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The impact of beliefs about mental health problems and coping on outcome in schizophrenia

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ABSTRACT

Background. Using the theoretical framework of the Self Regulation Model (SRM), many studies have demonstrated that beliefs individuals hold about their physical health problems are important in predicting health outcomes. This study tested the SRM in the context of a mental health problem, schizophrenia.

Method. One hundred and twenty-four people with a diagnosis of schizophrenia were assessed on measures of symptom severity, beliefs about their mental health problems, coping and appraisal of outcome at two time points, 6 months apart.

Results. Using multivariate analyses and controlling for severity of symptoms, beliefs about mental health were found to be significant predictors of outcome. Beliefs about greater negative consequences were the strongest and most consistent predictors of a poorer outcome in both cross-sectional and longitudinal analyses.

Conclusions. These results suggest that the SRM is a promising model for mental health problems and may highlight important areas for development in clinical, and especially psychosocial interventions.

INTRODUCTION

In physical health research many social cognition models have been proposed to identify key beliefs mediating the impact of disease factors on emotional and behavioural responses (Connor & Norman, 1995). Overall, these models have shown that beliefs about illness account for significant variance in outcome appraisal and are amenable to change. These findings offer important opportunities for clinical interventions.

The Self Regulation Model (SRM; Leventhal *et al.* 1984) assumes that people are problem solvers whose health-related behaviours are attempts to close the perceived gap between their current health and their future goal state. The model proposes that coping strategies are guided by interpretation of illness experiences. Individuals constantly appraise their outcome in relation to their desired health state and modify their beliefs and behaviour accordingly.

The SRM hypothesizes that beliefs about identity, cause, consequences, timeline and the potential for control/cure are the key beliefs guiding responses. These beliefs can be assessed using the Illness Perception Questionnaire (IPQ; Weinman *et al.* 1996). The recent Illness Perception Questionnaire Revised (IPQR; Moss-Morris *et al.* 2001), includes additional subscales: 'timeline cyclical' (how variable the symptoms are) and 'coherence' (how much individuals believe they understand their illness). The control dimension has been divided into personal and treatment control, and a dimension to assess the 'emotional' response of the individual has been added. IPQR is explicitly designed to be modified to suit particular illnesses and for research use.

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Outcome appraisal is defined as perceptions of current health state and has been assessed in various ways, the most common focusing on the individuals' perceived quality of life, emotional state or current level of functioning. These foci recognize the broad impact of physical health problems. In studies into schizophrenia, the main outcome is often symptom severity but this may not always be the most desirable outcome from the patients' perspective. A more psychological perspective, in which the ultimate aim is to reduce distress, suggests that emotional state, quality of life, satisfaction and functioning are important outcome variables; therefore these are used as measures of outcome appraisal in this study. Recent work by Birchwood *et al.* (1993, 2000) suggests that for some people with schizophrenia, an increase in emotional distress occurs after the remission of psychotic symptoms, and can be predicted by negative appraisals of this experience. Therefore, at least some variance in distress is associated with appraisals of psychosis rather than directly due to the psychotic process. This study attempts to examine appraisals about psychosis more closely.

METHOD

Participants

Participants were identified via Community Mental Health Teams. Diagnosis was taken from a systematic chart review using a checklist of diagnostic criteria based on DSM-IV (APA, 1994). Information about prescribed medication, length of contact with services and recent history of symptom fluctuations was taken from hospital notes.

Measures

All assessments were conducted by the first author (F.L.) or a research assistant.

Symptom severity

The Positive and Negative Syndrome Scale (PANSS; Kay *et al.* 1989) is widely used as a measure of symptom severity in schizophrenia and has acceptable levels of reliability and validity (Kay *et al.* 1989). A total of the positive and negative subscale scores was used in this study. The general subscale was not used as it has been shown to be less reliable (Purnine *et al.* 2000) and includes items that are confounded with appraisal of outcome (e.g. anxiety and depression). Each interviewer's reliability was assessed by comparing ratings of 10 interviews with those of an experienced consultant psychiatrist. Intra-class correlations suggested good inter-rater reliability (0·83–0·95).

Coping

Coping was assessed using a structured interview in conjunction with the PANSS. For each item identified as a problem by the rater (a score of 4+ on the PANSS), participants were asked about their primary appraisal of the experience, i.e. whether or not they perceived this to be a problem. If they did, they were asked to describe what coping strategies they used. Positive and negative strategies were defined by the taxonomy reported by Tarrier (1987) and Tarrier *et al.* (1993). Classifications were made by the first author (F.L.) and a Professor of Psychology (C.H.) that were highly reliable with each other (kappa = 0·88), and participants were categorized into the following variables for use in the analysis.

(1) *Positive coping*. 1 = participant did not perceive any problems; 2 = problems were perceived but a low frequency of positive strategies were reported (mean of less than two per problem); 3 = problems were perceived and a high frequency of positive strategies were reported (mean of two or more per problem).

(2) *Negative coping*. 1 = participant did not perceive any problems; 2 = problems were perceived but no negative strategies reported; 3 = problems were perceived and negative strategies used.

Beliefs about mental health problems

The Illness Perception Questionnaire for Schizophrenia (IPQS)

A modified version of the IPQR was used to assess beliefs about mental health problems. Adaptations were based on extensive qualitative interviews with people diagnosed with schizophrenia (Lobban & Barrowclough, unpublished observations). Alphas for the subscales ranged from 0·68 to 0·87, and all showed good test–retest reliability (range = 0·57–0·95) (Lobban *et al.* in press). The subscales are summarized below and the items are listed in the Appendix.

(1) *Identity* (58 items). Fifty-eight mental health experiences associated with schizophrenia were listed including positive symptoms, negative symptoms, affective symptoms, and side effects of medication. For each item participants were asked to indicate whether or not they had experienced this, and whether they attributed it to a mental health problem, effects of medication, and/or other factors. The remaining subscales all consisted of statements that were scored between 1 (=strongly disagree) and 5 (=strongly agree).

(2) Timeline acute/chronic (6 items).
(3) Timeline cyclical (4).
(4) Consequences (11).
(5) Personal control (4).
(6) Treatment control (5).
(7) Coherence (5).

High scores denote a more chronic and cyclical timeline, greater perceived negative consequences, greater perceived personal control and belief in treatment, and a sense of having a less coherent understanding. Although a causal subscale is included in the IPQS, the items were not easily classified into meaningful dimensions and are therefore not reported.

Outcome measures

(1) Hospital Anxiety and Depression Scale (HADS; Zigmund & Snaith, 1983) consists of 14 items (7 for anxiety, 7 for depression), all of which are scored 0–3.

(2) The Manchester Short Assessment of Quality of Life (Priebe *et al*. 1999) is a condensed and slightly modified version of the Lancashire Quality of Life Profile (Oliver *et al*. 1991). Two scores were used: mean quality of life (QL) and satisfaction with mental health (SMH), each rated on an 8-point scale.

(3) Global Assessment of Functioning (GAF; APA, 1994) is a measure of overall psychological disturbance rated by the interviewer. Only the GAF disability score was used in the main analysis. Reliability of the interviewers was assessed using a sub-sample of 10 participants who were rated by all three raters. The intraclass correlation $r=0{\cdot}74$ ($p<0{\cdot}01$), suggested adequate inter-rater reliability.

Statistical analysis

Not all participants completed all items. Therefore, the exact n for each of the statistical tests is reported. Descriptive statistics are presented for all measures followed by univariate associations between beliefs, coping and outcomes. Multiple regression analyses were then used to identify which of the independent variables were the best predictors of the outcome variables both cross-sectionally at each time point and longitudinally. Only variables that were univariately associated with each outcome variable ($p<0{\cdot}05$) at either time point were included in the regression. Patient characteristics were entered into the first block using forward selection. Symptom severity was forced into the second block to ensure that this was always controlled for. Beliefs about mental health problems were entered into block three using forward selection. Finally coping strategies were entered into block four using forward selection. The categorical coping variables were coded as two dummy variables, the first indicating whether or not a problem was perceived (primary appraisal) and the second indicating whether or not a particular coping style was used.

Despite multiple testing, a statistical significance level of $p<0{\cdot}05$ was chosen for interpreting the results. Given the exploratory nature of the study, the risk of making a type II error was considered more detrimental to future research than a type I error.

RESULTS

Patient characteristics

A total of 175 people were identified as eligible and invited into the study. Fifty-one declined, leaving a total sample size of 124 (response rate=71%). Participants were interviewed at two time points approximately 6 months apart (mean=197·59 days, S.D.=77·95 days). Twenty-two people (17·7%) declined to be interviewed at time 2. They did not differ significantly from those who were retained on any of the variables. A total of 94% of the sample ($n=116$) had a diagnosis of schizophrenia ($n=105$), or schizoaffective disorder ($n=11$). The rest had a diagnosis of psychosis ($n=5$), paranoid psychosis ($n=2$) or delusional disorder ($n=1$). The mean age of the sample was 38·81 years (S.D.=10·44 years). The average length of contact with mental health services was 12·05 years (S.D.=8·65 years). A total of 32% ($n=40$) of the sample were receiving regular depot medication and

Table 1. *Mean scores on beliefs about mental health problems, and comparison across coping styles at time 1 and time 2* [*F values* (*p value*)]

IPQS subscale (*n* in each analysis)	Time 1			Time 2		
	Mean per item (S.D.)	Positive coping (ANOVA)	Negative coping (ANOVA)	Mean per item (S.D.)	Positive coping (ANOVA)	Negative coping (ANOVA)
Identity 58 items; mean total ($n=113$)	35·10 (11·7)	10·74***	14·39***	36·56 (12·54)	1·52	1·91
Proportion attributed to mental health ($n=113$)	0·63	0·73	1·09	0·64 (0·28)	0·05	0·34
Proportion attributed to medication ($n=113$)	0·14	0·21	0·11	0·154 (0·15)	0·85	0·85
Proportion attributed to other factors ($n=113$)	0·31	0·45	0·50	0·29 (0·27)	0·28	1·37
Timeline acute/chronic ($n=109$)	3·53 (0·76)	4·74*	4·69*	3·49 (0·76)	1·37	1·45
Timeline cyclical ($n=111$)	3·77 (0·65)	7·43**	5·88**	3·79 (0·67)	0·61	1·56
Consequences ($n=111$)	3·43 (0·58)	2·40	3·40*	3·44 (0·60)	1·01	0·62
Personal control ($n=109$)	3·48 (0·70)	13·00***	16·12***	3·48 (0·66)	0·79	2·15
Treatment control ($n=111$)	3·53 (0·64)	7·95**	2·63	3·55 (0·65)	0·88	0·02
Coherence ($n=112$)	2·70 (0·69)	3·41*	1·56	2·65 (0·70)	0·23	1·78

IPQS, the Illness Perception Questionnaire for Schizophrenia.
Significance levels: * $p<0·05$; ** $p<0·01$; *** $p<0·001$.

78% ($n=97$) were receiving oral antipsychotic medication (most commonly atypicals). All psychotic symptoms had been stable for at least 6 weeks. The mean premorbid IQ assessed using the National Adult Reading Test was 97 (S.D. = 16).

Symptom severity

The mean score on the PANSS positive subscale was 15·12 (S.D. = 5·07) and on the negative subscale was 13·12 (S.D. = 4·82). There was no significant difference between the PANSS score at time 1 and time 2 ($t=1·454$, df = 101, $p=0·149$).

Beliefs about mental health problems

Table 1 shows mean scores per item on the IPQS. People reported experiencing well over half the symptoms listed. The majority of these were attributed to a mental health problem. People generally viewed their problems as chronic, cyclical and having high negative consequences. They felt they had some personal control over their symptoms and that treatment could offer some control. In general, people felt they had a coherent understanding of their mental health problems. There were no significant differences between scores at time 1 and time 2 on any IPQS subscales.

Coping strategies

Forty-two per cent of participants' primary appraisal was of not having any problems ($n=50$) at time 1 and they were categorized into group 1. Of the remaining 74 people, 36 (29% of the total sample) reported a high frequency of positive coping strategies and 21 (17%) used negative coping strategies.

At time 2, there was an increase in the proportion of people who did not perceive any problems.

Outcome measures

The mean score on HADS anxiety was 9·22 (S.D. = 4·50). The mean depression score was 7·86 (S.D. = 4·34).

The mean overall quality of life rating was 4·36 (S.D. = 0·85), which reflects 'neither satisfied nor dissatisfied'. Satisfaction with mental health had a mean score of 3·63 (S.D. = 1·54), suggesting that overall the sample were less satisfied with their mental health than with other aspects of their lives.

The mean score on the GAF disability subscale was 48·28 (S.D. = 11·30). This is consistent with 'serious impairment in social, occupational, or school functioning'.

There were no significant differences between scores at time 1 and time 2 on any of these measures.

Univariate analyses

Beliefs about mental health problems and coping strategies

Table 1 shows the results of ANOVAs to compare the three groups of people using different coping styles on each of the belief dimensions

Table 2. *Associations between independent variables (patient characteristics, symptom severity, beliefs, and coping) and dependent variables (outcome appraisal measures) at time 1 (n = 109–124)*

Independent variables	HADS anxiety	HADS depression	QL	SMH	GAF disability
Age	0·02	0·13	−0·14	−0·11	−0·17
Sex (*t* value)	−0·44	0·05	−1·79	−0·23	−1·87
Length of contact with services	0·08	−0·03	−0·05	−0·09	−0·09
PANSS pos + neg	0·34**	0·27**	−0·42**	−0·32**	−0·46**
Identity	0·36**	0·27**	−0·29**	−0·28**	−0·20*
Attributed to mental health problems	0·19*	0·09	−0·10	−0·18	−0·09
Attributed to medication side effects	−0·09	−0·13	0·06	0·11	0·19*
Attributed to other factors	−0·18	−0·06	0·04	0·21*	−0·06
Timeline acute/chronic	0·31**	0·28**	−0·24*	−0·30**	−0·27**
Timeline cyclical (non-parametric)	0·372**	0·452**	−0·263**	−0·190*	−0·155
Consequences	0·47**	0·54**	−0·61**	−0·48**	−0·41**
Personal control	−0·17	−0·14	0·26**	0·30**	0·30**
Treatment control (non-parametric)	−0·23*	−0·26**	0·32**	0·35**	0·28**
Coherence	0·13	0·32**	−0·22*	−0·23*	−0·20*
Positive coping strategies (*F* value)	16·42**	7·84**	29·01**	21·15**	16·25**
Negative coping strategies (*F* value)	16·70**	10·86**	32·35**	21·48**	21·66**

GAF, Global Assessment of Functioning; HADS, the Hospital Anxiety and Depression Scale; QL, quality of life; SMH, satisfaction with mental health.

Significance levels: * $p < 0{\cdot}05$; ** $p < 0{\cdot}01$.

All values are Pearson's correlations except for variables labeled (non-parametric) where Spearman's correlations are shown, and for coping variables where the *F* value for one-way ANOVA is given.

at time 1 and time 2. Significant differences at $p < 0{\cdot}05$ were further explored using Gabriel's *post-hoc* tests to control for unequal group sizes.

Positive coping strategies. At time 1 participants whose primary appraisal was of not having any problems (group 1) reported fewer symptoms, a more acute and less cyclical timeline, greater belief in treatment to control symptoms, and a more coherent understanding of their mental health problems than at least one of the other two groups. Among those who did perceive a problem, high frequency of positive coping strategies (group 3) was associated with an increased perception of personal control than those who reported few positive coping strategies (group 2, $p = 0{\cdot}002$). At time 2 there were no significant differences between any of the groups.

Negative coping strategies. At time 1 participants whose primary appraisal was of not perceiving any problems (group 1) had the most acute and least cyclical timelines for their symptoms, and believed that they had greater control over their symptoms. There were no significant differences between the groups distinguished by their use of negative coping styles on these subscales. Use of negative coping strategies was positively associated with increased identity scores ($p = 0{\cdot}028$), and more negative consequences ($p = 0{\cdot}044$). At time 2 there were no significant differences between any of the groups.

Associations between independent variables and outcome measures

Univariate relationships between the independent variables (patient characteristics, symptom severity, beliefs and coping) and dependent variables (outcome appraisal measures) are shown in Tables 2 and 3. None of the patient characteristics was directly associated with the outcome appraisal measures at time 1, but at time 2 being female was associated with a higher GAF score. Symptom severity was associated with poorer outcome appraisal on all measures at both time points. All belief dimensions were associated with at least one of the outcome appraisal measures. Poorer outcome appraisal was consistently associated with a stronger identity, a more chronic and more cyclical timeline, greater perceived negative consequences, less control and less sense of a coherent understanding of mental health problems at both time points.

Outcomes also significantly differed between groups on the coping variables at time 1. Most of these differences were between groups who differed in their primary appraisal. However, people who did perceive a problem and who also

Table 3. *Associations between independent variables (patient characteristics, symptom severity, beliefs, and coping) and dependent variables (outcome appraisal measures) at time 2 (n = 84–102)*

Independent variables	HADS anxiety	HADS depression	QL	SMH	GAF
Age	−0·05	0·19	−0·14	−0·11	−0·07
Sex (*t* value)	−0·58	1·67	−0·96	−0·93	−2·07*
Length of contact with services	0·01	−0·04	−0·01	−0·07	−0·03
PANSS pos + neg	0·32**	0·29**	−0·32**	−0·40**	−0·43**
Identity	−0·05	0·36**	−0·34**	−0·30**	−0·22
Attributed to mental health problems	0·22*	0·16	−0·14	−0·19	0·06
Attributed to medication side effects	−0·05	−0·14	0·26*	0·14	0·11
Attributed to other factors	−0·13	−0·15	0·03	0·15	−0·08
Timeline acute/chronic	0·35**	0·44**	−0·13	−0·36**	−0·23*
Timeline cyclical (non-parametric)	0·45**	0·25*	−0·18	−0·30**	−0·20
Consequences	0·52**	0·58**	−0·54**	−0·53**	−0·34**
Personal control	0·15	−0·21*	0·14	0·27*	0·18
Treatment control	−0·47**	−0·34**	0·453**	0·34**	0·24*
Coherence	0·18	0·37**	−0·23*	−0·24*	−0·14
Positive coping strategies (*F* value)	4·32*	0·38	2·03	4·15*	4·17*
Negative coping strategies (*F* value)	7·48**	0·69	1·59	5·00**	4·27*

GAF, Global Assessment of Functioning; HADS, the Hospital Anxiety and Depression Scale; QL, quality of life; SMH, satisfaction with mental health.

Significance levels: * $p < 0{\cdot}05$; ** $p < 0{\cdot}01$.

All values are Pearson's correlations except for variables labelled (non-parametric), where Spearman's correlations are shown, and for coping variables where the *F* value for one-way ANOVA is given.

used negative strategies had poorer perceived quality of life ($p = 0{\cdot}032$) and were rated as less able on the GAF ($p = 0{\cdot}013$) than those who perceived a problem but did not use negative strategies.

All of the significant differences at time 2 were due to differences between those who perceived a problem and those who did not rather than differences in use of specific coping strategies.

Multivariate analysis

Table 4 shows the results of the regression analyses with the outcome appraisal measures as the dependent variables at time 1. All the analyses were repeated on the data collected at time 2 to test the reliability of the findings and the results are described in the text below. Longitudinal analyses were also performed in which time 1 independent variables were used to predict outcome scores at time 2 (see Table 5). Scores on the outcome appraisal measures at time 1 were controlled for by entering them into an additional first block in the regression analysis.

To check how well the regression equations fitted the data, the standardized residuals were checked. None had an absolute value greater than three, suggesting adequate fit of the data (Field, 2000).

HADS anxiety

Symptoms alone were able to account for 11·3% of the variance in anxiety at time 1. With the addition of beliefs about symptoms, this increased to 34·2%. High negative consequences, strong identity and lack of faith in the ability of treatment approaches to control symptoms were all associated with higher anxiety, though treatment control became non-significant in the final model. The addition of coping failed to account for any additional variance.

Cross-sectional analysis of data collected at time 2 showed consistent findings over time. The total adjusted R^2 was 43·5%. Direct significant predictors were consequences [standardized beta ($s\beta$) = 0·303], identity ($s\beta = 0{\cdot}290$), and treatment control ($s\beta = -0{\cdot}307$). Symptom severity just failed to reach significance ($p = 0{\cdot}061$). Coping failed to account for any additional variance at time 2.

The longitudinal analysis showed that the only significant predictor of anxiety at time 2 was anxiety at time 1. This accounted for 46·1% of the variance.

HADS depression

Severity of symptoms explained 7·6% of the variance in depression at time 1. With the addition of beliefs about mental health problems,

Table 4. *Multiple regressions with outcome appraisal measures as dependent variables. Cross-sectional analysis at time 1*

Outcome variable	Independent variables in the equation	Beta (β)	CI Beta	sβ	Sig. ($p=$ or $<$)	Adj. R^2 with variable added
HADS anxiety ($n=109$)	PANSS pos + neg	0·086	0·001 to 0·173	0·163	0·048	0·113
	Consequences	0·175	0·039 to 0·311	0·237	0·012	0·280
	Identity	0·085	0·013 to 0·157	0·205	0·021	0·318
	Treatment control	−0·209	−0·448 to 0·030	−0·141	0·086	0·342
	Emotion focused coping	2·465	0·732 to 4·197	0·246	0·006	0·385
HADS depression ($n=111$)	PANSS pos + neg	0·055	−0·037	0·100	0·240	0·076
	Consequences	0·345	0·220	0·469	0·001	0·316
	Coherence	0·305	0·083	0·224	0·008	0·357
QL ($n=108$)	PANSS pos + neg	−0·019	−0·034 to −0·004	−0·186	0·013	0·238
	Consequences	−0·059	−0·079 to −0·040	−0·434	0·001	0·491
	Personal control	0·046	0·005 to 0·086	0·147	0·028	0·515
	Primary appraisal	−0·552	−0·828 to −0·276	−0·306	0·001	0·578
SMH ($n=108$)	PANSS pos + neg	−0·022	−0·047 to 0·014	−0·088	0·289	0·144
	Consequences	−0·061	−0·103 to −0·019	−0·245	0·005	0·291
	Personal control	0·076	−0·016 to 0·1269	0·136	0·104	0·342
	Proportion of symptoms attributed to other factors	1·419	0·397 to −2·381	0·214	0·010	0·364
	Treatment control	0·096	0·010 to 0·182	0·192	0·029	0·384
	Primary appraisal	−1·154	−1·715 to −0·594	−0·353	0·001	0·470
GAF ($n=107$)	PANSS pos + neg	−0·376	−0·619 to −0·133	−0·269	0·003	0·217
	Consequences	−0·335	−0·655 to −0·015	−0·181	0·041	0·281
	Personal control	0·640	−0·025 to −1·305	0·153	0·059	0·317
	Proportion of symptoms attributed to medication effects	16·137	2·780 to 29·494	0·187	0·018	0·342
	Primary appraisal	−6·780	−11·161 to −2·40	−0·280	0·003	0·393

GAF, Global Assessment of Functioning; HADS, the Hospital Anxiety and Depression Scale; PANSS, the Positive and Negative Syndrome Scale; QL, quality of life; SMH, satisfaction with mental health.
sβ, Standardized beta.

Table 5. *Multiple regressions with outcome appraisal measures as dependent variables. Longitudinal analysis*

Outcome variable	Independent variables in the equation	Beta (β)	CI Beta	sβ	Sig. ($p=$ or $<$)	Adj. R^2 with variable added
HADS anxiety ($n=102$)	HADS anxiety time 1	0·635	0·465 to 0·804	0·672	0·001	0·461
HADS depression ($n=91$)	HAD depression time 1	0·552	0·376 to 0·729	0·593	0·001	0·489
	PANSS pos + neg time 1	−0·028	−0·117 to 0·061	−0·051	0·534	0·483
	Consequences time 1	0·149	0·019 to 0·278	0·218	0·025	0·509
QL ($n=89$)	Quality of life time 1	0·399	0·181 to 0·618	0·394	0·001	0·480
	PANSS pos + neg	−0·0007	−0·018 to 0·019	0·006	0·894	0·474
	Consequences time 1	−0·049	−0·075 to −0·023	−0·361	0·001	0·550
	Negative coping strategies	−0·407	−0·047 to −0·433	−0·177	0·027	0·572
SMH ($n=91$)	SMH time 1	0·371	0·144 to 0·598	0·351	0·002	0·347
	PANSS pos + neg time 1	0·032	−0·070 to 0·007	−0·152	0·104	0·365
	Consequences time 1	−0·081	−0·134 to −0·028	−0·315	0·003	0·425
GAF disability ($n=96$)	GAF disability time 1	0·795	0·670 to 0·921	0·833	0·001	0·689

GAF, Global Assessment of Functioning; HADS, the Hospital Anxiety and Depression Scale; PANSS, the Positive and Negative Syndrome Scale; QL, quality of life; SMH, satisfaction with mental health.
sβ, Standardized beta.

symptom level was no longer a significant predictor and the amount of variance explained increased to 35·7%. A perception of high negative consequences and lack of coherence were both associated with greater depression. Coping did not account for any additional variance.

Cross-sectional analysis of the time 2 data showed that, as at time 1, high negative

consequences (sβ = 0·381) and low coherence (sβ = 0·333) were the strongest predictors of depression. Greater symptom severity (sβ = 0·177) and a more chronic perception of timeline (sβ = 0·279) were also direct predictors of greater depression at time 2. Coping did not account for any additional variance.

In the longitudinal analysis time 1 depression scores accounted for 48·9% of the variance in depression scores at time 2. High negative consequences at time 1 also significantly predicted later depression.

QL

Lower symptom severity score was associated with higher QL and accounted for approximately 23·8% of the variance at time 1. With the addition of beliefs about symptoms, the amount of variance accounted for increased to 51·5%. Perception of low negative consequences and greater personal control predicted higher perceived QL scores. Primary appraisal of not having a problem increased the amount of variance explained a small but significant amount to 57·8%.

The data at time 2 confirmed low negative consequences as the main predictor of high QL (sβ = −0·555). Control was important again, though high treatment control (sβ = 0·289) was a stronger predictor of QL than personal control at time 2. Neither coping nor symptom severity were significant direct predictors of QL at time 2.

In the longitudinal analysis quality of life at time 2 was strongly predicted by quality of life at time 1. However, perceived negative consequences was also significant and increased the amount of variance accounted for from 48·0% to 55·0%. Negative coping was able to account for a small but significant additional 2·2% of variance.

Satisfaction with mental health (*SMH*)

Symptom severity was not a direct significant predictor of SMH at time 1. Perception of low negative consequences, greater treatment control and attributing a higher proportion of symptoms to factors other than mental health problems or medication effects was associated with increased SMH problems. These beliefs were able to account for 38·4% of the variance. Primary appraisal increased this to 47%. People who did not perceive themselves as having any problems reported higher satisfaction with their mental health.

Time 2 analysis supported the important role of beliefs about consequences in accounting for the greatest amount of variance in SMH. However, symptom severity was a direct predictor at time 2 (sβ = −0·232). Symptoms accounted for approximately 11·5% of the variance in satisfaction, and beliefs about consequences (sβ = −0·496) increased this to 33·9%. Primary appraisal and coping variables were unable to account for any additional variance.

SMH at time 1 positively predicted satisfaction at time 2 and accounted for approximately 34·7% of the variance. Higher perceived negative consequences at time 1 significantly predicted lower satisfaction at time 2 accounting for an additional 7·8% of variance. Symptom severity was not a significant predictor.

GAF-disability

Symptom severity accounted for 21·7% of the variance in GAF scores with fewer symptoms being associated with higher GAF ratings. Beliefs about mental health problems increased this to 34·2% with fewer perceived negative consequences, and attributing a higher proportion of symptoms to medication effects both being associated with higher GAF ratings. Primary appraisal increased the amount of variance accounted for to 39·3%. People who did not perceive themselves as having any problem received higher GAF ratings.

Very similar results were found using the time 2 data. Higher functioning was associated with lower symptom severity (sβ = −0·368), and fewer negative consequences (sβ = −0·305). GAF scores were also higher for females than for males (sβ = 0·205). Symptom severity accounted for approximately 17% of the variance and negative consequences increased this to 35·3%. None of the coping variables accounted for any additional variance.

There was very little change in GAF scores between time 1 and time 2. GAF ratings at time 1 accounted for 68·9% of the variance in GAF ratings at time 2. None of the other variables accounted for any additional variance.

DISCUSSION

The main findings from the study support the SRM in showing that variation in beliefs about mental health problems is associated with significant variation in appraisal of outcome both cross-sectionally and longitudinally.

In the cross-sectional analysis the amount of variation accounted for by beliefs in anxiety (22·9% at time 1–26·8% at time 2) and in depression (28·1% at time 1–41·5% at time 2) is directly comparable to that found in physical health studies using similar methodologies (Rutter & Rutter, 2000; Edwards *et al.* 2001; Fortune *et al.* 2002). In all of these studies beliefs about negative consequences were most strongly associated with outcome. Coherence was also an important predictor of depression in this study but was not assessed in the physical health studies. Perceived QL and SMH have also been used as measures of outcome appraisal in physical health. Rutter & Rutter (2002) showed that for patients with IBS 26% of variance in perceived QL (compared to 27·7–38·6% in this study) and 28% of variance in satisfaction with mental health (compared to 24·0–22·4% in this study) could be accounted for by illness beliefs with high negative consequences again showing the strongest relationship.

The GAF has not been used in previous studies but was included here as a non self-report measure in order to test whether relationships between beliefs and outcome appraisal were largely a function of them being from a common source. The results from the GAF show that beliefs accounted for significant amounts of variance at both time points. As with the above analyses, perceived negative consequences were the strongest predictors of GAF ratings.

In this study we attempted to examine how beliefs at one time point could be used to predict outcome appraisal at a second time point. However, there was very little change over the 6-month period in either beliefs about mental health problems or outcome appraisal. Despite this, perception of greater negative consequences at time 1 did predict greater depression, lower perceived quality of life, and less satisfaction with mental health at time 2. The amounts of variance accounted for by beliefs were small (2% for depression, 7% for QL and 6% for SMH) but comparable to those reported in longitudinal studies in physical health (e.g. Scharloo *et al.* 2000), suggesting that beliefs about health problems are at least as important in mental health as they are in physical health. One reason for the amount of variance being so small is that the outcome appraisal measures are very general and therefore likely to be influenced by variables other than those linked to health, such as relationships, housing, work etc.

The clinical significance of the variance in outcome appraisal accounted for by beliefs in both physical and mental health problems is unclear. Intervention studies are needed to test both the causal mechanism of the relationship between beliefs and outcome and the potential to change this relationship in a way that has a meaningful impact on peoples' lives. Petrie *et al.* (2002) reported the results of a Randomized Controlled Trial using a three-session early intervention to challenge illness perceptions following a myocardial infarction. They found a reduction in negative beliefs, and reduced delay in returning to work for the intervention group. Intervention studies specifically focused on challenging negative beliefs about mental health problems have not yet been reported.

The assertion that coping mediates the relationship between illness beliefs and outcome appraisal was not supported in this study. Beliefs had significant direct associations with outcome appraisal and coping generally accounted for little or no additional variance. However, firm conclusions cannot be drawn as there were considerable difficulties in accurately measuring coping. In this study, the reduction of specific strategies to categorical variables measuring positive and negative strategies is problematic in that fails to take into account the effectiveness of strategies for the individual, how consistently they are used, and the appropriateness of strategies to different settings. Finally, univariate associations between beliefs and coping suggest some degree of shared variance that is difficult to disentangle using these statistical methods (though tolerance statistics were checked to ensure that these associations were not causing multi-colinearity in the analyses).

Despite these problems, the finding that coping is not a mediator has potentially important implications of the mechanism underlying the association between beliefs and outcome.

The finding is consistent with a number of physical health studies, which have failed to find strong evidence for the importance of coping (Moss-Morris *et al*. 1996; Heijmans, 1999; Steed *et al*. 1999). These studies suggest that rather than beliefs guiding attempts to cope, which in turn impact on outcome appraisal as the SRM suggests, beliefs about health problems may have a direct effect on the outcome. This is consistent with a more general cognitive models of psychosis as described by Morrison (2001), Birchwood *et al*. (2000) and Garety *et al*. (2001).

This study has several further limitations that need to be taken into account when interpreting the findings. The assessment of beliefs in this study does not include some potentially important dimensions. Beliefs about the causes of mental health problems and beliefs about personal responsibility and blame are assessed by the IPQS, but did not form internally consistent subscales and so were not used in this analysis (Lobban *et al*. in press). The important role of beliefs about specific treatments has also been highlighted in previous literature (Horne & Weinman, 1995), but were not assessed.

The longitudinal analysis in this study showed little change over time. Future research may focus on longer time periods and on events that may be likely to be associated with change, such as interventions, or relapse.

Finally, there are important differences between physical and mental health problems that may limit the applicability of the SRM to psychosis. The SRM assumes that people hold models of illness in their heads that can be accessed by questioning. In psychosis, the nature of the disorder may impair the ability or the need to do this. In physical health problems there may be a desire to identify a disease entity that can be diagnosed and separated from the sense of self. In psychosis the distinction between self and illness is often more blurred and this may make the ability to create an illness model more difficult. The greater degree of stigma associated with psychosis may increase the impact of the social environment on the development and expression of beliefs in a way that is not currently addressed in current applications of the SRM.

Despite these limitations, the results have important clinical implications. They suggest that the current focus on symptom severity as a main outcome measure in clinical trials is perhaps unwarranted. Symptom severity accounted for some variance in outcome appraisal for individuals in this study, but perceived consequences, controllability and a sense of coherence were also very important. This highlights important opportunities for interventions that aim to challenge negative appraisals using well developed cognitive and behavioural therapies.

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DECLARATION OF INTEREST

None.

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APPENDIX

Timeline acute/chronic
- My mental health problems will last a short time (R).
- My mental health problems are likely to be permanent rather than temporary.
- My mental health problems will last for a long time.
- My mental health problems will pass quickly (R).
- I expect to have these mental health problems for the rest of my life.
- My mental health problems will improve in time (R).

Timeline cyclical
- Sometimes I have more symptoms than other times.
- I have times when I am well and times when I am not so well.
- Sometimes the symptoms of my mental health problems are worse than other times.
- Some of my symptoms will be there all the time but others will come and go.

Consequences
- My mental health problem is a serious condition.
- My mental health problems do not have much effect on my life (R).
- My mental health problems have financial consequences for me.
- My mental health problems make it more difficult for me to do day to day things.
- My mental health problems cause difficulties for those who are close to me.
- I don't get on as well with our family since their mental health problems.
- My mental health problems have messed up my social life.
- My mental health problems mean that I am valued less by other people.
- My mental health problems make working very difficult for me.
- I have lost important relationships as a result of my mental health problems.
- My mental health problems have had some positive effects on my life (R).

Personal control
- There are some things that I can do to control my symptoms.
- To some extent, what I do can determine whether my mental health problems get better or worse.
- Nothing I do will affect my mental health problems (R).
- My actions will have no effect on the outcome of my mental health problems (R).

Treatment control
- There is little treatment available that can improve my mental health problems (R).
- My treatment will be effective in managing my mental health problems.
- The negative effects of my mental health problems can be prevented (avoided) by my treatment.
- My treatment can control my mental health problems.
- There is no treatment that can help with my condition (R).

Illness coherence
- I feel very puzzled by my mental health problems.
- I don't have any understanding of my mental health problems at all.
- I feel that I don't know anything about my mental health problems.
- My mental health problems make no sense to me at all.
- I have a clear picture or understanding of my mental health problems (R).

(R) = reverse scored items.