988; Winters & Neale, 1983).

Although it is generally believed that such beliefs are incongruous with reality, strongly held and persistent (Winters & Neale, 1983; APA, 1987), some authors have argued that they occupy an extreme position on normal–pathological belief continua (Strauss, 1969; Kendler *et al*, 1983; Harrow *et al*, 1988). Within the available psychological literature two broad explanations of delusions have been offered. One view, entertained by Kraepelin (1919/73) and more recently elaborated by Maher (1974), holds that all delusional beliefs are the product of rational attempts to account for anomalous experiences. Some case-study data is consistent with this view (Johnson *et al*, 1977; Maher & Ross, 1984), as is the suggestion that patients with Capgras' syndrome suffer from neurological impairments affecting face recognition (Ellis & Young, 1990). However, it is equally clear that some patients are deluded in the absence of perceptual abnormalities and that many perceptually disturbed patients do not suffer from delusions (Chapman & Chapman, 1988).

The second type of explanation offered for delusions and delusion-like beliefs implicates reasoning processes. Hemsley & Garety (1986) suggested that delusional thinking could be the result of an inability to evaluate novel information and adjust beliefs accordingly. Consistent with this hypothesis, Brennan & Hemsley (1984) found that schizophrenics with paranoid beliefs were more likely to perceive illusory correlations between randomly associated words than non-paranoid schizophrenics, and that this effect was more pronounced for words of paranoid content. Huq *et al* (1988) and Garety *et al* (1991) have shown that deluded people request less information than normal people on probabilistic reasoning tasks, and express greater certainty about their judgements. Such findings give weight to the theory that deluded individuals perceive, but are insensitive to, information about the covariation of events, and raise the possibility that other abnormalities of information processing may be implicated.

Another type of abnormality which has been found in association with delusional thinking is selective bias in information processing. Using an emotional Stroop task, Bentall & Kaney (1989) found that patients suffering from persecutory delusions selectively process words of paranoid content. More recently, when Kaney *et al* (1992) required immediate recall from subjects of vignettes with either threatening or neutral themes, deluded patients were found to recall more threatening propositions than depressed controls.

These information-processing biases have been further investigated from the perspective of social attribution theory, a theoretical approach which is particularly relevant to the problem of delusions, as many of the abnormal beliefs encountered in psychiatric practice are concerned with the individual's

https://doi.org/10.1192/bjp.164.5.637 Published online by Cambridge University Press

position in the social universe (Bentall, 1994). Kaney & Bentall (1989) gave deluded, depressed and normal subjects the Attributional Style Questionnaire (Peterson *et al*, 1982), which requires subjects to think of possible explanations for hypothetical positive (e.g. getting a pay rise) and negative (e.g. friends are hostile) events and to then self-rate these explanations on three bipolar scales: internality ('caused by self' v. 'caused by others or circumstances'), stability ('unchangeable cause' v. 'changeable cause') and globality ('cause affects all areas of life' v. 'cause affects only one area of life'). Like the depressives, the patients with persecutory delusions made excessively global and stable self-ratings of their explanations of unpleasant events. However, unlike the depressives (who make relatively internal self-ratings for negative events; Abramson *et al*, 1978; Brewin, 1988), the deluded patients gave excessively external self-ratings of their explanations for negative events and excessively internal self-ratings of their explanations for positive events. This finding was substantially replicated by Candido & Romney (1990), who compared depressed, paranoid and co-morbid patients.

In 1992, Kinderman *et al* further analysed the data of Kaney & Bentall (1989), together with data from a further series of patients, by asking independent judges to rate for internality the deluded and control subjects' explanations. The actual explanations offered for positive and negative events were found not to differ between the groups in terms of internality as rated by the judges, although the internality of self-ratings made by the deluded subjects remained abnormal in this analysis. Specifically, the deluded subjects sometimes offered explanations for negative events which were rated as internal by the judges (e.g. friend acts hostile "because of something I've done to them") but which the subjects themselves rated as external (caused by other people rather than by self). This finding suggests that abnormal judgements about the causes of negative events tend to be made by deluded subjects only when they are required to make an explicit and effortful estimate of blame.

In a study of deluded subjects' reasoning about the behaviour of others, Bentall *et al* (1991) presented subjects with short vignettes about social events in which they were not involved and asked them to make causal attributions. Although no less sensitive to the contextual information supplied by the experimenters, the persecuted patients tended to make more 'person' attributions (i.e. they excessively blamed the person engaging in the behaviour rather than other people or circumstances) when explaining antisocial actions than did the depressed and normal controls. These results parallel the earlier findings of Kaney & Bentall (1989): just as deluded subjects were found to be unwilling to make internal self-ratings of their explanations of their own negative experiences, they were equally reluctant to blame other victims of negatively valued social interactions.

In the light of this evidence, the beliefs of deluded individuals might be viewed as reflecting an extreme form of 'self-serving bias': the tendency, widely observed in normal individuals, to attribute favourable outcomes to self and unfavourable outcomes to external circumstances (Zuckerman, 1979; Hewstone, 1989). In a direct test of the hypothesis that deluded patients have this bias to an extreme degree, Kaney & Bentall (1992) asked subjects to estimate the degree of control they believed they had over winning or losing points on two computer games which were pre-programmed to yield 'win' and 'lose' outcomes. The deluded subjects' estimates of control were excessively biased, so that they reported high control when gaining points and low control when losing points, even though their choices in the games had no influence over point scoring. This was in stark contrast to the depressed control subjects, who had a more realistically modest view of their control in both win and lose conditions (a replication of a previous finding by Alloy & Abramson, 1979).

If deluded subjects do have an abnormal self-serving bias, it is reasonable to ask whether this bias has a positive function for them. One such function might be the maintenance of self-esteem. This explanation is consistent with Zigler & Glick's (1988) suggestion that both paranoia and mania may be camouflaged forms of depression. In this study we tested this hypothesis directly by observing the attributions of persecuted and matched depressed and normal controls on opaque (unobvious) and transparent (obvious) tests of attributional style. It was predicted that on the transparent test, deluded subjects would show an extreme self-serving bias, whereas on the opaque test (which would not trigger defensive processes), this bias would be absent and the deluded subjects, like the depressed subjects, would attribute negative outcomes to internal causes.

The opaque test chosen for the study was Winters & Neale's (1985) Pragmatic Inference Task (PIT), which was developed from Peterson *et al*'s (1982) Attributional Style Questionnaire (ASQ) and which requires subjects to make attributional inferences when responding to an apparent memory test. Using the PIT, Winters & Neale were able to show that remitted manic patients possess a cognitive schema of low self-esteem and an attributional style similar to that of depressives, despite reporting high

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self-esteem on more conventional measures. The transparent (i.e. non-defence-penetrating) measure chosen for comparison in the present study was a version of the ASQ specially designed to avoid repetition of items on the PIT.

Method

Three groups of subjects participated in this study and were approximately matched for age, sex and intelligence. The National Adult Reading Test (NART; Nelson, 1982) was used as a measure of intellectual compatibility across the groups and the Beck Depression Inventory (BDI; Beck & Beamesderfer, 1974) was used to measure overt depressive symptoms. No significant differences were found between the groups for age ($F=1.539$, d.f. $=2.39$, $P=0.227$) or for NART errors ($F=0.148$, d.f. $=2.39$, $P=0.861$). However, significant between-group differences were found for BDI scores ($F=41.316$, d.f. $=2.39$, $P<0.0001$). Scheffe tests confirmed that all groups scored significantly differently from each other on the BDI ($P<0.01$ for all comparisons).

The experimental group consisted of 12 men and 2 women, all of whom were receiving either in-patient or out-patient treatment for persecutory delusions at the time of the study. All patients met the DSM–III–R criteria (American Psychiatric Association, 1987) for either paranoid schizophrenia (ten patients) or delusional (paranoid) disorder (four patients). This diagnostic classification was made by the researchers on the basis of a brief interview, supported by information from case notes and ward staff. A record was kept of the delusional themes of each patient (see Appendix 1). The mean BDI score for the group was 16.00 (s.d. 7.67), their mean age was 35.6 years (s.d. 9.89) and their mean NART error score was 22.43 (s.d. 9.91).

The psychiatric control group consisted of 12 men and 2 women, all receiving either in-patient or out-patient treatment for depression at the time of the study. All met the DSM–III–R diagnostic criteria for major depressive episode or depressive disorder. The mean BDI score for the psychiatric control group was 29.71 (s.d. 8.30) which indicates moderate–severe depression. The mean age of this group was 40.9 years (s.d. 9.65) and the mean NART error score was 24.14 (s.d. 10.52).

The normal control group consisted of 12 men and 2 women recruited via informal contacts. None reported history of psychiatric disturbance requiring treatment. The mean BDI score for the normal control group was 5.93 (s.d. 4.14), which falls into the normal range. The mean age of this group was 35.7 years (s.d. 9.66) and the mean NART error score was 22.43 (s.d. 8.11).

Test materials

In addition to the measures used in subject selection, three additional measures were administered: an anglicised version of the PIT, a parallel form of the ASQ, and the Rosenberg Self-Esteem Questionnaire.

The Pragmatic Inference Task (Winters & Neale, 1985) is presented as a memory test in order to avoid conscious response biasing. The test consists of 12 short hypothetical vignettes, all of which are self-referent and which are derived from the original ASQ (Peterson *et al*, 1982). Six of the PIT vignettes describe positive events (e.g. "You are complimented on your appearance") and six describe negative events (e.g. "You can't find a job"). Positive and negative items are randomly ordered and both an internal and an external locus of causality is implied in each story. Thus, in the example of being unable to secure employment, a bad personal work record (internal cause) and the poor local job market (external cause) are both implicated. Each vignette is followed by four questions presented as multiple-choice items. Two of the questions require memory of stated facts (e.g. "How long do you go for without finding work?") and one question requires subjects to arrive at a non-attributional inference (e.g. "What kind of job interests you?"). The target (or attributional inference) question implicitly demands that subjects recall what they perceive to be the main contributing factor in the described outcome (e.g. "Why do you have trouble finding work?") by selecting one of the two causes (internal and external) given in the story. Only target questions are scored to give response frequencies in four categories: internal and external attributions for negative events and internal and external attributions for positive events. A PIT self-serving bias score can be calculated by subtracting the number of internal attributions selected for negative events from the number of internal attributions selected for positive events.

For the purpose of the present research the PIT was slightly anglicised to ease comprehension by British subjects (e.g. "Kurt Vonnegut" became "John Fowles", "Thanksgiving" became "New Year"). The vignettes were recorded on to audiotape for presentation to subjects. Immediately after each story, the researcher read aloud the corresponding questions and noted subjects' verbal responses. A complete PIT item, together with procedural details, is given in Appendix 2.

The Attributional Style Questionnaire, parallel form (ASQpf) was used as a method to access subjects' overt expression of attributional style. Because of the close similarity of its items to the items on the PIT, the original version of the ASQ could not be used in this study (Winters & Neale did not use any version of the ASQ in their study of the PIT responses of remitted manic patients). Like the original ASQ, the ASQpf explicitly requires subjects to state causes for hypothetical successes and failures. Six negative and six positive events were presented to subjects, who were asked to imagine the event happening to them. After writing down one likely cause of the event, the subjects were required to self-rate the cause on 7-point scales of internality versus externality, stability versus instability and globality versus specificity. An example item from the ASQpf is given in Appendix 2.

The ASQpf was constructed from a draft questionnaire consisting of 40 ASQ-type items which were given to and completed by 48 undergraduate medical students. These items were derived from the following sources: 18 were those negative items in Peterson & Villanova's (1988) expanded ASQ (which contains only negative items) which were not in the original ASQ, 12 were negative items drawn

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Table 1
Pearson correlations for original and parallel-form Attributional Style Questionnaires for a sample of 15 chronic fatigue, 13 depressed, 12 muscular dystrophy and 8 normal subjects

	Correlation	Significance level
Positive events		
Internality	0.2952	0.022
Stability	0.2152	0.073
Globality	0.3070	0.018
Negative events		
Internality	0.4104	0.002
Stability	0.6432	0.001
Globality	0.3827	0.002

up by the researchers and ten were positive items also drawn up by the researchers. An attempt was made to select six negative and six positive items on the basis of adequate item–whole correlations for internality, lack of skew and adequate variance. As the best positive items did not have wholly satisfactory psychometric properties, a further 18-item scale was constructed using the six negative items selected after the first validation phase, the six best positive items and six additional positive items, again devised by the researchers. This was administered to and completed by a further 64 medical students. The final scale of six positive and six negative items was selected from this data.

As part of a separate study, the original ASQ, the final ASQpf and the PIT were administered to a mixed group of 15 patients with chronic fatigue syndrome, 13 depressed patients and 12 muscular dystrophy patients together with eight normal subjects. Pearson correlations between the subscales of the two ASQ versions are given in Table 1. Modest correlations were observed between the ASQ and the ASQpf subscales although one correlation (globality scores for negative events) failed to reach significance. When self-serving bias scores were calculated by subtracting internality scores for negative events from internality scores for positive events, following the procedure used by Kaney & Bentall (1989; see below), a highly significant correlation of $r=0.568$ ($P<0.001$) was observed between the two scales. It was therefore decided to proceed with the scale because of the significant correlations observed between the ASQ and the ASQpf on those measures (internality and self-serving bias) of direct relevance to the hypotheses being tested in the present experiment.

Data were also available allowing a comparison of PIT and ASQ scores for the 15 depressed subjects, 13 muscular dystrophy subjects and 15 chronic fatigue syndrome patients. A highly significant correlation of $r=0.503$ ($P<0.001$) was found between PIT bias scores and the ASQ self-serving bias scores.

The Rosenberg Self-Esteem Questionnaire (RSEQ) (Rosenberg, 1965) was given to all subjects as a unidimensional index of overtly reported global self-esteem. It consists of ten statements which the subject is asked to rate on 4-point scales.

Procedure

Psychiatric subjects were interviewed and their hospital records inspected to determine if the inclusion criteria for the study were met. All subjects were taken to a private room to complete the test battery. Testing procedure and order of presentation of the five measures was identical across the groups. As the PIT and the ASQpf are conceptually related measures, it was important that subjects were exposed to the opaque measure prior to the transparent measure. Subjects listened to the recording of the PIT vignettes, and the researcher read aloud the corresponding questions and noted subjects' verbal responses. Subjects were then asked to read the words from the NART and to self-administer the RSEQ. The first three items of ASQpf were then read aloud by the researcher. Thereafter, the ASQpf questionnaire was self-administered. Testing concluded with the self-administration of the BDI. The test battery took between 45 and 60 minutes to complete.

Results

The deluded subjects had a mean RSEQ score of 12.54 (s.d. 5.39), the normal subjects had a slightly lower mean RSEQ score of 11.21 (s.d. 4.26), whereas the depressed subjects had a mean RSEQ of 5.57 (s.d. 3.06). These scores, shown in Fig. 1 together with the BDI scores of each group, indicate that the deluded and normal groups reported relatively high self-esteem whereas the depressed group expressed low self-esteem. A one-way ANOVA yielded highly significant differences between groups on the RSEQ ($F=10.23$, d.f. $=2.39$, $P<0.001$). Scheffe tests indicated that the scores of the normal group and the deluded group both differed significantly from those of the depressed group ($P<0.01$ for each comparison), though not from each other. In comparison, the mean BDI scores for each group, as previously described, indicate that deluded subjects experienced relatively high levels of depression, though not as high as those reported by the depressed group. The deluded group therefore exhibited a profile of high self-esteem and high depression.

When Pearson correlations were calculated between BDI and RSEQ scores for each group, these were found to be negative, and significant in the case of the deluded ($r=-0.49$, $P=0.038$) and normal subjects ($r=-0.54$,

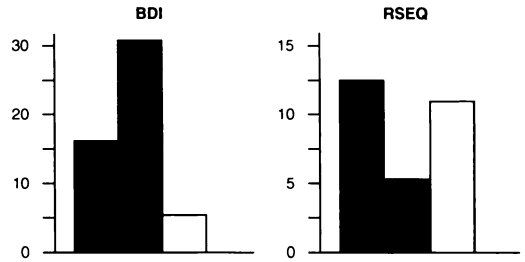


Fig. 1 Beck Depression Inventory (BDI) and Rosenberg Self-Esteem Scale (RSEQ) scores of deluded (■), depressed (■), and normal subjects (□).

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$P=0.023$) but not for the depressed subjects ($r=-0.19$, $P=0.261$). These correlations should be treated with caution because of the low numbers contributing to each calculation.

The ASQpf subscale scores of most relevance to the present study are the measures of internality, as these can be compared to the subject's responses to target items on the more opaque PIT. Mean ASQpf internality scores are shown in Fig. 2 and are also given in Table 2. Consistent with the previous findings of Kaney & Bentall (1989) and Candido & Romney (1990), it can be seen that the deluded subjects give relatively external attributions for negative events and relatively internal attributions for positive events. This bias appears to be present to a much lesser degree in the normal subjects and is entirely absent in the case of the depressed controls. When a two-way ANOVA (group × positive v. negative events) was carried out on this data the group main effect was not significant ($F=1.52$, d.f. $=2.39$, $P=0.232$), although the condition main effect (positive v. negative events) was highly significant ($F=26.88$, d.f. $=1.39$, $P<0.0001$). The group × condition interaction was found to be highly significant ($F=12.69$, d.f. $=2.39$, $P<0.001$). Tests of simple effects confirmed that significant differences in scores between conditions were obtained for both deluded ($P<0.001$) and normal subjects ($P<0.01$), whereas the depressed controls were relatively even-handed in their judgements about the likely causes of positive and negative events ($P=0.634$). In order to investigate these differences between the groups further, a composite self-serving bias score was calculated by subtracting internality ratings for positive events from internality ratings for negative events according to the procedure previously used by Kaney & Bentall (1989). A one-way ANOVA on this data revealed a highly significant difference between the groups ($F=12.68$, d.f. $=2.39$, $P<0.0001$). Scheffe tests showed that the deluded subjects showed a greater self-serving bias than both the depressed ($P<0.01$) and normal subjects ($P<0.05$). These findings therefore directly replicate the previous results for ASQ internality scores reported by Kaney & Bentall (1989) and Candido & Romney (1990).

Similar two-way analyses were conducted for stability–instability and globality–specificity scores on the ASQpf, which are also given in Table 2; these results should be interpreted with caution because of the validity limitations of these subscales. The group main effect for stability was non-significant ($F=2.40$, d.f. $=1.39$, $P=0.104$), as was the interaction between group and condition ($F=1.92$, d.f. $=2.39$, $P=0.160$). However, the condition main effect for stability was found to be highly significant, the entire sample making more stable inferences for positive than for negative events ($F=16.36$, d.f. $=1.39$, $P<0.001$). For globality, the group main effect was also found to be non-significant ($F=0.66$, d.f. $=2.39$, $P=0.521$). However, as all subjects made substantially more global inferences for positive than for negative events the condition main effect was found to be highly significant ($F=17.25$, d.f. $=1.33$, $P<0.0001$). The group × condition interaction also just reached significance ($F=3.94$, d.f. $=2.39$, $P<0.05$), accounted for by the depressed subjects' relative lack of bias in globality ratings between conditions.

Table 2
Attributional Style Questionnaire (pf) and PIT data

Group	Positive events mean	(s.d.)	Negative events mean	(s.d)
ASQpf internality–externality				
Deluded	30.86	(7.06)	15.07	(4.48)
Depressed	24.00	(7.13)	23.33	(6.66)
Normal	29.71	(6.12)	23.00	(8.97)
ASQpf stability–instability				
Deluded	31.57	(5.33)	25.42	(9.24)
Depressed	27.75	(4.67)	25.00	(5.27)
Normal	34.14	(5.89)	26.57	(8.16)
ASQpf globality–specificity				
Deluded	26.86	(6.64)	22.57	(8.04)
Depressed	24.00	(5.60)	21.66	(7.46)
Normal	30.35	(5.89)	22.07	(9.70)
PIT internality–externality				
Deluded	1.71	(1.20)	3.64	(1.08)
Depressed	1.58	(1.24)	3.41	(1.16)
Normal	3.21	(1.12)	1.64	(1.50)

PIT internality and externality inferences were mutually exclusive and, as no instances of missing data occurred, it would be redundant to report both. PIT internality scores are shown in Fig. 2 and also in Table 2. When a two-way ANOVA (group × negative versus positive events) was carried out on this data the group main effect was found to be non-significant ($F=0.769$, d.f. $=2.39$, $P=0.470$). The condition main effect was just significant ($F=4.397$, d.f. $=1.39$, $P<0.05$), with marginally more internal inferences being made about negative as opposed to positive events. Examination of Fig. 2 shows that there was a clear difference in the pattern of scores for each group between conditions, and this was confirmed by a highly significant interaction on the ANOVA ($F=12.61$, d.f. $=2.39$, $P<0.0001$). The deluded subjects had a score profile similar to that of the depressed groups, both groups making fewer internal inferences about positive events than about negative events. The normal control group, on the other hand, exhibited a positive bias, making more internal attributions about positive events than about negative events. Thus, as

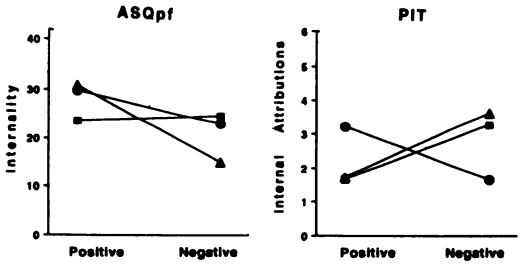


Fig. 2 Internality scores for negative and positive events on the Attributional Style Questionnaire, parallel form (ASQpf), and number of internal attributions made for positive and negative events on the Pragmatic Inference Task (PIT) for deluded (—▲—), depressed (—■—) and normal (—●—) subjects.

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predicted for the PIT, the normal group alone appear to exhibit a self-serving bias in attributional style. This was confirmed using a composite PIT bias index calculated by subtracting internality ratings for negative events from internality ratings for positive events. A one-way ANOVA carried out on this data revealed a highly significant difference between the groups ($F = 12.603$, d.f. $= 2.39$, $P < 0.0001$). Scheffe tests showed that this was entirely accounted for by the normal subjects' positive PIT bias scores in comparison to the negative scores of both the depressed ($P < 0.01$) and deluded subjects (also $P < 0.01$).

Comparing the ASQpf and PIT scores shown in Fig. 2 shows clear differences in internality between measures for the deluded group. On the transparent ASQpf the deluded patients made highly internal attributions about positive events and highly external attributions about negative events. However, on the opaque PIT, the deluded group produced a completely opposite pattern of scores, making internal attributions about negative events and external attributions about positive events, an attributional style similar to that of the depressed group.

Discussion

The hypothesis that persecutory delusions reflect a defensive attributional style which protects the individual against harboured feelings of low self-esteem was broadly supported by the data collected in this study.

As a self-rated measure of depressive symptoms, the BDI encompasses feelings of low self-esteem (Beck & Beamesderfer, 1974). It would generally be anticipated that subjects obtaining high scores on this measure would obtain low scores on the RSEQ and vice versa. The combination of high RSEQ and relatively high BDI scores in the deluded group might therefore be thought of as evidence that these subjects are abnormally defensive. Certainly, the RSEQ scores of the deluded subjects were abnormal in comparison with those of psychotic patients as a whole, who generally show evidence of low self-esteem on this measure (Silverstone, 1991). Nonetheless, a negative association between the two tests was evident in both the deluded and normal subjects, although not in the depressives. It would be wrong, therefore, to conclude too much from the RSEQ data alone.

As predicted, the deluded group made excessively external attributions for negative events and internal attributions for positive events on the ASQpf in comparison with the controls. This finding is a direct replication of those from previous studies, which have shown that deluded subjects exhibit a greater self-serving bias than either depressed or normal subjects on transparent measures of attributional style (Kaney & Bentall, 1989, 1992; Candido & Romney, 1990). In contrast, and also as predicted, the attributional inferences made by deluded subjects on the PIT substantially resembled those of depressed subjects. Both groups made extremely external attributions for positive events and internal attributions for negative events whereas the normal subjects did the opposite. Thus, deluded subjects demonstrated a dramatic transition in style between the two measures, changing from an extremely self-serving bias to an extremely self-disparaging bias according to the method of testing. This finding parallels Winters & Neale's (1985) study with remitted manic patients.

One way of construing this data would be to assert that the PIT is capable of penetrating defence mechanisms apparently shared by deluded and manic patients. However, a full account of the present data would have to indicate which specific cognitive processes underlie the defences of deluded subjects, and why responses on one of the attributional measures (the ASQ) were affected by these processes whereas responses on the other (the PIT) were not. One possible answer to this question is suggested by the study of Kinderman *et al* (1992), who examined in detail deluded subjects' responses on the ASQ. On the ASQ, subjects are required to make a direct numerical estimate of blame for each positive or negative event, and it was these estimates that were found to be specifically abnormal in the deluded subjects, rather than the actual explanations of the events offered by the subjects. On the PIT, no such direct estimate of blame is required. Rather, subjects have to choose from a list the attribution (internal or external) which is most consistent with their memory of the story which directly preceded it. Thus, when deluded subjects are required to make an *explicit* judgement of blame their responses seem to be defensive whereas when they make an *implicit* judgement of blame, no defensiveness is evident. Considerable evidence exists which suggests that explicit judgements and implicit judgements are sustained by different cognitive mechanisms (Reber, 1989; Berry & Broadbent, 1988). On this view, implicit knowledge is sustained by a cognitive system which executes tasks in parallel, is fast and effortless and which makes no demands on attention, whereas explicit knowledge is sustained by a cognitive system which executes tasks serially, is slow and demanding of cognitive effort and attention. Power and Brewin (1991) have suggested, on the basis of a range of evidence, that this kind of distinction found in the work of many cognitive psychologists may be similar or even equivalent to the psychoanalytic distinction between conscious and unconscious processes. They further suggest that self-schema of the sort presumably activated by attributional tasks may be represented at both implicit and explicit levels. It might be

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expected, therefore, that the requirement to make explicit attributional judgements would trigger defensive responses, whereas the requirement to make implicit attributional judgements would produce responses consistent with underlying negative self-schema. Of course, the suggestion that it is this kind of distinction which explains the difference between deluded subjects' responses on the ASQ and the PIT must remain tentative and a hypothesis for further research.

A number of criticisms can be made of the present study. Using the original ASQ, Kaney & Bentall (1989) and Candido & Romney (1990) found that both deluded and depressed subjects made excessively stable and global attributions about negative events. Similar group differences on these dimensions were not observed in the present experiment, although such differences were not crucial to the hypotheses under investigation. The most likely explanation of this discrepancy is the psychometric limitations of the parallel form of the ASQ developed for use in this investigation. Although significant correlations between internality scores on the original and parallel-form ASQ were obtained, even these were not entirely satisfactory. Correlations for stability and globality were also poor, and the result for positive stability failed even to approach significance. Clearly the reliability of the new questionnaire merits further investigation and the present findings indicate that the ASQpf results should therefore be interpreted with caution. In this context, it is important to note that similar difficulties with subscale reliability have been observed with the original ASQ (Tennen & Herzberger, 1985; Bellack & Hersen, 1988). These limitations of the ASQpf do not pose a serious threat to the present study, however. The results obtained with the PIT stand in marked contrast not only to the ASQpf internality scores of the same subjects in the present experiment but also to the scores obtained from similar subjects in previous studies using the original ASQ (Kaney & Bentall, 1989; Candido & Romney, 1990). It should also be noted that any validity problems inherent in the ASQpf would be expected to minimise group differences in internality and thus work against the predicted outcome of the investigation.

A further criticism which might be levelled against the present study concerns the selection criteria for the experimental group, which required the presence of persecutory delusions rather than that they met DSM-III-R criteria for particular diagnoses. Given the present uncertainty about whether existing diagnostic classifications represent discrete unitary disorders (Blashfield, 1984; Bentall, 1990; Costello, 1992), this criticism is not a compelling one. However, it might be argued that the specificity of the present findings remains unclear and that the possibility that non-deluded psychotic patients would respond similarly to the deluded subjects in this study should be considered. As already mentioned, the RSEQ data obtained from the deluded subjects is evidence that they are not representative of psychotic patients in general, at least so far as their response on tasks relating to self-esteem is concerned. Nonetheless, in future research it may be desirable to compare deluded patients with patients suffering from other psychotic symptoms such as thought disorder or hallucinations.

A more telling objection concerns the limitations of the present experimental design, which preclude other than speculative conclusions about the role of cognitive biases in the *aetiology* of delusions. Indeed, it is possible that the defensive attributional style detected in deluded subjects is itself caused by some fundamental feature of delusional thinking which, in turn, could be a product of either environmental or biological antecedents.

Despite these limitations, the present findings have important implications for the investigation and treatment of deluded patients. First, these results and others reported by the present authors (e.g. Bentall & Kaney, 1989; Kaney & Bentall, 1989, 1992; Bentall *et al*, 1991) indicate that the understanding of psychological processes involved in normal beliefs and attitudes is germane to any further exploration of paranoid thinking, and that explanations of delusions which make reference only to perceptual processes (Maher, 1974) are inadequate. Second, these findings suggest that the success of cognitive therapy in enhancing the self-esteem of depressed patients may be pertinent to the treatment of deluded patients, but that cognitive interventions which avoid direct challenges to patients' defences are most likely to be successful with these patients. This view is consistent with existing data on the efficacy of cognitive-behavioural therapy with paranoid patients (Watts *et al*, 1973; Hartman & Cashman, 1983; Chadwick & Lowe, 1990).

A final implication concerns the application of attribution theory to psychopathology in general. Many authors (e.g. Abramson *et al*, 1978) seem to have assumed that attributions, particularly of internality, represent a stable unidimensional trait. In contrast, the present findings indicate that the generation of attributions for valued outcomes is a dynamic process, perhaps involving complex interacting cognitive processes susceptible to a number of environmental and contextual influences. This observation may account for some of the difficulties encountered by authors who have attempted to

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construct simple measures of attributional style (Tennen & Herzberger, 1985; Bellack & Hersen, 1988) and also for the sometimes inconsistent results of investigations of the role of attributional style in depression (Brewin, 1988).

Although the present findings may give some impetus to current efforts to integrate cognitive and psychodynamic theories (Power & Brewin, 1991), further research is required to determine the exact cognitive processes involved in the defensive mechanisms identified in this study. Certainly, the results of the present experiment could reflect conscious attempts at positive self-presentation. Alternatively, psychodynamic theorists have long postulated that disordered individuals unconsciously project a positive self-image in order to protect themselves from painful self-referent attitudes. Freud himself considered persecutory delusions to be the product of (misguided) attempts at psychic restitution (Sacks, 1987). Similarly, the research to date has not established how the paranoid attributional style is acquired or why some individuals find it necessary to employ this defence when others do not. Although it has been postulated that paranoia and depression are psychologically similar phenomena (Zigler & Glick, 1988), the relationship between the two conditions is clearly complex.

In conclusion, the results of the current study are broadly consistent with the present state of attributional research on paranoid delusions. The study contributes to an increasing body of evidence which indicates that certain psychopathologies (including delusions) are associated with abnormalities in the way that individuals construe themselves and their world. This study also shows how cognitive methods can be used to investigate psychodynamic hypotheses. Further research using models of normal social reasoning should resolve some of the remaining uncertainties concerning the paranoid defence and will delineate the specific cognitive processes involved.

Acknowledgements

Data from this study were submitted by Helen Lyon in partial fulfilment of the requirements for the degree of Mastership of Clinical Psychology at the University of Liverpool. The research was also partly supported by a grant to Richard Bentall from the Wellcome Trust for cognitive studies of psychotic symptoms. We are grateful to J. Neale and K. Winters for permission to use the PIT.

Appendix 1. Delusional themes recorded from subjects in the deluded group

Subject 1. Believed Jesus is a demon and that people were plotting against him, especially hospital staff.

Subject 2. Believed there was a conspiracy against him, which included the police, hospital staff and members of football clubs other than Everton.

Subject 3. Believed that his house was being 'pressured' and that people were listening in on his thoughts and conversations. Believed that people in the opposite house were watching and following him and that they intended to poison him.

Subject 4. Believed that Prince Charles, the Lever family and Mrs Thatcher were involved in a conspiracy against him and that all Lever products in the hospital were espionage devices.

Subject 5. Believed that he was being followed and that everyone was staring at him.

Subject 6. Believed that colleagues had poisoned him by giving him special sweets in order to get rid of him.

Subject 7. Believed that the family of his ex-girlfriend were persecuting him and were sending him unpleasant 'thought bleeps'.

Subject 8. Believed he was being persecuted by his family and psychiatrist who were engaged in a conspiracy to impede his progress and hide his great achievements.

Subject 9. Believed he was being persecuted by children and dogs and that the government sabotaged his attempt to distil a special kind of alcohol.

Subject 10. Believed his neighbour was plotting with his family and talking to him through thought waves.

Subject 11. Believed he was substituted at birth and that he was being persecuted by the Bank of England who were interfering with his research thesis.

Subject 12. Believed others were against him, that people were trying to make him sad and give him a heart attack, that cars were trying to nudge him off the pavement and that buses made a 'pissst' noise at him.

Subject 13. Believed her husband was trying to poison her and wrote messages on her body to be found after her death.

Subject 14. Believed that she was being influenced by occult forces that were doing her harm and preventing her from achieving her goals in life.

Appendix 2. Example items from the Pragmatic Inference Test and the Attributional Style Questionnaire (parallel form) Procedural details are given in square brackets.

PIT

[Vignette presented on tape]

You decide to open your own dry-cleaning shop in a small but growing town near the border. Your shop will be the only one of its kind for miles around. In the first year of business, the town's population doubles and your business prospers. Your advertising campaign is a big success and reactions from your customers indicate that the cleaning is of good quality. Your gross sales exceed expectations. You wonder whether it would be to your advantage to open a chain of shops, so you go to the bank and apply for a loan. As you had hoped, the bank approves the loan.

[Questions read aloud by researcher, who noted subject's verbal responses and offered the prompt "Which do you think is more likely?" in case of difficulty]

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1. What kind of shop do you open?
   A. Hardware B. Dry-cleaning
2. In what part of the country is the town located?
   A. Birmingham B. Carlisle
3. Where is the loan obtained?
   A. A finance company B. A bank
4. What is the reason for the success of your business?
   A. You are a clever businessman B. You have no competition.

[In this example, Questions 1 and 3 require factual responses, 2 requires a nonattributional inference, and 4 requires an attributional inference].

ASQpf

[Items presented on paper. The first three items were also read aloud by the researcher.]

You win a competition. Write down one major cause _____

Is the cause of this due to something about you or something about other people or circumstances (circle one number)?

Totally due to others 1 2 3 4 5 6 7 Totally due to me

In the future will this cause again be present (circle one number)?

Never present 1 2 3 4 5 6 7 Always present

Is this cause something that affects just this type of situation, or does it also influence other areas of your life (circle one number)?

Just this situation 1 2 3 4 5 6 7 All situations

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(*First received July 1992, final revision May 1993, accepted June 1993*)

https://doi.org/10.1192/bjp.164.5.637 Published online by Cambridge University Press