Treatment appraisals and beliefs predict adherence to complementary therapies: A

prospective study using a dynamic extended self-regulation model

Running Head: Predicting adherence to complementary therapies

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ABSTRACT

Objectives: Complementary and alternative medicine (CAM) is used by large numbers of the general public and is increasingly becoming integrated into the mainstream. An understanding of why people use CAM in general has been developed in the literature, but relatively little is known specifically about adherence to CAM. We tested hypotheses (derived from a dynamic extended version of Leventhal's common sense model) that patients' beliefs about treatment, perceptions of illness, and treatment appraisals would predict adherence to CAM.

Design: A prospective self-report questionnaire study was carried out with a 3-month follow-up period.

Methods: 240 patients from 5 CAM clinics completed self-report questionnaire measures of treatment beliefs, illness perceptions and treatment appraisals at baseline. 3 months later they completed self-report measures of adherence to therapists' recommendations concerning attendance, remedy use and lifestyle changes.

Results: Logistic regression analyses showed that positive perceptions of one's therapist and belief that mental factors do not cause illness independently predicted adherence to appointments. Positive beliefs in holistic health and finding it difficult to travel to appointments predicted adherence to remedy use. Using homeopathy was the only independent predictor of adherence to lifestyle changes.

Conclusions: Treatment appraisals, treatment beliefs and illness perceptions explain modest proportions of the variance in adherence to CAM. This study highlights the value of operationalising the appraisal element of the common sense model when investigating adherence to treatment.

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Complementary and alternative medicine (CAM), includes a wide range of therapies such as acupuncture and homeopathy, and is popular with the general population. In the UK 46% of the population can be expected to use one or more CAM therapies in their lifetime (Thomas, Nicholl, & Coleman, 2001), and many conventional doctors now have positive attitudes towards or practice CAM themselves (Perry & Dowrick, 2000). While the majority of CAM use in the UK occurs in private practice (Thomas et al., 2001), some CAM (e.g. homeopathy) is accessible on the National Health Service (NHS) and there are moves towards integration in some areas (e.g. pain clinics). Systematic rigorous research into psychological aspects of CAM use is needed because of both the potential practical applications of new knowledge in this area and the potential gains to health psychology theory offered by this different 'testing ground'.

Adherence concerns the extent to which patients carry out the actions recommended by or agreed with their doctor or therapist. Reviews of the adherence literature in the context of conventional medicine conclude that between 30 and 50% of patients do not adhere to their doctor's recommendations (Vermeire, Hearnshaw, Van Royen, & Denekens, 2001) and that non-adherence contributes to poor health outcomes and increased economic costs of health care (World Health Organisation, 2003). Equivalent information on rates and consequences of adherence in CAM are not available. A growing literature has investigated why people use CAM, but few studies have focussed specifically on adherence. In the CAM setting, adherence might concern a range of behaviours, including attending follow-up appointments, taking prescribed remedies (such as homeopathic remedies), or making changes to one's lifestyle (such as changing one's diet). At present there is little understanding of how, or indeed whether, these behaviours are related to patient outcomes in CAM.

Our planned examination of patients' adherence to CAM will thus not only inform our understanding of adherence behaviours but could also inform attempts to examine the psychological mechanisms of action within CAM therapies. Extensive data on adherence rates in CAM are not available, but one small prospective study of people using homeopathy found that 84% of patients were satisfied with and 83% reported adhering to their treatment (Attena, Del Giudice, Verrengia, & Granito, 2000). Qualitative evidence suggests that peoples' decision-making concerning CAM use is an ongoing process, in that people evaluate their experiences over time and make repeated decisions about whether to continue using CAM (Truant & Bottorff, 1999). It is important to understand the factors that influence these decisions, in order to inform interventions to improve adherence to CAM and to learn from these therapies that apparently already generate high adherence. This paper reports a prospective study, conducted within the framework of the common-sense model of self-regulation (Leventhal, Brissette, & Leventhal, 2003) of the relationship between treatment appraisal, treatment beliefs, illness perceptions and adherence to CAM.

According to the common sense model, people's illness perceptions influence their use of coping strategies, such as adherence to interventions, in response to an illness or perceived health threat (Leventhal et al., 2003). Evidence from a range of conventional medicine settings supports the existence of theorised links between illness perceptions and coping strategies (Hagger & Orbell, 2003). Research on the predictors of adherence to prescribed medication suggests that beliefs about treatment are more proximal determinants of coping strategies than are illness perceptions, and thus Horne and colleagues have incorporated treatment beliefs into an extended common sense model (Horne, 1997; Horne & Weinman, 2002). In particular patients' perceptions of their own need for specific medications and their concerns

about taking those medications have been shown to predict adherence across a range of settings (Horne & Weinman, 2002; Neame & Hammond, 2005; Phatak & Thomas, 2006; Sud et al., 2005;).

An important element of the common sense model is that coping strategies are appraised and may be modified (Leventhal et al., 2003). In other words, patients may use early experiences of treatment to test whether they find the treatment helpful, and will therefore continue with it (Conrad, 1985; Pound et al., 2005; Vermeire et al., 2001). The common sense model can be further elaborated to detail the factors that may be important in the appraisal of treatment. Previous research on the use of non-pharmacological treatments suggests that four dimensions of appraisal may be important predictors of adherence (Yardley, Sharples, Beech, & Lewith, 2001): perceptions of symptom change; perceptions of treatment efficacy (Kaplan & Simon, 1990); experiences of the consultation, including perceptions of therapist competence and communication (Luciano & Herruzo, 1992; Williams, 1994); and practical aspects of treatment, including cost and convenience (Bissell, May, & Noyce, 2004). We suggest that these dimensions can be integrated into a dynamic extended common-sense model of self-regulation (as shown in Figure 1). According to this model, perceptions of one's CAM therapist and therapy (aspects of appraisal), treatment beliefs, and illness perceptions will predict ongoing CAM use.

Appraisal and CAM Use

Qualitative evidence suggests that patients' appraisals of treatment, in particular their relationship with a practitioner, might be important determinants of ongoing CAM use (Canales & Geller, 2003; Luff & Thomas, 2000), but we have no direct quantitative evidence to support this suggestion. Patients' perceptions of practitioner empathy

have predicted health outcomes in homeopathy and acupuncture, but adherence was not examined (Bikker, Mercer, & Reilly, 2005; Price, Mercer, & MacPherson, 2006).

Treatment Beliefs and CAM Use

Cross-sectional questionnaire studies show that people who use CAM are more likely than non users to hold pro-CAM beliefs, including beliefs in holistic health, natural treatments and participating in treatment (Astin, 1998; Furnham & Forey, 1994; O'Callaghan & Jordan, 2003) and to be dissatisfied with orthodox medicine (Furnham & Kirkaldy, 1996; McGregor & Peay, 1996; Sirois & Gick, 2002). Qualitative interview studies with CAM users suggest that belief in holistic health might be involved in deciding to continue using CAM (Mercer & Reilly, 2004). There is contradictory evidence concerning 'dissatisfaction with orthodox medicine' and adherence to CAM. One cross-sectional quantitative study of new and established CAM users suggests dissatisfaction with orthodox medicine is not associated with ongoing CAM use (Sirois & Gick, 2002), while qualitative work suggests it might be (Luff & Thomas, 2000). Prospective relationships between treatment beliefs and adherence to CAM have yet to be tested quantitatively.

Illness Perceptions and CAM Use

A small number of cross-sectional questionnaire studies suggest that CAM use is associated with believing that psychological factors have a role in illness origins and health promotion (Furnham & Bhagrath, 1993; Furnham & Forey, 1994; Furnham & Kirkaldy, 1996). There is some evidence that CAM use is also associated with perceptions that one's illness has serious consequences and that one has a strong understanding of one's illness (Bishop, Yardley, & Lewith, 2006). Searle and Murphy (2000), in a prospective questionnaire study, showed that perceptions of the causes of illness (including that stress and one's own behaviour cause illness), were

the best predictors of adherence to homeopathy (compared to other illness perceptions). The findings from this study cannot be generalised, because other possible predictors of adherence to homeopathy were not included, and the study was small ($\underline{n}$ = 30). The balance of evidence suggests that illness perceptions, in particular perceptions that psychological factors cause illness, might be associated with adherence to CAM.

Aims

Few studies have examined the factors and processes involved in adherence to CAM. This study tests the theoretically derived hypotheses that treatment appraisals, treatment beliefs and illness perceptions predict adherence to CAM. Given the scarcity of previous research on adherence to CAM, this study takes an exploratory approach in investigating the relationships between specific predictor variables and different aspects of adherence to CAM.

METHOD

Design

This was a prospective self-report postal questionnaire study in which beliefs, perceptions and appraisals were assessed at baseline and adherence to CAM was assessed at three month follow-up. At baseline all participants had experienced at least one consultation with their therapist.

Questionnaires

Self-report questionnaires assessed patients' characteristics, treatment beliefs, illness perceptions, treatment appraisal, and adherence to treatment.

Background characteristics

Participants provided demographic details (gender, age, education, and income; the latter three were measured on ordinal scales) and background information concerning

their treatment (whether they were seeing a therapist they had seen before or using a therapy they had used before, whether they were attending for a new illness, the duration of their health problem). A 39-item checklist of CAM modalities (Furnham, 2000) was used to measure the number of CAM modalities participants had ever used ('past CAM use') and the number of CAM modalities that participants knew a close friend or family member had used ('other CAM use').

Treatment appraisal

A 20-item Treatment Appraisal Questionnaire was developed for this study to measure three dimensions of treatment appraisal (Table 1). Five items assessed appraisal of the therapy, five items assessed appraisal of the therapist, and five individual items assessed appraisal of different practical aspects of treatment. All items were scored so that high scores indicate positive appraisals of treatment. Five further items assessing appraisal of therapist (those items with the lowest factor loadings) were excluded from this analysis in order to improve the comparability of this subscale with the subscale measuring appraisal of therapy.

The items were derived from previous qualitative work (Yardley et al., 2001) and were rated on 7-point likert scales. Eighty one people (recruited from the same clinics as this study) participated in a pilot study to test the questionnaire's factor structure, concurrent validity and internal consistency. Principal axis factoring with direct oblimin rotation showed that two correlated factors (appraisal of therapist and appraisal of therapy, $r = 0.52$) accounted for 56% of the variance and that the five practical items should be treated as single items rather than a scale. Mann-Whitney tests revealed that patients completing the questionnaire after a follow-up appointment ($n=70$) scored more positively on perceptions of therapy and perceptions of therapist than patients attending for the first time ($n=11$). According to Cronbach's alpha

statistics the scales had acceptable internal consistency (alpha >.7; Loewenthal, 2001) in both the pilot study and the current study (for perceptions of therapist α =0.91 and 0.90; for perceptions of therapy α = 0.92 and 0.88).

Insert Table 1 here

Treatment beliefs

The CAM Beliefs Inventory (CAMBI; Bishop, Yardley, & Lewith, 2005), a valid and reliable 17-item questionnaire, was used to measure three dimensions of pro-CAM treatment beliefs. Six items assessed beliefs in holistic health (e.g. 'health is about harmonizing your body, mind and spirit'), six items assessed beliefs in natural treatments (e.g. 'treatments should only use natural ingredients') and five items assessed beliefs in participation in treatment (e.g. 'patients should take an active role in their treatment'). The subscales had acceptable internal consistency (0.58 to 0.77).

Negative beliefs about orthodox medicine GPs were measured using a six-item scale developed by Furnham and Kirkaldy (1996) (e.g. 'at your last visit to your general practitioner how satisfied were you with your treatment'). The internal consistency in this sample was good (α = 0.92).

Illness perceptions

The well-validated and reliable revised Illness Perceptions Questionnaire (IPQ-R; Moss-Morris et al., 2002) was used to measure 8 dimensions of illness perceptions, all of which demonstrated good internal consistency in this sample (αs ranged from 0.73 to 0.91) : perceptions of the number of symptoms associated with one's illness (identity); perceptions of duration of illness (timeline acute/chronic); perceptions of the recurrent nature of illness (timeline cyclical); perceptions of the severity of the results of illness

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(consequences); perceptions of one's ability to control illness (personal control); perceptions of one's treatment's ability to control illness (treatment control); the coherence of one's understanding of illness (illness coherence); emotional representations of illness (emotional representations). Eighteen items assessed perceptions of the causes of illness. Principal axis factoring with direct oblimin rotation was conducted on these items and three subscales were computed that assessed perceptions of mental attitudes (cause mental attitude, e.g. 'my mental attitude'), viruses (cause virus, e.g. 'a germ or virus'), and lifestyle factors (cause lifestyle, e.g. 'smoking') as causes of illness.

Adherence

Three individual items were developed for this study to measure adherence to therapists' recommendations concerning three aspects of treatment a) attendance at appointments, b) making lifestyle changes, and c) taking remedies. Participants reported whether they had been given any advice on these issues: "Has your therapist advised you to [use a herbal or homeopathic remedy/make changes to your lifestyle/make one or more follow-up appointments]". Participants then rated the degree to which they adhered to each piece of advice separately ("If yes, how much have you followed this advice?") on a scale from 1 ('not at all') to 7 ('completely'). This item was introduced using socially normative wording to increase the acceptability of non-adherence, emphasising that sometimes people decide they no longer want to continue with their therapy and that the researchers were interested in the participants' own experiences. Validated measures of adherence tend to focus on adherence to medication and so were unsuitable for this study (e.g. Morisky, Green, & Levine, 1986).

Procedure

Ethical approval was granted by the host institution's Ethics Committee. Participants were recruited between June 2003 and February 2004 by reception staff at five private CAM clinics, who handed out packs of the baseline questionnaires including a small token incentive. Clinics in London and the South of England and were chosen as a convenient sample of clinics offering three different forms of CAM in a range of settings. The largest clinic principally provided chiropractic treatment, one smaller clinic provided Traditional Chinese Medicine, and the remaining three provided homeopathy. Three months following receipt of baseline questionnaires, the adherence questionnaire was mailed to participants. Follow-up reminders were used to encourage completion.

Statistical Methods

A missing value analysis revealed that income was the only item with more than 5% of data missing. Fifty nine participants had small amounts of missing data, 52 of these were missing less than 5% of data values. Missing data values were imputed using the EM algorithm.

Bivariate associations between adherence and demographic characteristics, treatment beliefs, illness perceptions and treatment appraisals were tested in order to select variables for inclusion in the regression analyses. Non-parametric statistics (Mann-Whitney U tests and Spearman's rho correlations) were used because the distributions of adherence scores were significantly skewed. Bonferroni corrections were not made, in order to protect against type II errors.

The adherence scores were converted into dichotomous variables using median splits in order to examine the predictors of high compared to low adherence in logistic regressions (see Results for details). Three sequential stepwise logistic regressions were conducted to predict adherence to appointments, lifestyle changes

and remedy use. Demographic characteristics were entered in Block 1, treatment beliefs and illness perceptions were entered in Block 2. Treatment appraisals were entered in Block 3, in order to determine whether they predicted adherence after controlling for illness and treatment beliefs. This strategy permitted a test of the significance in the model of groups of variables after controlling for the impact of the other variables already in the model. Variables were only included in each regression analysis if they showed significant bivariate associations with the dependent variable, which maximised the ratio of sample size to variables. Forward likelihood ratio method was used to determine entry of individual variables into the models. Thus we used a sequential approach to test our hypotheses concerning groups of variables, and we used a statistical approach to explore which individual variables should be retained within each block. The assumptions made for logistic regression analyses (concerning expected frequencies, lack of linearity in the logit, absence of multicollinearity and the absence of outliers in the solution) were tested using approaches suggested in the literature (Tabachnick & Fidell, 2001; Field, 2000) and found to be supported by the data.

RESULTS

Participant Characteristics and Adherence

Of the 279 people who completed and returned the first questionnaire pack, 39 (14%) dropped out prior to completing the adherence questionnaire, yielding a sample of 240. The majority of participants were female (74%). Eleven percent were aged between 18 and 29 years, 16% between 30 and 39 years, 20% between 40 and 49 years, 24% between 50 and 59 years, 19% between 60 and 69 years, and 10% were 70 years of age or older. A large proportion was educated to postgraduate (10%) and undergraduate (33%) level, 22% left school at 18, 27% at 16 and 9% younger than 16.

The majority of participants (65%) were attending osteopathic or chiropractic appointments, 23% were attending homeopathic appointments and 12% were attending appointments for Traditional Chinese Medicine. One in five participants were recruited following their first appointment with the practitioner, 80% of participants had previously seen the practitioner and were recruited during the course of treatment. Over two thirds of participants had a health problem which had lasted for at least one year, for 18% their health problem had lasted between one and six months, and for 7% their health problem had lasted for less than one month. The majority of participants reported that pain (73%) and stiff joints (57%) were related to their illness. Smaller numbers reported other symptoms related to their illness, including fatigue (38%), loss of strength (36%), sleep problems (35%), and headaches (30%).

The majority of participants (202, 84%) reported being given advice about attendance at follow-up appointments and 150 (74%) of them reported complete adherence to that advice. Eighty two participants (34%) reported being given advice about taking remedies and 52 (63%) of them reported complete adherence to that advice. One hundred and forty three participants (60%) reported being given advice about changing their lifestyle and 17 (7%) of them reported complete adherence to that advice. Median splits resulted in groups of high and low adherence which were used in the logistic regression analyses. The high adherence groups for attendance ($\underline{n}$=150) and remedy use ($\underline{n}$=52) all reported complete adherence (scoring 7 on the 7-point scale) to their therapists' recommendations; for lifestyle change, the high adherence group ($\underline{n}$=64) reported complete or near complete adherence (scoring either 6 or 7 on the 7-point scale).

Table 2 shows mean scores on the questionnaire measures and their correlations with adherence. Participants tended to have positive perceptions of their therapy and therapist, with high mean scores above the mid-point of these scales. Strong beliefs in holistic health, natural treatments and participation in treatment were also evident in this sample. These findings are consistent with the high adherence rates reported, and indicate a pro-CAM group who appraise their experiences positively. Mean scores on the IPQ-R sub-scales tended to be close to the scale mid-points. The correlations between the measures of demographic characteristics, beliefs, and adherence were relatively small in size.

Insert Table 2 here

Factors Associated with Adherence to Appointments

In the bivariate analyses attendance at follow-up appointments was associated with increased age, positive perceptions of one's therapist and therapy, reporting that one's therapy is not too much effort, believing one's illness is not cyclical in nature and having low beliefs in mental state as a cause of illness. In addition, people who had seen a therapist for the first time reported significantly lower attendance for their follow-up appointments ($\underline{M}$=5.95, $\underline{SD}$ = 1.65) than those who had seen a therapist whom they had seen before ($\underline{M}$=6.47, $\underline{SD}$ = 1.28; $\underline{z}$ = -2.65, $\underline{p}$<.01). People who were using a therapy they had not used before reported significantly lower attendance ($\underline{M}$=5.80, $\underline{SD}$=1.79) than those who had used the therapy before ($\underline{M}$=6.47, $\underline{SD}$=1.25; $\underline{z}$ = -2.86, $\underline{p}$<.01).

The multivariate regression model to predict attendance at appointments is summarized in Table 3. The model was a good fit to the data (χ^2 (10) = 37.30, $\underline{p}$ =

.00) and the predictors accounted for approximately 25% of the variance in attendance. Demographic variables, illness perceptions and treatments appraisals all contributed to the model and their inclusion in Blocks 1, 2 and 3 respectively improved the model fit (for Block 1 χ^2 (7) = 22.39, $\underline{p}$ = .00; Block 2 χ^2 (2) = 10.79, $\underline{p}$ = .01; Block 3 χ^2 (1) = 4.12, $\underline{p}$ = .04). The independent predictors of adherence to appointments were being aged between 50 and 59, having weak perceptions that one's illness is caused by mental factors, and having more positive perceptions of one's therapist.

Insert Table 3 here

Factors Associated with Adherence to Lifestyle Change

Bivariate analyses showed that adherence to recommended lifestyle change was associated with increased illness duration, appraising one's therapy as being too expensive, positive perceptions of one's therapist, and believing in viruses as a cause of illness. Adherence to lifestyle change differed according to therapy: people using homeopathy reported significantly higher adherence to lifestyle change ($\underline{M}$=5.71, $\underline{SD}$=1.46) than people using osteopathy/chiropractic ($\underline{M}$=4.91, $\underline{SD}$=1.26; $\underline{z}$ = -3.86, $\underline{p}$<.01) or traditional Chinese medicine ($\underline{M}$=4.77, $\underline{SD}$=1.09; $\underline{z}$ = -3.48, $\underline{p}$<.01). People attending for a new illness reported significantly lower adherence to lifestyle change (M=4.41, SD=1.59) than those attending for an ongoing problem (M=5.15, SD=1.37; z=-2.36, p<.05).

The regression model to predict adherence to lifestyle change recommendations is summarized in Table 4. The predictors accounted for approximately 19% of the variance in adherence and the model had a good fit to the

data (χ^2 (3) = 21.67, $\underline{p}$ = .00). Demographic variables and treatments appraisals contributed to the model and Block 1 but not Block 3 significantly improved the model fit, but no measures of illness perceptions reached the inclusion criteria for this model (for Block 1 χ^2 (2) = 19.50, $\underline{p}$ = .00; Block 3 χ^2 (1) = 2.17, $\underline{p}$ = .14). Using homeopathy was the only significant independent predictor of adherence to lifestyle changes.

Insert Table 4 here

Factors Associated with Adherence to Remedy Use

Adherence to remedy use had significant bivariate correlations with increased age, finding it difficult to travel to appointments, strong beliefs in holistic health and negative perceptions of one's GP.

The regression model to predict adherence to remedy use is summarized in Table 5. The model had a good fit to the data (χ^2 (7) = 27.23, $\underline{p}$ = .00) and the predictors accounted for approximately 39% of the variance in remedy use. Demographic variables, illness perceptions and treatments appraisals all contributed to the model and their inclusion in Blocks 1, 2 and 3 respectively improved the model fit to varying degrees (for Block 1 χ^2 (4) = 8.57, $\underline{p}$ = .07; Block 2 χ^2 (2) = 9.55, $\underline{p}$ = .01; Block 3 χ^2 (1) = 9.11, $\underline{p}$ = .00). A number of variables emerged as significant independent predictors. Participants were more likely to adhere to their remedies if they were aged over 50, held strong beliefs in holistic health and found it difficult to travel to their appointments.

Insert Table 5 here

DISCUSSION

This study was the first to use a prospective design to investigate the relationship between treatment appraisals, treatment beliefs, illness perceptions, and adherence to CAM. Adherence rates were varied; more people reported complete adherence to recommendations concerning attendance (74%) and remedy use (64%), compared to advice concerning lifestyle changes (7%). Unsurprisingly the predictors of the three adherence behaviours also differed; it is important to be precise in defining different aspects of adherence, particularly in the context of CAM in which multi-factorial holistic interventions are common. Based on a dynamic extended common sense model of self-regulation, it was hypothesised that patients' illness perceptions, treatment beliefs and treatment appraisals would predict adherence to CAM. Our predictor variables accounted for between 19 and 39% of the variance in adherence to CAM measured 3 months later, which is comparable to previous cross-sectional studies of CAM use (e.g. O'Callaghan & Jordan, 2003). Given the 3 month gap between measures of the independent and dependent variables the small effects found are not surprising; the low variability on some of our measures may also have weakened the effects found. While this provides partial support for our hypothesis it also suggests that other factors, such as perceived symptom change, are involved in adherence to CAM.

Treatment Appraisal and Adherence

Treatment appraisals were independently associated with attendance and adherence to remedy use. Having positive appraisals of one's therapist predicted continuing attendance. Patients who experienced their therapist as competent and trustworthy were more likely to attend further consultations. This demonstrates the importance of

patients' appraisals of the therapist patient relationship in attendance for CAM, and is consistent with previous qualitative research (Luff & Thomas, 2000). It is unclear why patients' appraisals of therapy did not emerge as predictors of adherence to CAM; it could be a result of the emphasis that many forms of CAM and CAM users place on the practitioner as a (if not <u>the</u>) vital element in the healing process.

Finding it difficult to travel to appointments was associated with adherence to remedy use. This was not hypothesised; we had expected experiencing practical constraints such as finding it difficult to travel to appointments to be associated with decreased adherence. Perhaps if a person finds it difficult to travel to appointments they compensate for this perceived difficulty by adhering more closely to therapists' recommendations concerning remedies. It is unclear why other practical constraints were not related to adherence but it may be a function of using single-item measures of practical constraints.

The treatment appraisal questionnaire developed for this study is a brief measure of three broad aspects of treatment appraisal, appraisals of therapist, therapy efficacy, and practical aspects of using a treatment. The subscales demonstrated acceptable internal consistency and the relationships found with adherence suggest that the questionnaire also has a degree of predictive validity. Participants in this study had positive appraisals of their therapist and therapy, which is consistent with the high rates of adherence in this sample.

Treatment Beliefs and Adherence

Treatment beliefs were only associated with remedy use. People who reported higher adherence to remedy use held stronger beliefs in holistic health. This is consistent with previous qualitative findings that holistic health beliefs (Mercer & Reilly, 2004)

are involved in ongoing CAM use. Beliefs in natural treatments and participation in treatment were not associated with adherence to CAM.

Illness Perceptions and Adherence

Illness perceptions were weakly associated with adherence but believing that mental attitudes do not cause illness was an independent predictor of adherence to appointments. This is somewhat consistent with our hypothesis and with previous research showing that perceptions of causes of illness predicted adherence to homeopathy (Searle & Murphy, 2000). However, it is also at odds with previous research: CAM users were more likely than non-users to believe in the role of psychological factors in health and illness in studies of CAM users attending homeopathy (Furnham & Bhagrath, 1993), remedial therapy, homeopathy, feldenkrais or psychosocial therapy (Furnham & Kirkaldy, 1996) and general alternative therapy clinics (Furnham & Forey, 1994). This inconsistency might be a result of our focus on adherence to rather than overall use of CAM, but it could also be the result of the different CAM modalities studied. People using manipulative or body-based methods such as osteopathy and chiropractic (over half our sample) might be less likely to believe in psychological factors as causes of illness than people using more overtly holistic therapies such as homeopathy (more prevalent in Furnham's studies).

The mixed illness and treatment group within this sample may have reduced the size of relationships found between illness perceptions and adherence; for instance chiropractic may be a confounder. It is possible that different aspects of illness perceptions are related to adherence in different illness groups, and a mixed illness group is likely to mask any such differences. Alternatively, the weak associations between illness perceptions and adherence found in this study could indicate that illness perceptions are more relevant to treatment initiation than adherence. This is

consistent with the observation that most previous studies document cross-sectional associations between illness perceptions and CAM use in general, as opposed to adherence to CAM.

Age and Adherence

Participants aged in their 50s and those aged over 50 respectively were more likely to attend follow-up appointments and adhere to remedy use. Previous research suggests that people who use CAM tend to be young or middle-aged adults and older adults are less likely to use CAM (e.g. Featherstone, Godden, Selvaraj, Emslie, & Took-Zozaya, 2003; Haetzman, Elliott, Smith, Hannaford, & Chambers, 2003; Harris, Finlay, Cook, Thomas, & Hood, 2003; Thomas et al., 2001). In their review of adherence to conventional treatments Vermiere et al (2001) found little evidence of an association between age and adherence. The robustness of our finding that age is associated with adherence to CAM therefore needs to be tested in future studies.

Generalisability of Findings

The demographic characteristics of the study sample are broadly consistent with those of CAM users in general, in that the majority of participants were female and educated beyond age 16 (Thomas et al., 2001). The participants in this study had used a high number of CAM forms in the past but a small minority was completely new to CAM. In addition, a large proportion of participants were recruited when they were in the middle of an ongoing course of treatment, rather than at their first consultation. It is therefore possible that this study may overestimate the importance of factors that predict adherence later on in people's CAM experiences. For example, it is possible that perceptions of one's therapist predict adherence when people have seen their therapist more, and perceptions of therapy might predict adherence when people are newer to a therapy and have only experienced a small number of consultations.

The participants used a range of CAM forms and were drawn from a number of private clinics. While there were consistencies across these different CAM forms, this study was not large enough to reliably investigate in detail the predictors of adherence to specific types of CAM. Further work is needed to investigate the validity of these findings in specific populations, including groups of less experienced CAM users, specific illness groups, and people who use specific types of CAM.

Limitations

A limitation of this study was that it was not possible to obtain an objective measurement of adherence. Self-report measures are concordant with other measures of adherence, such as electronic measures, and questionnaire methods show higher concordance with other measures than do interview methods (Garber, Nau, Erickson, Aikens, & Lawrence, 2004). Nevertheless, the use of single item measures of adherence suffers from low reliability and future research would benefit from incorporating some objective measures of adherence, such as asking practitioners to record their recommendations and their patients' adherence to appointments. Participants' self-reported adherence to treatment recommendations was high but incomplete, and there was relatively little variance. In addition to having better validity and reliability, objective measures might increase the variance obtained, which might then increase the size of correlations between our predictors and adherence.

A second limitation surrounds the lack of measurement of perceived health change. The extended dynamic common-sense model predicts that, in addition to the psychological factors investigated in this study, people's perceptions of health change influence their ongoing use of treatment (Yardley et al., 2001). Had we operationalised this part of the model we might have explained a greater proportion of

variance in adherence behaviours. Future research would benefit from using appropriate patient-centred measures of health status such as the MYMOP (Paterson, 1996), which enables patients to select the aspects of their health which are most important to them in the context of their treatment and to assess these over the course of treatment.

CONCLUSION

Treatment appraisals (positive perceptions of one's therapist and finding it difficult to travel to appointments), and treatment beliefs (beliefs in holistic health), and illness perceptions (causal beliefs) were independent predictors of adherence to CAM. These results provide some support for the applicability of the dynamic extended common sense model of self-regulation and demonstrate the importance of considering not only treatment beliefs and illness perceptions but also treatment appraisals when attempting to explain adherence to CAM. Future studies are needed to test the current findings in more specific populations of CAM users. Furthermore there is no a priori reason why this model could not also be applied and tested in the context of orthodox medicine, where it could provide a useful extension to existing frameworks for research on adherence to conventional medical treatments.

Table 1. Treatment Appraisal Questionnaire Subscales and Items

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Perception of Therapist

I trust my therapist

I have confidence that my therapist is well-qualified to treat me

My therapist is a competent provider of my treatment

I am comfortable talking to my therapist about my health problem

My therapist wants to help me with my health problem

When my therapist talks about my health problem it does not make sense to me [R]

My therapist is an expert in my treatment

My therapist is interested when I talk about my health problem

My therapist knows how to treat my health problem

My therapist provides explanations of my treatment that make sense to me

Perception of Therapy

I am confident that my current treatment will help my health problem

I am confident that my current treatment will help my symptoms

I am confident that my current treatment will improve my well-being

I am concerned that my current treatment will not be effective [R]

I am confident that my current treatment will help me to stay healthy

Perceptions of Practical Aspects of Therapy (single items)

My treatment offers value for money

I find it difficult to travel for my appointments for treatment [R]

I can always get appointments at a convenient time

Seeing my therapist can be too much effort [R]

My treatment is too expensive for me [R]

Note. Items in italics are not included in the final 5-item subscale measuring

Perceptions of Therapist. [R] indicates item is reverse-scored.

Table 2. Mean Scores on Questionnaire Scales and Spearman's Correlations between Patient Characteristics and Beliefs and Adherence

	Mean (SD) (n=240)	Mid-Point (Possible range)	Attendance (n=202)	Lifestyle change (n=143)	Remedy use (n=82)
Background characteristics					
Age	N/A (ordinal measure)		.17*	-.08	.22*
Income	N/A (ordinal measure)		.01	-.02	.01
Education	N/A (ordinal measure)		-.13	.04	.09
Duration of health problem	N/A (ordinal measure)		.03	.19*	-.15
Past CAM use	8.87 (6.06)	---	-.08	.12	.22
Other CAM use	9.27 (6.91)	---	-.05	.13	.10
Treatment Appraisals					
Perceptions of therapist	32.05 (3.75)	20 (5-35)	.19**	.16*	.19
Perceptions of therapy	29.91 (4.94)	20 (5-35)	.19**	.09	.15
Value for money	5.86 (1.33)	4 (1-7)	.09	-.01	.14
Easy to travel	5.58 (1.66)	4 (1-7)	-.06	-.16	-.23*
Convenient appointments	6.02 (1.40)	4 (1-7)	.05	.03	.08
Not too much effort	6.11 (1.33)	4 (1-7)	.15*	.03	-.03
Not too expensive	4.74 (1.86)	4 (1-7)	.01	-.19*	-.11
Treatment Beliefs					
Natural treatments	33.63 (5.26)	24 (6-42)	.01	.04	.10
Participation in treatment	27.95 (4.27)	20 (5-35)	-.04	.15	-.05
Holistic health	33.14 (5.12)	24 (6-42)	.06	.14	.24*
Attitudes to GP	21.20 (5.99)	18 (6-30)	.02	.08	-.21*
Illness Perceptions					
Timeline acute chronic	19.93 (5.81)	18 (6-30)	.11	.09	-.01
Consequences	16.57 (5.62)	18 (6-30)	-.08	.13	.12
Personal control	22.38 (4.09)	21 (7-35)	-.11	-.09	-.08

Treatment control	18.65 (3.22)	20 (5-35)	-.07	-.10	.02
Illness coherence	20.03 (4.24)	15 (5-25)	.09	.06	.05
Timeline cyclical	11.94 (3.67)	12 (4-20)	-.16*	.08	.07
Emotional representations	15.91 (5.08)	24 (8-40)	-.11	-.01	.07
Cause mental attitude	8.98 (3.64)	12 (4-20)	-.23**	-.08	-.12
Cause lifestyle	3.14 (1.43)	6 (2-10)	-.12	-.08	-.21
Cause virus	4.23 (2.13)	6 (2-10)	-.08	.18*	.11
Identity	3.35 (2.44)	7 (0-14)	-.01	.10	-.01

*$p<.05$; **$p<.01$

Table 3

Summary of Sequential Logistic Regression to Predict Attendance (n=202)

Predictors	B	Wald	OR	95% CI	
				lower	upper
Block 1					
Age 18-29 (comparison)					
Age 30-39	0.41	0.43	1.50	0.44	5.12
Age 40-49	1.02	2.74	2.77	0.83	9.24
Age 50-59	1.71	7.32**	5.50	1.60	18.92
Age 60-69	0.90	2.09	2.45	0.72	8.27
Age 70 +	1.29	2.75	3.64	0.79	16.72
New Therapy	-0.74	2.21	0.48	0.18	1.26
New Therapist	0.53	1.31	1.70	0.68	4.23
Block 2					
Time cyclical	-0.10	3.25	0.91	0.81	1.01
Cause mental attitude	-0.13	6.33*	0.88	0.79	0.97
Block 3					
Perceptions of therapist	0.10	4.04*	1.10	1.00	1.21
Constant	-0.76	0.20	0.47		

Note. Variables entered according to forward likelihood ratio (criteria for inclusion $p<.15$). Variables not meeting entry criteria: perceptions of therapy and too much effort (Block 3).

OR = odds ratio

CI = confidence interval

*$p<.05$

**$p<.01$

Table 4. Summary of Sequential Logistic Regression to Predict Adherence to Lifestyle Change (n=143)

Predictors	B	Wald	OR	95% CI	
				lower	upper
Block 1					
Homeopathy	1.61	11.87**	5.00	2.00	12.47
New illness	0.84	2.99	2.31	0.89	5.94
Block 3					
Perceptions of therapist	0.08	2.05	1.09	0.97	1.21
Constant	-3.88	4.30*	0.02		

Note. Variables entered according to forward likelihood ratio (criteria for inclusion $p<.15$). Variables not meeting entry criteria: illness duration (Block 1); cause virus, (Block 2); too expensive (Block 3).

OR = odds ratio

CI = confidence interval

*$p<.05$

**$p<.01$

Table 5

Summary of Sequential Logistic Regression to Predict Adherence to Remedy Use

(n=82)

Predictors	B	Wald	OR	95% CI	
				lower	upper
Block 1					
Age 18-29 (comparison)					
Age 30-39	0.18	0.04	1.20	0.18	7.98
Age 40-49	1.03	1.38	2.81	0.50	15.83
Age 50-59	2.36	5.79*	10.55	1.55	71.92
Age 60 +[1]	2.44	4.96*	11.27	1.34	95.00
Block 2					
Holistic Health	0.13	4.76*	1.13	1.01	1.27
Attitude to GP	-0.10	3.45	0.90	0.81	1.01
Block 3					
Not difficult to travel	-0.52	7.49**	0.59	0.41	0.86
Constant	-0.03	0.00	0.97		

Note. Variables entered according to forward likelihood ratio (criteria for inclusion

$p<.15$). No variables failed to meet entry criteria.

OR = odds ratio

CI = confidence interval

*$p<.05$

**$p<.01$

[1] Age groups 60-69 and 70 + were combined to form one group to satisfy the

statistical requirement concerning expected frequencies for combinations of discrete
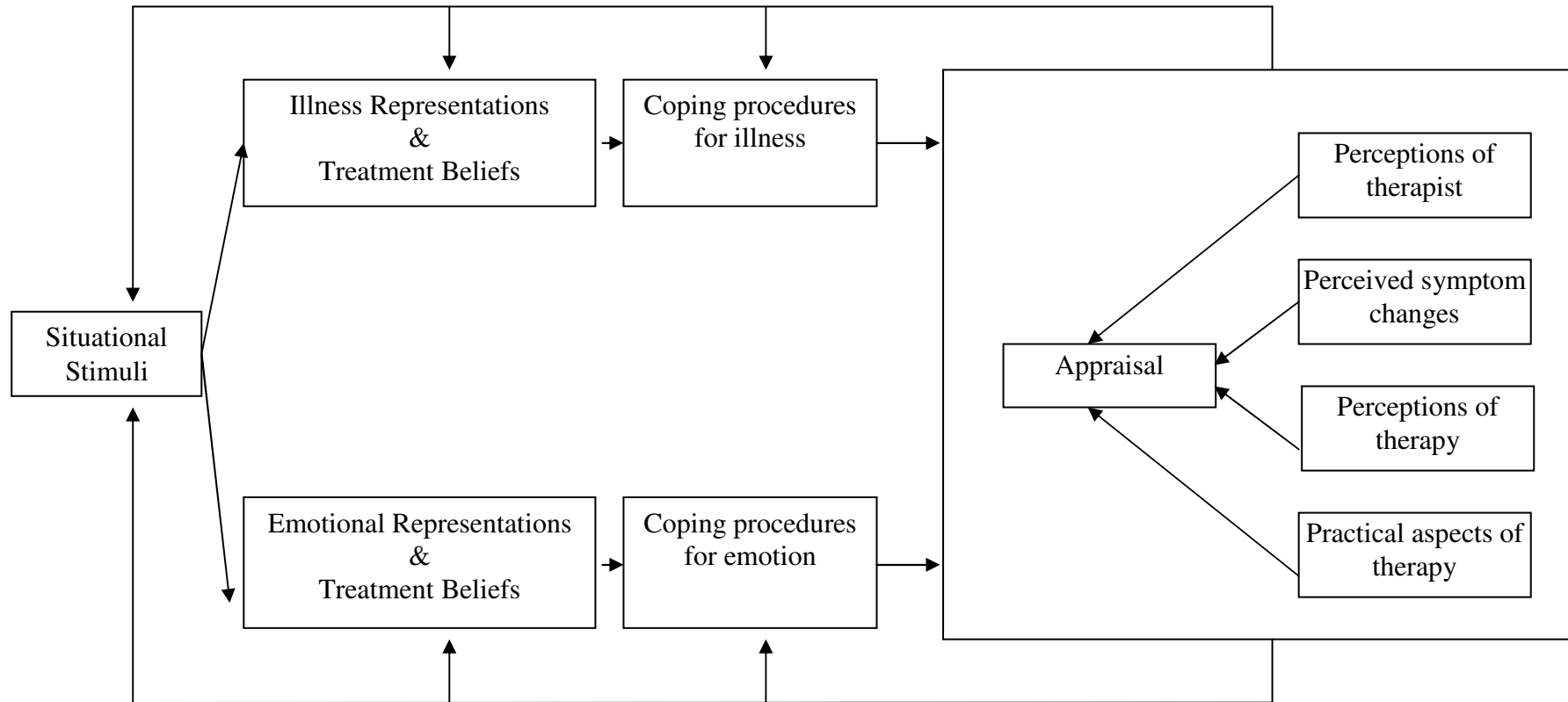
variables.

Figure 1: A dynamic extended model of treatment and illness representations. Adapted from the dynamic model of treatment perceptions (Yardley et al., 2001) and the common sense model of self-regulation (Horne & Weinman, 2002; Leventhal et al., 2003).

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