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How consistent are beliefs about the causes and solutions to illness?:

an experimental study.

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Abstract

Objectives: Research illustrates that people hold beliefs about the causes and solutions to illness. This study aimed to assess the consistency in these beliefs in terms of their variation according to type of problem and whether they are consistent with each other. Further the study aimed to assess whether they are open to change and whether changing beliefs about cause resulted in a subsequent shift in beliefs about solutions. **Design:** Experimental factorial 3 (problem) X 2 (manipulated cause) design using vignettes. **Methods:** 279 participants rated their beliefs about the cause and solution of one of three problems (depression, obesity, sleep problems) following a vignette which described the causes as either psychological or biomedical.

Results: Beliefs about causes and solutions varied according to type of problem indicating that beliefs are illness specific. The results also showed that people hold beliefs about causes and solutions which are consistent with each other as an endorsement of a psychological cause was consistently reflected in a belief that a psychological solution was most appropriate and effective. A similar pattern was seen for beliefs about biomedical causes and solutions. Finally the results showed that beliefs were open to manipulation and that a shift in beliefs about causes resulted in a parallel shift in beliefs about solutions. **Conclusions:** People hold beliefs about causes and solution which vary according to type of problem. However, they are always consistent with each other and a shift in one set of beliefs results in a significant shift in the other set.

Keywords: illness representations, beliefs, causes, solutions, change.

Introduction

In 1982, Brickman and colleagues analysed different models of helping and coping behaviours and argued that they could be understood in terms of attributions for the causes and solutions to the problem being considered. In particular, Brickman et al (1982) described the moral model in which the individual is responsible for both the cause and the solution to a problem, the enlightenment model whereby the individual is responsible for the cause but not the solution, the biomedical model whereby the individual is responsible for neither the cause nor the solution to a problem and the compensatory model in which the individual is not responsible for the cause but is responsible for the solution.

This approach has proved a useful basis for classifying clinical interventions. It also illustrates how beliefs about causes and solutions can either be consistent or inconsistent with each other. In line with this, some research has explored whether the different permutations of beliefs about causes and solutions relate to patient outcomes. For example, some studies indicate that a compensatory model produces the best outcomes for managing alcoholism (Brickman et al. 1982), recovering from accidents (Frey et al, 1987) and patients adjusting to breast cancer (Taylor et al, 1984). This suggests that unmatched beliefs about causes and solutions may be most effective. In contrast, however, some research suggests a role for matched beliefs in predicting improved health outcomes. For example, research exploring adherence to asthma medication concluded that patients are more likely to take their medication if their beliefs about the cause of their problem are consistent with their beliefs about its treatment (Horne, 1997; Horne and Weinman, 1999; 2002). Similarly, from a study of successful weight loss and maintenance, Ogden (2000) concluded that the 'success stories' were more likely to believe that behaviour was central to both the cause and

solution of their weight problem. Furthermore, consistent beliefs about causes and solutions have also been reported to relate to the effectiveness of weight loss medication (Ogden and Sidhu, 2006), uptake of rehabilitation following heart attack (Petrie et al, 1996) and sustained changes in diet, smoking and exercise behaviours (Ogden and Hills, in press). A degree of consistency between beliefs about causes and solutions would therefore seem potentially to relate to health outcomes.

Research has also explored whether beliefs about causes and solutions differ according to the problem being considered (Ogden et al, 1999; 2001) and Leventhal et al (1984; 1992; 1997) has argued that illness representations are illness specific. For example, Ogden et al (1999; 2001) illustrated that whereas doctors tend to see depression from a more biomedical perspective they see obesity as the product of behaviour. Furthermore, some research has also explored population differences for these two dimensions of illness representations with a focus on differences between GPs' and patients' beliefs about depression and obesity (Ogden et al, 1999; 2001) and patients and non patients views about heart disease (French et al, 2001). Similarly, Brickman et al (1982) suggested that many of the problems characterizing relationships between help givers and patient arise from the fact that the two parties are applying different models of illness and Wile (1977) argued that 'Many of the classic disputes which arise between clients and therapists can be attributed to differences in their theories of aetiology and cure'.

Such a focus on beliefs about causes and solutions finds reflection in the self regulatory model of illness behaviour which describes how individuals develop illness representations that inform the ways in which they adjust and respond to illness (eg. Leventhal et al, 1997). Central to these representations are people's beliefs about the

cause of their illness which can range from psychological causes such as health related behaviours, cognitions or personality to biomedical causes such as a virus or genetics through to social factors such as pollution. In addition, the self regulatory model also describes a central role for beliefs about treatments in terms what types of treatment should be used for what problem and whether a treatment is deemed effective. Leventhal and colleagues suggest that illness behaviour is governed by the 'if – then' rules with beliefs about causes translating into subsequent action (Leventhal et al, 1984; 1992; 1997). For example, Leventhal and colleagues argue that individuals decide whether or not to carry out behaviours such as seeking help or taking medication based upon their beliefs about what has caused their problem. Accordingly, a person may believe '**if** my heart attack was caused by an inactive lifestyle **then** I will do more exercise'. This would then lead them to follow their doctor's advice regarding rehabilitation. In contrast, however, if their cognitions were '**if** my heart attack was caused by over using my heart, **then** I must take more rest' they would find recommendations to follow an exercise regimen strange and confusing. Leventhal and colleagues also argue that the 'if – then' rules apply across the range of the different dimensions of illness representations such as time line, consequences and control and cure. For example, a belief about how long an illness is going to last for may well influence decisions to seek help and a belief about the controllability of an illness would also impact upon decisions to take medication. Research has described such associations as a 'goodness of fit' between different sets of cognitions (Petrie and Weinman, 2006). Two recent studies have examined the extent to which beliefs about causes are linked to beliefs about solutions. Kuppin and Carpiano (2006) explored lay beliefs about mental illness and concluded that a belief in biological causes was associated with greater endorsement of biological solutions.

In a similar vein, Ogden and Flannagan (in press) examined GPs' and lay people's beliefs about obesity and similarly reported that a belief in a biological cause of obesity was related to a stronger belief in the effectiveness of obesity medication. In contrast, an endorsement of policy change as a solution was related to a belief that obesity was caused by social factors. This pattern of consistency, however, was only apparent in GPs and not the lay sample.

Research therefore shows that people hold representations about illness, and that beliefs about the causes and solutions to illness are central to these representations. Some studies have explored differences in these beliefs across different populations, whilst others have explored differences by type of problem being considered. Furthermore, research has also addressed the impact of these beliefs upon health outcomes. Research has therefore focused on the consistency in these beliefs. To date however, no research has examined whether beliefs about causes and solutions are open to change and whether a shift in one set of beliefs would result in a subsequent shift in the other. This would seem particularly pertinent if the degree of consistency could relate to patient outcomes and is in line with Leventhal et al's (1984) notion of the 'if – then' rules. The present study therefore aimed to explore whether beliefs about causes and solutions are consistent across a range of health problems and whether they are consistent with each other. In addition, the study aimed to assess whether they can be manipulated and whether a shift in beliefs about causes results in a subsequent shift in beliefs about solutions. The present study focused on beliefs about obesity, depression and sleep problems. These were selected to present the participants with a range of familiar problems for which either a biomedical or psychological cause and solution would seem viable.

Method

Design

The study used an experimental factorial design with 2 independent variables; problem (depression vs sleep problems vs obesity) and experimental manipulation (biomedical cause vs psychological cause). The dependent variables were; beliefs about causes (biomedical and psychological), beliefs about appropriateness of treatment (biomedical and psychological), and beliefs about effectiveness of treatment (biomedical or psychological). A between subjects design was employed with each participant receiving one vignette describing one problem (depression, sleep problems, or obesity) which indicated either a biomedical or psychological cause. Such a design enabled participants' beliefs about causes to be manipulated and to assess the impact of this upon their beliefs about solutions.

Sample

Questionnaires were distributed to 390 students at a University through lectures and laboratory classes. The study was explained to the students by the researcher who were asked to stay and complete the questionnaire. Equal numbers of questionnaires were randomly handed out to participants for each condition and each participant received one vignette. Completed questionnaires were received from 279 students (response rate = 76%). The non responders were those who left the lecture theatre or laboratory without completing the questionnaire. No data is available on these students.

Procedure

Participants were asked to take part in a study designed to explore their beliefs about a range of illnesses. They were then asked to complete the different rating scales after reading the case vignette. Ethical approval was obtained via the University Ethics committee.

Experimental manipulation

In order to manipulate participants' beliefs about the causes of the problem, vignettes were prepared for each problem (depression, sleep problems, and obesity) designed to emphasise either the psychological or biomedical causes of the problem. All vignettes started with a description of the problem as follows: 'Person X is suffering from depression / sleep problems / obesity'. To define the cause of the problem as psychological the vignette then stated 'and has recently experienced high levels of stress'. To define the problem as biomedical the vignette then read 'which runs in the family'. This resulted in 6 vignettes which varied in terms of type of problem (depression, obesity, sleep problems) and experimental manipulation of cause (psychological vs biomedical).

Measures

After reading the vignette participants completed a questionnaire which measured the following variables:

Beliefs about the problem

Participants rated a series of statements using 5 point Likert scales ranging from 'not at all' (1) to 'entirely / completely' (5). These items related to the following constructs. The items for each construct were kept as consistent as possible between

problems but some variability was necessary so that the causes and solutions reflected realistic approaches for each problem.

i) Causes of the problem

Participants were asked to what extent they believed 6 factors were causes of the problem which varied according to the problem being described. These were conceptualised as either biomedical causes or psychological causes as follows in line with the existing literature (Leventhal et al, 1997):

Biomedical: ‘genetics’, ‘brain chemical imbalance’, and ‘hormones’ (for all problems).

Psychological: Depression: ‘worry’, ‘negative thought processes’, ‘upsetting life events’; **Obesity:** ‘low self esteem’, ‘eating the wrong food’, ‘not doing enough exercise’; **Sleep problems:** ‘anxiety’, ‘anger’, ‘upsetting life events’.

ii) Appropriate treatment

Participants were asked to what extent they thought the problem should be treated by 6 different treatments which were conceptualised as biomedical or psychological.

Biomedical: Depression: ‘medication’, ‘a doctor’, ‘a psychiatrist’; **obesity:** ‘surgery’, ‘medication’, ‘a doctor’; **Sleep problems:** ‘medication’, ‘a doctor’, ‘alternative medicines’.

Psychological: Depression: ‘counselling’, ‘therapy’, ‘speaking to friend or family’; **obesity:** ‘change of diet’, ‘change of exercise patterns’, ‘counselling’; **sleep problems:** ‘therapy’, ‘speaking to friend or family’, ‘counselling’.

iii) Effectiveness of treatment

Participants were also asked to indicate how effective they thought the treatment of the problem would be in terms of 6 factors which were the same as those described above for appropriateness of treatment.

Mean scores were then computed for a biomedical cause, a psychological cause, a biomedical treatment, a psychological treatment, the effectiveness of a biomedical treatment and the effectiveness of a psychological treatment.

Profile characteristics

Participants finally recorded their age (yrs), gender and personal experience of the problem and if anyone close to them had suffered from the problem.

Data analysis

Data was analysed using SPSS. Data was checked for distribution and heterogeneity of variance (all $p > 0.05$). The results were then analysed to describe participants' profile characteristics, to explore correlations between beliefs about causes and beliefs about solutions across all problems and to assess the main effects of problem (depression, obesity, sleep problems) and the experimental manipulation (biomedical or psychological causes) on participants' beliefs about causes and solutions using two-way 3 (problem) by 2 (manipulation) ANOVA and post hoc tests (LSD). For the ANOVA, problem (depression, obesity, sleep problems) and manipulation (biomedical cause vs psychological cause) were entered as independent variables and beliefs about causes, treatments and effectiveness of treatments were entered as dependent variables.

Results

1. Profile characteristics

The participants' profile characteristics are shown in Table 1.

-Insert table 1 about here –

The participants were equally split by gender and were mostly in their twenties. The sample was equally divided according to the experimental manipulation. The results also showed that about a third had personally experienced each of the problems in question and just over a third had known someone who had experienced the problem. These were not used to explore between group differences as the numbers for each problem and by each manipulation were too small.

2. Correlations between beliefs about causes and solutions

Correlations between beliefs about causes and solutions are shown in table 2.

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The results showed significant positive correlations between beliefs about psychological causes and psychological solutions and between beliefs about biomedical causes and biomedical solutions. The results also showed significant negative correlations between psychological causes and biomedical solutions and biomedical causes and psychological solutions. This indicates that individuals tend to hold beliefs about causes and solutions which are consistent with each other.

3. Effect of type of problem and experimental manipulation

The data were analysed using 2-way-ANOVA to assess the main effects of both the problem (obesity vs depression vs sleep problems) and the experimental manipulation

(biomedical causes vs psychological cause). The interaction between the two was also assessed. These results are shown in Table 3.

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Main effect of the type of problem

The results showed significant main effect of problem for beliefs about psychological causes, psychological treatment, biomedical treatment, psychological treatment effectiveness and biomedical treatment effectiveness. No differences were found for biomedical causes, indicating that the three problems were viewed as being equally caused biomedically. Post hoc tests indicated that sleep was viewed as more likely to be caused by psychological factors than depression or obesity; that obesity was least appropriate for psychological treatments; that sleep problems were most appropriate for biomedical treatments, and that both psychological and biomedical treatments were more effective for sleep problems compared to obesity and depression. Participants therefore differentiated in their beliefs about causes and solutions in terms of the type of problem being considered.

Main effect of experimental manipulation

The results showed a significant main effect of the manipulation for all beliefs about the problem. Post hoc tests indicated that participants who were told that the problem had a psychological cause were more likely to believe that the problem had a psychological cause, that a psychological treatment was more appropriate and that psychological treatments would be more effective. In parallel, participants who were told that the problem had a biomedical cause were more likely to believe that the problem had a biomedical cause; that a biomedical treatment was more appropriate and that a biomedical treatment would be more effective. The manipulation was

designed to change beliefs about causes. These results suggest that this was effective and that this manipulation also had a subsequent effect upon beliefs about solutions.

Interaction between nature of problem and experimental manipulation

The results showed a significant interaction between the nature of problem and the experimental manipulation for psychological and biomedical treatments in terms of both appropriateness and effectiveness. Therefore although the manipulation changed participants' beliefs about solutions this effect varied according to the type of problem being considered. In particular, the means indicated that for beliefs about psychological treatment, depression was more open to manipulation and for beliefs about biomedical treatment and the effectiveness of both psychological and biomedical treatments, sleep problems were more open to manipulation.

Discussion

The present aimed to explore how consistent individuals' beliefs are about causes and solutions, whether these beliefs can be changed and whether a change in one set of beliefs results in a subsequent shift in the other set.

In terms of consistency across health problems, the results showed that beliefs about causes and solution varied depending upon the problem being considered. Previous research illustrates differences in beliefs in terms of the population being studied (eg. French et al, 2001; Ogden et al, 1999; 2001) and it has been argued that such differences could account for problems arising between patients and health professionals (Brickman et al, 1982). The results from this study support Leventhal

et al's argument that illness representations are illness specific (Leventhal et al, 1984; 1992; 1997) and suggest that beliefs are not consistent across problem type.

In contrast, however, the results showed that beliefs about cause and solution do tend to be consistent with each other. In particular, those who endorsed a psychological cause also tended to endorse a psychological treatment with a similar pattern emerging for beliefs about biomedical causes and solutions. This provides support for previous research that has reported consistency for beliefs about causes and solutions for both mental illness and obesity (Kuppin and Carpiano, 2006; Ogden and Flannagan, in press). It is also in line with Leventhal and colleagues' notion of the 'if – then' rule with beliefs about causes translating into subsequent action (Leventhal et al, 1984; 1992; 1997) . The results from the present study provide evidence for this association and illustrate consistency across these different dimensions of illness representations.

This consistency was also supported by the results of the experimental manipulation as although beliefs about causes and solutions changed following the simple manipulation, they changed in a consistent fashion; changing beliefs about cause resulted in a subsequent shift in beliefs about solutions. Previous research indicates that matched models of causes and solutions are predictive of better patient outcomes such as adherence and behaviour change (Horne and Weinman, 1999; 2002; Ogden and Hills, in press; Ogden and Sidhu, 2006). These results illustrate that many people show such matched models of illness. Furthermore the results indicate that beliefs can be changed but that they tend to change in a consistent way with beliefs about causes and solutions remaining in line with each other.

There are however, some problems that need to be addressed. First the study utilised vignettes as a means to access people's beliefs about causes and solutions.

Furthermore, the study involved a non patient sample. Both these approaches have their limitations as beliefs are being accessed in an abstract sense rather than about a concrete problem that the person is currently experiencing. Such an approach was necessary for the present study as the aim was to explore beliefs across a range of problems (ie depression, obesity and sleep problems) and it would not have been possible to find a group who were currently experiencing all these problems. Much research also illustrates that people hold beliefs about illnesses even in the absence of symptoms (eg. Leventhal et al, 1997) and it was these beliefs that were the focus of the present study. The study therefore provides some insights into beliefs about causes and solutions to a range of health problems and how these beliefs are associated with each other. Further research is needed to enable these results to be generalised beyond the confines of a student sample and to assess whether consistency is also common amongst a clinical population.

To conclude, the results from the present study indicate that although beliefs about causes and solutions vary according to type of problem they tend to be with consistent with each other and, if manipulated, they change in consistent ways. These results have positive implications for patient health as such consistent models have been shown to be better predictors of changes in patient outcomes. Further, if beliefs can be changed then interventions offering particular solutions could include a manipulation to facilitate the development of matched causal beliefs. However, such a consistent approach to causes and solutions may not always be of benefit,

particularly if it is the health professional rather than the patient who holds such consistent beliefs. It has been argued that treatment interventions for health related problems are often developed based upon an understanding of the cause. For example, as obesity is generally considered a problem of overeating and under activity, treatments emphasise similarly behavioural solutions (Ogden, 2005). Similar consistency can also be found for many health problems which are conceptualised as a product of behaviour. Although in line with much psychological thinking such a consistent approach ignores and underestimates the potential contribution of non behavioural solutions to behavioural problems including structural changes, changes in policy and biomedical interventions. By endorsing a consistent approach many health professionals may neglect alternative solutions which are not in line with their beliefs about causality. People therefore do seem to hold beliefs about cause and solution which are consistent with each other. For patients trying to respond to or adopt a particular solution, such consistency may well be predictive of positive outcomes. But for health professionals designing or recommending interventions, such consistency may limit their perspective on what constitutes a suitable solution.

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Table 1: Participants' profile characteristics

Variable	N / % / X / SD
Sex	Male = 147 (49.5%) Female = 150 (50.5%)
Age	Mean = 21.6 (SD= 2) Range: 18 – 28
Personal problem	No = 198 (66.7%) Yes = 99 (33.3%)
Other person had problem	No = 176 (59.3%) Yes = 121 (40.7%)
Problem	Sleep = 64 (21.5%) Depression = 116 (39.1%) Obesity = 117 (39.4%)
Exp Cause	Biomedical = 132 (44.4%) Psychological = 165 (55.6%)

	Randomisation	
	Personal problem	Condition
Sleep	No = 39 (64%)	Biomed = 23 (35.9%)
	Yes = 25 (36%)	Psy = 41 (64.1%)
Depression	No = 75 (64.7%)	Biomed = 52 (44.1%)
	Yes = 41 (35.3%)	Psy = 64 (55.9%)
Obesity	No = 84 (71.8%)	Biomed = 57 (48.7%)
	Yes = 33 (28.2%)	Psy = 60 (51.3%)

Table 2: Correlations between beliefs about causes and solutions

	Psych. cause	Biomed. Cause	Psych. Treat	Biomed. Treat	Psych. Effect	Biomed Effect
Psych. Cause						
Biomed Cause	-0.48*					
Psych. Treat	0.47*	-0.39*				
Biomed Treat	-0.43*	0.39*	-0.39*			
Psych. Effect	0.51*	-0.45*	0.45 *	-0.37*		
Biomed Effect	-0.39*	0.44*	-0.31*	0.54 *	-0.36*	

*p<0.0001

Table 3: Effects of problem and experimental manipulation on means scores (SDs) for beliefs about causes and solutions

	Sleep		Depression		Obesity		Main effect Problem	Main effect manipulation	Manip X Problem
	Biomed	Psych	Biomed	Psych	Biomed	Psych	F / eta ² / P	F / eta ² / P	F / eta ² / P
Psych cause	2.61 (0.54)	3.76 (0.42)	2.29 (0.54)	3.60 (0.59)	2.41 (0.55)	3.70 (0.55)	3.86 / 0.03 p = 0.02	359 / 0.56 p = 0.0001	0.62/0.004 p = 0.54
Biomed cause	3.28 (0.47)	2.34 (0.5)	3.36 (0.63)	2.26 (0.56)	3.43 (0.66)	2.44 (0.52)	1.76 / 0.01 p = 0.173	205 / 0.41 p = 0.0001	0.54 / 0.004 p = 0.59
Psych treat	2.70 (0.6)	3.23 (0.55)	2.47 (0.62)	3.72 (0.51)	2.56 (0.61)	3.20 (0.61)	4.09 / 0.03 p = 0.018	125 / 0.30 p = 0.0001	10.49/ 0.07 p =0.0001
Biomed treat	3.19 (0.46)	3.10 (0.6)	3.50 (0.62)	2.36 (0.56)	3.43 (0.64)	2.34 (0.54)	4.08 / 0.03 p = 0.018	116.1/ 0.29 p = 0.0001	18.2/ 0.11 p =0.0001
Psych effect	2.87 (0.51)	3.62 (0.62)	2.34 (0.63)	3.58 (0.52)	2.40 (0.46)	3.3 (0.63)	10 / 0.07 p = 0.0001	202 / 0.41 p = 0.0001	4.9/ 0.03 p = 0.008
Biomed effect	3.07 (0.54)	3.14 (0.55)	3.28 (0.65)	2.30 (0.5)	3.33 (0.63)	2.50 (0.53)	5.6 / 0.04 p = 0.004	66.07 / 0.19 p = 0.0001	17.26/ 0.11 p =0.0001