

Rate of Agreement Between Clinicians on the Content of a Cognitive Formulation of Delusional Beliefs: The Effect of Qualifications and Experience

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Background: A key process in Cognitive Therapy (CT) is the development and sharing of a formulation. How clinicians develop formulations is under-researched, particularly in working with people with psychosis. **Aims:** This study investigated agreement between clinicians, when conceptualizing an individual's psychotic beliefs. It also explored whether agreement was dependent on qualifications and experience. **Method:** Eighty-two clinicians watched a video of an individual with delusional beliefs, and were asked to provide formulations using a CT template. These were compared with a "benchmark" formulation provided by three experts. **Results:** There was good agreement for overt behaviours, emotions, and some aspects of early experience. However, identification of theory driven components such as core beliefs or assumptions was poorer. Greater clinical experience improved the agreement with the benchmark formulation overall, and greater CT specific experience improved formulation of the theory driven items. The more experience a clinician had of working with people with psychosis the lower the rate of agreement with the expert formulation. **Conclusions:** Formulation of delusional beliefs from a cognitive perspective is dependant on overall experience in cognitive therapy and not knowledge of psychosis, which may hinder performance. The implications for training in CT and psycho-social interventions are considered.

Keywords: Case conceptualization, formulation, cognitive therapy, psychosis.

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Introduction

Case conceptualization, or formulation, is the process in which unique client experience is blended with a psychological theory or model with the purpose of understanding the origins, development and maintenance of a presenting problem (Tarrier and Calam, 2002). The conceptualization is used to select the optimal interventions in order to alleviate the person's distress and help keep him or her well in the future (Kuyken, Padesky and Dudley, 2008). Given the central role of formulation in treatments such as Cognitive Behavioural Therapy (CBT), there is a surprising lack of research into this process (Bieling and Kuyken, 2003). Within this scant evidence base, much of the research to date has addressed whether clinicians agree with each other on the content of a cognitive case formulation.

This work has indicated that cognitive therapists tend to agree about clients' overt presenting issues (i.e. the physical symptoms, and behavioural, and emotional difficulties). However, the intra-psychic aspects of the person's presentation, those where an inference is made based upon cognitive theory (i.e. a person's core beliefs or dysfunctional assumptions) leads to poor agreement (Persons, Mooney and Padesky, 1995; Persons and Bertagnolli, 1999; Mumma and Smith, 2001; Kuyken, Fothergill, Musa and Chadwick, 2005).

This low rate of agreement poses a challenge as formulation is considered to be a lynchpin process in effective CBT (Butler, 1998). Hence, if therapists do not agree on the content of a formulation then it is unlikely they will agree on what interventions will be of most help to the person. Discrepancies in understanding arising from different formulations could have a profound impact upon the treatment a client receives in therapy. Formulation is therefore an important skill to understand and for cognitive therapists to develop. Consequently, research has considered which factors are associated with better rates of agreement between therapists. Persons *et al.* (1995) reported that PhD level training was the only predictor of the ability to identify presenting problems, and that training or experience did not relate to the ability to identify inferential aspects of the formulation. Kuyken *et al.* (2005) noted that formal training, greater experience and accreditation as a cognitive therapist were associated with higher quality CBT formulations. Eells, Lombart, Kendjelic, Turner and Lucas (2005) compared novice, experienced, and expert clinicians in their ability to formulate a series of cases. The formulations of experts were more comprehensive, elaborated, complex, and systematic than both of the other two groups. In addition, they found that the treatment plans of experts were more elaborated and linked better to the formulations. Hence, it was not experience *per se* that predicted best performance but some level of expert knowledge. In this case, "expertise" was defined in terms of those clinicians who had devised and published formulation systems or led workshops on the topic. This clearly implies that formulation is a skill that requires time, effort and resource to develop.

One key function of formulation in CBT is to provide a shared understanding of what may have led to, and what may be maintaining the current difficulties (Dudley and Kuyken, 2006). Hence, developing a formulation is of potentially great value when working with people with psychotic illness who often report experiences that may, at first, appear difficult to understand. Consequently, CBT for Psychosis (CBTp) treatment manuals place great emphasis on the importance of formulation as a way to help see the world from the person's point of view (Kingdon and Turkington, 1994; Fowler, Garety and Kuipers, 1995; Chadwick, Birchwood and Trower, 1996; Morrison, Renton, Dunn, Williams and Bentall, 2004).

To our knowledge there are only two studies directly investigating formulation in psychosis (Chadwick, Williams and Mackenzie, 2003; Dudley, Siitarinen, James and Dodgson, 2009) neither of which investigated reliability or agreement between therapists. Dudley et al. (2009) studied how people with psychosis made sense of the onset of their psychosis. In effect, it was a study of the client's own formulation as participants were asked about which stressors and/or vulnerabilities they felt led to the onset of their breakdown (as opposed to whether or not there was agreement between therapists).

Chadwick et al. (2003) investigated the value and impact of formulation in a case series of people in receipt of CBTp. The conceptualization was developed over two sessions and then summarized in a formulation letter that incorporated an understanding of maintenance and development based on standard cognitive therapy models (Beck, 1995). The results were somewhat equivocal, in that a formulation session had no impact on symptoms. Therapists perceived the formulation as helpful and the formulation session was associated with an increase in working alliance from the therapists' perspective, but not by the client. At first glance the results of this study appear to be at odds with the functions attributed to formulation (Kuyken et al., 2008). To understand this mismatch it is important to consider the potential limitations of the work before we discount the value of formulation in CBTp. First, the work was undertaken with a small number of participants and to demonstrate that a feature of treatment (be it homework, therapeutic alliance) is a mediator of a good outcome typically requires large scale highly powered studies (Borkovec and Castonguay, 2006). Second, in our view there is no reason that a formulation developed in this way will naturally lead to the change expected in the study. In CBT a formulation is developed collaboratively with the client rather than presented to them. In addition, a conceptualization is developed over the course of therapy according to the level of understanding that is necessary for that stage of treatment (Kuyken, Padesky and Dudley, 2009). Third, formulation in and of itself is not a treatment intervention. CBT as an approach does not consider the development of insight or understanding in itself, to be sufficient to lead to a reduction in distress (Beck, 1995). Hence, the real value of formulation is in helping to create a shared understanding of the difficulties. This understanding is then actively subjected to empirical testing by the therapist and client, through the subsequent selection of treatment options. Formulation guides the selection of treatment interventions that are chosen to help alleviate a person's distress. The success or value of the intervention in turn acts as a test of value of the formulation.

As can be seen, the evidence base is extremely limited with regards formulation in general (Kuyken, 2006) and particularly so in CBTp (Dudley and Kuyken, 2006). Nevertheless, NICE guidelines for schizophrenia (2002) recommended CBTp be available for people with treatment resistant symptoms. The training of therapists to use CBTp almost invariably emphasizes the need to develop a coherent formulation of the person's presenting issues, based on a cognitive model. Hence, how we formulate psychotic illness, and the extent to which clinicians agree with each other, is still a highly relevant question.

The current study investigates what features of a formulation are identified by mental health professionals, when asked to produce a cognitive behavioural case formulation of an individual's delusional beliefs, within the context of a psychotic illness. It is the first study that investigates this rate of agreement of formulation, for psychotic illness. Additionally, we are able to investigate the relative contribution of different forms of experience, qualification and knowledge in the development of a conceptualization of delusional beliefs.

Despite the evidence that CBTp is helpful for people with psychotic illness (Turkington, Dudley, Warman and Beck, 2004) there is still relatively little access to this form of help (Berry and Haddock, 2008). Rather, within the UK there has been an emphasis on training in Psycho-Social Intervention (PSI) that focuses on good case management, family and individual work (including CBT) in the context of increased understanding of the processes involved in psychotic illness such as the role of stress vulnerability models (Brooker and Brabban, 2004). Hence, there is rich clinical experience of working with psychosis, but perhaps less specific CBT psychosis knowledge.

This study targets clinicians with CBT experience and those with psychosis experience in order to help understand the relative contributions of the two factors to the ability to produce cognitive conceptualizations. Previous research studies have not considered experience of CBT separately from the experience of the disorder. Thus, there were two main research questions. The first considers the reliability or rate of agreement between the therapists, and the second considers factors that may lead to lesser or greater agreement in the content of a formulation. In keeping with the previous research, it was hypothesized that participants would be better able to identify the overt symptoms and problems, and less able to identify the inferential aspects of a formulation, such as core beliefs or dysfunctional assumptions. It was also hypothesized that the higher level of academic qualification (Persons *et al.*, 1995), and greater clinical experience (Kuyken *et al.*, 2005) would lead to greater levels of agreement with an expert derived benchmark formulation. In addition, it was hypothesized that high levels of experience in either CBT or psychosis would be related to different patterns of strength in formulation ability. In particular, therapists with greater experience in CBT would be better at identifying the inferential aspects of the formulation (core beliefs, dysfunctional assumptions and thoughts). In contrast, therapists with greater experience of working with people with psychosis would be better at identifying the “stress-vulnerability” aspects of the presentation (*i.e.* individuals’ vulnerabilities, stressors and behaviours/coping strategies). The latter are aspects routinely taught on PSI courses and are compatible to some extent with the cognitive model that specifies psychological vulnerabilities. One key difference however, is the use of stress vulnerability models that often emphasize social and physical stressors in the onset of psychosis, and tend to not address the meaning of events so much as the quantity of events (Brabban and Turkington, 2002).

When studying reliability of formulation it is vital to consider a number of key methodological challenges. The first concerns the materials that clinicians draw upon when developing formulations. To help ensure the validity of the formulation, it should ideally be derived from multiple sources of information, such as the person’s self report, the results of assessment measures, thought records, and response to interventions. Previous researchers have used written case vignettes (Eells *et al.*, 2005), or audio (Persons *et al.*, 1995) or video tapes of excerpts from sessions to provide the clinical material (Mumma and Smith, 2001; Kuyken *et al.*, 2005). The client information in the current study is presented in the form of a video of an assessment session, in an attempt to emulate as closely as possible the information available to a clinician in their own practice. In addition, a timeline is used as a means of eliciting key historical events. This is a common technique utilized by clinicians when working with people with psychotic illness, within a PSI framework.

A second vital consideration when studying reliability of formulation is to consider what the clinician is meant to agree with. The benchmark formulation ideally will be high quality,

parsimonious, logically coherent and, if possible, be agreed as acceptable by the client, therapist, supervisor, and the broader peer group of therapists (Butler, 1998). At worst, a formulation may just be one person's opinion and, hence, be subject to bias (Kahenman, 2003). To help reduce possible bias, we drew on a case that was treated by one of the research group, and we consulted three experts to provide an agreed formulation of the case based on the timeline, and viewing of the video. This reduced the potential subjectivity of the benchmark case formulation that was used to compare the responses of the clinicians against.

A third important matter is the format of the cognitive model on which to base the formulation. There are many variants on the cognitive model that are proposed to account for the emergence and maintenance of psychotic symptoms (i.e. Bentall, 2003; Chadwick et al., 1996; Freeman, Garety, Kuipers, Fowler and Bebbington, 2002; Freeman, 2007; Morrison, 1998). These vary in the amount of empirical support for the mechanisms described in the models, but generally lack evidence of their effectiveness (see Trower, Birchwood and Meada, 2004 for an obvious exception in treating command hallucinations). To date, no specific cognitive models have shown to improve treatment for delusions above and beyond a generic cognitive model (Wykes, Steel, Everitt and Tarrrier, 2008). Moreover, these models share in common the notion that appraisals of events affect feelings and behaviour and, therefore, are all compatible with more generic cognitive models. Given the absence of a validated "symptom" specific model for delusions, it is assumed that more generic cognitive behavioural frameworks (i.e. Beck, 1995; Persons and Bertagnolli, 1999) are commonly applied to understand and treat delusional beliefs. Therefore, in this research we chose to use a generic cognitive model based on maintenance cycles (Beck, 1995) and predisposing factors to difficulties described in terms of early life experiences leading to beliefs about self, and others that are managed by rules, and assumptions with distress activated by a triggering event that breached these rules or assumptions.

Method

Participants

Eighty-five mental health clinicians were recruited from postgraduate and professional training courses in CBT, and Psychosocial Interventions. Clinical psychologists undertaking doctoral training were also recruited. All participants were familiar with CBT, having undertaken a least a 4-day basic course in CBT. All participants completed a demographic questionnaire eliciting information about professional background, professional and academic qualifications, number of years of clinical experience, as well as specific experience in psychosis and CBT, including an estimate of the number of cases seen for CBT work, and the number of people with psychosis with whom the person has worked. Three people did not participate owing to choosing to use the time for other purposes. Hence, the rate of participation (82/85) was high.

Demographic characteristics of the sample and training information are shown in Table 1. Participants had a variety of professional backgrounds, with almost half comprising of mental health nurses. Almost two-thirds were educated to at least Bachelors' degree level, and had an average of 8½ years clinical experience. They reported a rich experience of working with people with psychotic illness, having worked with many cases, but generally having less CBT case experience.

Table 1. Participants' demographic characteristics and training information

Characteristics	Total <i>N</i> (%) or Mean (<i>SD</i>)
Core profession	
Psychiatric/mental health nurse	36 (46%)
Trainee clinical psychologist	17 (22%)
Social worker	6 (8%)
Clinical psychologist	5 (6%)
Occupational therapist	4 (5%)
Psychiatrist	3 (4%)
Support worker	3 (4%)
Counsellor	2 (3%)
Other	3 (4%)
Highest degree/qualification	
PhD/DClinPsy/MD	7 (9%)
MPhil/MA/MSc	13 (16%)
BA/BSc	29 (37%)
Nursing Diploma	26 (33%)
Psychotherapy/counselling diploma	1 (1%)
Other	3 (4%)
Post-qualification clinical experience	
Overall experience (years)	8.5 (<i>SD</i> 7.17)
CBT (years experience)	1.8 (<i>SD</i> 2.32)
Psychosis (years experience)	6.2 (<i>SD</i> 6.43)
CBT cases (<i>N</i>)	21.5 (<i>SD</i> 46.02)
Psychosis cases (<i>N</i>)	130.1 (<i>SD</i> 192.00)

Measures

The measures employed were specifically developed for the study in light of the methodological challenges outlined in the introduction. A video of a clinical session was the basis on which participants constructed their formulations. Their formulations were then compared to a benchmark formulation previously developed by an expert panel of therapists. A scoring manual was used to assess how well the participant's formulation corresponded with the template, or benchmark formulation.

Video vignette

The case was presented as a video of a 30 minute CBT assessment session. The material was based on an actual client, who had given his consent, subject to protecting his anonymity. As a real case, the material contained many of the features that are emphasized within the disorder specific models (i.e. Freeman, 2007) of delusions that are considered important in the formation and maintenance of delusions (e.g. substance misuse, social isolation, disrupted sleep, jumping to conclusions reasoning style, bullying and negative beliefs about others). The client was role-played by a clinical psychologist who is also an experienced actor. Additional information was provided in the form of a timeline that detailed the client's history. In brief, the

person developed a psychotic illness whilst working away from home. He was experiencing a number of stressors including being away from his supportive family, taking cannabis, working shifts, experiencing disturbed sleep, and working in a loud environment (an engine room). He became very concerned that his colleagues would discover some pornography he had brought with him that he had not realized contained homosexual images. He feared he would be ridiculed if this was discovered. During this period he watched a number of films with a common theme of aliens (i.e. Close Encounters of the Third Kind, ET). One evening whilst working in the engine room he became convinced that aliens were coming to harm him.

Formulation template

As stated, there is no unifying model of psychosis and there is only preliminary evidence of a symptom specific model for delusional beliefs, particularly in relation to treatment (Freeman, 2007). Despite their differences, such frameworks share many similarities with the generic cognitive model (Dudley and Kuyken, 2006) in that they aim to account for: the presenting problems, maintenance features, precipitants or triggers, and predisposing factors that may have left this person vulnerable to the stressors at the time of onset. In choosing a formulation template, these criteria were considered and agreed as present via a process of consultation with an expert panel.¹ Beck's (1976) cognitive behavioural therapy framework, originally developed for depression, was used as the basis for the formulation template as it accounted for the common features in cognitive models of psychotic experiences.

To ensure the formulation format was appropriate, the courses from which the participants were recruited were contacted to ensure that the students would have had training in using these models. Whilst the CBT diploma courses emphasized disorder specific models for emotional disorders, they also included introductory training using generic formulation models. The Doctorate of Clinical Psychology courses and PSI courses also taught CBT using the generic model.

A pilot study ($n = 5$) of the materials led to clarification and definition of language in the template. The revised template was approved by the expert panel. The pilot data were not included in subsequent analyses.

Benchmark formulation

The expert panel individually watched the video and used the timeline to develop a cognitive formulation. Subsequent group discussion led to an agreed benchmark formulation. Only items agreed by all three members of the panel were included in the final formulation. The case material was rated by the expert panel for its likeness to a "typical case", on a 0 to 5 ("nothing like" to "very much like" a typical case) likert scale, with an average rating of 4 indicating an acceptable level of face validity.

¹The expert panel comprised of three highly experienced clinicians, of different professions who are recognized for their contribution to training and research in the field of PSI and CBT for psychosis.

Scoring manual

The scoring manual was developed based on the experts' benchmark formulation, and was refined further using three completed formulation templates that were randomly selected from the entire sample (described below). These cases were subsequently excluded from the data set. The research team scored the templates individually using the expert formulation as a guide, and discussed any discrepancies in the scores. This enabled precise guidelines to be written for the scoring of each item.

Each item of the formulation was scored of either 0 (inaccurate), 1 (theme identified) or 2 (accurate). Scores for each item were summed to produce a score for each component level of the formulation (i.e. Early experiences, Core beliefs, Dysfunctional assumptions, Stressors/triggers, Maintenance cycle). These components were summed to produce a total score. Components that were considered to be specific features of CBT formulations (Core beliefs, Dysfunctional assumptions, and the item "Thoughts" from the Maintenance cycle) were summed to create an "Inferential" subscale. The components of the formulation most consistent with stress-vulnerability models (Early experiences, Stressors, and the item "Behaviours" from the Maintenance cycle) were also identified, and labelled Stress-vulnerability subscale. Three completed formulations were selected at random from the data set. Each was scored independently by three of the researchers to establish inter-rater reliability of the scoring, using these guidelines. An acceptable level of inter-rater reliability for the total score, and the Inferential and Stress vulnerability subscales ($\kappa > 0.85$) was achieved. For an illustration of the items and components within the formulation see Table 2.

Procedure

Having consented to participate, participants were tested in group settings, usually as part of scheduled training. Once familiar with the formulation template and the timeline materials, the video was presented, after which the participants were asked to complete the formulation template, without conferring about the case. Participants then completed the demographic questionnaire. Feedback on the expert formulation was provided at the end of the training session.

Ethics procedures

The study was subject to independent peer review, registered with a Trust R and D department and received Local Regional Ethics approval.

Data analysis

Data were analyzed using version 15 of SPSS (Statistical Package for the Social Sciences, 2007). In order to consider the first research question - what elements of a formulation are identified and to what extent it agrees with an expert formulation - the percentage agreement among participants was calculated, which is a recognized method of establishing reliability (Luborsky and Diguier, 1998). By convention, a level of 70% demonstrates good reliability. To address which factors were associated with the ability to formulate, a series of regression analyses were undertaken in which qualification, years of and type of experience were entered

as predictor variables. Three regressions were undertaken in which the criterion variable was total score, inferential score, and stress vulnerability score allowing consideration of whether particular CBT or psychosis experience was linked to these aspects of formulation.

Results

Table 2 provides the percentage agreement on each item (Kuyken et al., 2005) and component of the benchmark formulation overall, by level of training. The figures shown represent the proportion of clinicians who correctly identified the item for each aspect of the benchmark formulation – i.e. scoring 1 or 2 on that item.

It is evident that as a component of formulation, behaviours are the most readily agreed items (overall agreement 91.6%). Physical symptoms are the next most readily identified (70.3%), followed by stressors or triggers (64.4%). This is consistent with previous research indicating that the overt presenting issues are better identified than the theory based inferential components of a formulation. However, it is also evident that there is great variability in the individual items of the formulation that are identified. Clinicians identify some of the more overt historical events (e.g. being bullied, 83.5%), as well as stressors/triggers (e.g. drug use, 91.1%), behaviours (e.g. carrying a knife, 88.6%) and physical symptoms of anxiety (77.2%) and one feeling (i.e. anxiety, 83.5%) with a high level of agreement. There was much less agreement for the inferential aspects of “core beliefs” and “dysfunctional assumptions” (between 36.7% and 65.8%). There was particularly low agreement with respect to identifying thoughts (mean overall agreement of 32.2%).

In keeping with previous research, there was only moderate agreement with the experts’ formulation amongst all of the participants. The mean score of 26.8 ($SD = 5.88$) was about half of the maximum score of 54. Scores for the inferential components (mean of 6.5 $SD = 2.84$, maximum possible = 20) were lower than that of the scores of the stress vulnerability components (mean = 16.1, $SD = 3.7$, maximum score possible = 26) once again reflecting the greater identification of more overt current and precipitating difficulties and less agreement on more theory based components.

To investigate potential predictors of formulation ability, a series of multiple regressions were performed in which the criterion variable was total score, inferential score, and stress vulnerability score. As some of the independent variables were significantly and positively skewed, transformations were employed as suggested by Tabachnick and Fidell (1996 p.174). “Years overall experience” and “number of CBT cases” were successfully transformed using the square root and log (base 10) transformations respectively. Transformations of the “number of psychosis cases” led to a bimodal distribution with one of the modes at zero. This variable was successfully transformed by taking the cube root. However, there still remained 18 participants or nearly 25% of the group who reported that they had had no experience of working with people with psychosis. Consequently, all analyses were run twice, once when cases where the experience of psychosis was zero were removed from the analysis, resulting in a reduced sample size of 58, and a second time, with all participants categorized into groups on the basis of their experience of working with psychosis (none, some, considerable) and the categorical variable was used as a predictor variable (only the reduced sample size is reported as it is the most conservative analysis, unless there were differences). The removal of cases did not impact significantly on the distributions for the other predictor variables. Bi-variate

Table 2. Percentage agreement on each formulation aspect (overall and by level of training)

Expert formulation – components (bold) and items	Diploma (Nursing/ counselling/ other)			Overall N = 79
	N = 30	BSc/BA degree N = 29	Masters/PhD/ Doctorate N = 20	
	%	%	%	%
Early experiences/vulnerability (mean)	56.2	54.2	54.8	55.1
Masculine/Male dominated environment	*96.4	*86.7	*81.0	*88.6
Bullied/called queer	*82.1	*83.3	*85.7	*83.5
Doesn't/can't show feelings/emotionally limited	14.3	13.3	9.5	12.7
Psychological problems/obsessional/checking behaviour	32.1	33.3	42.9	35.4
Core beliefs/schema (mean)	48.8	41.1	58.8	49.8
I am weak/vulnerable/powerless/helpless	25.0	36.7	52.4	36.7
Men are strong/powerful/tough	60.7	26.7	42.9	46.8
People/others are unkind/judgemental/hostile/cruel	60.7	60.0	*81.0	65.8
Dysfunctional assumptions (mean)	52.4	44.5	65.1	52.7
I must be strong/powerful/tough to be a man	67.9	46.7	*81.0	63.3
If I can't cope, I am not a man/I should be able to cope	32.1	40.0	42.9	38.0
I should not show emotion/how I feel/get painful feelings	57.1	46.7	*71.4	56.9
Stressors/triggers (mean)	64.0	63.3	66.7	64.4
Away from home/family/emotionally vulnerable	*87.7	*90.0	*90.5	*88.7
Drug use	*92.9	*93.3	*85.7	*91.1
Sleep deprivation	42.9	30.0	33.3	35.5
Engine room noise/sensory deprivation	25.0	46.7	47.6	39.3
Debts/unable to quit job	53.6	36.7	52.4	46.8
Gay porn	*82.1	*83.3	*90.5	*84.8
Thoughts (mean)	32.2	32.5	32.2	32.2
There are aliens around	42.9	56.7	38.1	46.9
The aliens know about me	28.6	36.7	38.1	34.2
The aliens are going to do/say something	35.7	6.7	23.8	21.5
I am going to get found out (about the porn/homosexual preoccupation)	21.4	30.0	28.6	26.6
Feelings (mean)	46.5	45.0	47.6	46.2
Anxiety/paranoia	*78.6	*80.0	*95.2	*83.5
Shame	14.3	10.0	0.0	8.9
Behaviours (mean)	90.6	92.2	92.0	91.6
Attacks (carries knife/martial arts/fighting)	*85.7	*93.3	*85.7	*88.6
Avoids (hat/collar up/beard/avoids eye contact)	*92.9	*96.7	*95.2	*95.0
Cannabis/drug use	*92.9	*86.7	*95.2	*91.1
Physical symptoms (mean)	73.2	70.0	66.7	70.3
"Fused"/tension	50.0	63.3	*81.0	63.3
Symptoms of anxiety	*96.4	*76.7	52.4	*77.2

*Agreement for item > 70% A level of 70% demonstrates good reliability (Luborsky and Diger, 1998)

correlations (Tabachnick and Fidell, 1996) and checks for multicollinearity indicated the variables were sufficiently independent.

The first multiple regression was for total formulation score as the outcome variable. Age and gender were entered next as control variables, followed by overall experience (years), highest qualification, number of CBT cases, and number of psychosis cases as the predictor variables. The overall model was significant and accounted for 21% of the variance ($R^2 = 0.21$, $F(4,53) = 3.49$, $p < .01$). Two of the predictor variables contributed significantly to the overall model, (square root) overall years experience ($\beta = 0.42$, $t = 2.85$, $p < .01$) and (cube root) number of psychosis cases ($\beta = -0.37$, $t = -2.38$, $p < .05$). It should be noted that the “number of cases of psychosis seen” was inversely related to the outcome variable. This suggests that therapists with a greater number of years of clinical experience produce more reliable formulations, whereas therapists who have seen a high number of cases of psychosis specifically produce formulations that are less in agreement with those of an expert group of clinicians.

A second multiple regression, with the outcome variable being the score for the inferential components of the formulation, was undertaken. The predictor variables were entered as before. The overall model was significant ($R^2 = 0.17$, $F(4,53) = 2.79$, $p < .05$) with the (log10) “number of CBT cases seen” making the only significant contribution to the prediction of the outcome variable ($\beta = 0.28$, $t = 2.17$, $p < .05$). This suggests that individuals with greater experience in CBT are better able to reliably formulate inferential aspects of a formulation.

A third multiple regression was performed with the stress-vulnerability component score as the outcome variable, and the predictor variables included previously. The overall model was not significant and accounted for only 14% of the variance ($R^2 = 0.14$, $F(4,53) = 2.15$, $p = .09$). Effect sizes were calculated using R^2 for each of the regression equations, using the convention stated by Cohen (1988). The effect size for total score as the dependent variable was 0.27 (small effect size), which resulted in adequate power (0.87). With “Inferential aspects”, the effect size was 0.21 (small effect size), indicating reasonable power (0.77). For the stress-vulnerability components effect size was 0.16 (small), resulting in low power (0.63).

Additional analyses to investigate features considered to be very important in the development and maintenance of delusional beliefs were not possible owing to the lack of specificity in the formulation template. Hence, the identification of features such as jumping to conclusions reasoning style, or the presence of anomalous experiences (see Freeman, 2007) was not possible. However, we also considered if participants identified material not present in the expert formulation. In brief, no additional information was revealed, indicating that people did not include material not incorporated by the experts.

Discussion

This study investigated which features of a formulation were identified by clinicians with varying levels of experience of working with people with psychosis, and of CBT. We also investigated the rate of agreement with an expert generated formulation to help determine whether clinicians can produce reliable CBT formulations of an individual’s delusional beliefs. Consistent with previous research on the reliability of CBT case formulation, there was greater identification of aspects of the formulation such as overt behaviours, physical symptoms, and triggers. There was less identification of the inferential aspects, such as core beliefs and dysfunctional assumptions.

The overall identification of CBT elements of formulation was low, with only 10 out of 27 elements (37%) achieving over 70% agreement when considering the entire sample (see Table 2). This illustrates the wide variation in features identified within the formulation. However, the participant sample was relatively inexperienced and had on average less than 2 years experience practising CBT. Despite this, the level of reliability was comparable to previous research on the reliability of CBT formulations (Persons and Bertagnolli, 1999; Mumma and Smith, 2001), and was consistent with research examining the reliability of psychodynamic case formulation (Luborsky and Diguier, 1998). This is particularly encouraging as clinicians were asked to generate items of the formulation independently, rather than be given a list of attributes as in some previous CBT reliability studies, which may have helped to increase reliability (Persons *et al.*, 1995; Persons and Bertagnolli, 1999).

The identification of thoughts was particularly poor. There are a number of possible reasons for this. The thoughts may have been poorly defined by the experts, making this aspect of the formulation difficult to assess. Also, the process of identifying thoughts is likely to be associated with more CBT specific knowledge, rather than identifying more descriptive items such as behaviours, and CBT knowledge was generally low in the participants. However, there was a reasonable level of agreement for other components that involved making inferences based on cognitive theory (i.e. core beliefs and dysfunctional assumptions) amongst the more qualified group, suggesting that the low agreement on thoughts is unlikely to be owing to a lack of knowledge of cognitive theory *per se*.

Alternatively, it is possible that this aspect of Beck's (1976) generic CBT model does not transfer well to the formulation of delusional beliefs in psychosis. As yet, there is no widely accepted cognitive model of psychosis (Wykes *et al.*, 2008), nor of delusional beliefs. In one model (Freeman, 2007), persecutory delusions are conceptualized as threat beliefs, which are maintained by similar processes to those implicated in the maintenance of anxiety disorders. Beck's (1976) model was originally developed for conceptualizing depression, which is characterized by a negative cognitive triad (Beck, 1976). The low level of agreement on thoughts observed in this study could reflect subtle differences in the formulation of thoughts within cognitive models for different disorders, or a lack of knowledge about the specific processes that are thought to be involved in the development of delusional thoughts.

It was hypothesized that the level of qualification, amount of overall clinical experience, and experience in CBT and psychosis would be related positively to the level of agreement with the benchmark formulation. Two variables, "years overall experience" and "number of psychosis cases seen" predicted the level of agreement to the benchmark formulation. Contrary to the Persons and Bertagnolli (1999) study, level of academic qualification did not make a significant contribution to the total formulation score, whereas overall experience did predict the total formulation score. This suggests that the ability to formulate improves with clinical experience, and is not significantly influenced by the level of qualification. This is somewhat at odds with the results of Eells *et al.* (2005), who noted that it was not "experience" but "expertise" that was associated with better formulation. However, we did not specifically recruit experts, nor did we include a variable measuring expertise, and hence are unable to differentiate the effect of experience vs. expertise. However, the sample we recruited were undertaking training in PSI or CBT and were not targeted as potential experts in these approaches; hence the findings need to be considered against the moderate level of experience of the groups.

It is relevant to note that there was a negative relationship between the "number of psychosis cases seen" and the agreement with the benchmark formulation. In attempting to account for

this finding it could be hypothesized that individuals with many years of experience in working with psychosis found it difficult to make the conceptual shift from their existing views to thinking psychologically about the development of psychosis, particularly within a cognitive framework. This is because, in the above sample, the majority (nearly 60%) of individuals who had experience with psychosis were nurse clinicians who had worked with a high number of people with psychotic illness. Presumably, one could predict that we would not see this negative relationship if we were to recruit participants at the end of their PSI training.

The hypothesis that therapists with greater experience in CBT are more able to formulate the inferential aspects of a formulation was supported. This finding is consistent with the idea that making inferences about a client's beliefs (e.g. core beliefs and assumptions) is a skill that develops through specific CBT experience. CBT case experience seems to be related to the reliability to be able to formulate the inferential aspects. This has implications for training, indicating the potential value of using supervised practice to develop clinical experience and greater competence in formulation work.

This study did not support the hypothesis that therapists who had seen more cases of psychosis could more reliably identify the stress-vulnerability components of a formulation. However, the level of power was low (63%), making small effects difficult to detect.

The findings need to be considered in the context of the potential limitations of this and similar research. A stark limitation of this work is that the client was not an active contributor to the process. Whether therapists agree with each other is perhaps less important a question than whether a client and therapist can agree together on the content of a formulation. For clinical, ethical and pragmatic reasons it was not possible to ask the client to meet with the participants to allow them to generate a formulation. However, without the involvement of the client, the resulting formulation will always be limited in its ability to capture the richness of the clinical material. Given this, the actual formulation developed with the client by the therapist (who was CBT trained) was very similar to that produced by the experts. This adds some support for the validity of the expert generated formulation.

A further limitation of this work is that we used a "static" or "snapshot" formulation, which is one in which no information was provided about the client's reaction to the formulation, or of the results of interventions guided by the formulation. In reality, formulation is a dynamic, collaborative, shared, tentative clinical process and one that changes and alters over the course of therapy. For these reasons, it could be argued that there is never a "right" formulation that accounts for all aspects of a person's distress and development. Moreover, they may be "good enough" for the therapeutic task at hand, and at early stages of treatment may not need to be comprehensive and all encompassing. We very much recognize that formulations are always subject to revision in the light of new information. Nevertheless, this does not mean that we cannot examine the process of formulation, but it does mean that we should be appropriately cautious in our interpretation of findings.

Further limitations of this work include the fact that the formulation template had to be derived *de novo*. There is at present no consensus on the most appropriate formulation model for psychosis. This may have led to a neglect of important disorder specific information. However, the generic model adopted in this study has been used elsewhere when working with psychosis (Chadwick et al., 2003) and is taught on the courses from which the participants were recruited.

There was great variance in the sample in relation to experience in CBT versus psychosis, with only a few people having a great deal of experience in CBT. The sample may not

have had the experience of CBT that would enable them to produce coherent and high quality formulations. They would not likely meet criteria for BABCP accreditation which Kuyken et al. (2005) found was a predictor of formulation quality. Whilst an obvious potential limitation for this research, the amount of training and experience required to undertake CBT for Psychosis is unclear. Turkington et al. (2002) demonstrated that valuable help was provided by community nurses with 10 days of training in CBT and family work. Hence, the threshold for skills development is not clearly defined. Participants in this study had been on the training courses for several months, and had completed at least 4 days of training in CBT. However, it is the case that the sample size was small for the regression analysis (Tabachnik and Fidell, 1996, p.132). Also, the study primarily considered the rate of agreement using a quantitative approach. It would be interesting to consider whether qualifications or experience impacted upon the quality of the formulations, which may be assessed on criteria such as the degree of parsimony or elegance of the formulations. We have not considered the overall quality of the formulation, or whether the formulations are “good enough”.

Finally, with regards to future research directions there are naturally many questions that arise regarding the objective “truth” of a formulation, and it can be argued that formulation is an idiosyncratic and non replicable process. However, it would seem that the emphasis within cognitive approaches is to base formulations on empirically validated models accounting for the specific features of the presenting problem (Salkovskis, 1996). Whilst the models may have limitations, we should expect some level of consistency if we are basing our understandings on such models. There are also additional features of cognitive therapy that, if implemented effectively, should help increase the usefulness or utility of the formulation. For instance, the collaborative approach in CBT means that the client is closely involved in the process of generation of the formulation, and this acts as a natural check or balance on the process. Also, placing an emphasis on incorporating a person’s strengths into a formulation can help emphasize how much the person has coped with effectively, and helps draw attention to the aspects of the person that may serve as a resource in coping with the current difficulties. It will be helpful to consider future research that incorporates collaborative approaches, and an emphasis on strengths in their findings (Kuyken et al., 2009).

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References

- Beck, A. T.** (1976). *Cognitive Therapy and the Emotional Disorders*. New York: International Universities Press.
- Beck, J. S.** (1995). *Cognitive Therapy: basics and beyond*. London: Guilford Press.
- Bentall, R. P.** (2003). *Madness Explained*. London: Penguin Books Ltd.

- Berry, K. and Haddock, G.** (2008). The implementation of the NICE guidelines for schizophrenia: barriers to the implementation of psychological interventions and recommendations for the future. *Psychology and Psychotherapy, Theory, Research and Practice*, 81, 419–436.
- Bieling, P. J. and Kuyken, W.** (2003). Is cognitive case formulation science or science fiction? *Clinical Psychology: Science and Practice*, 10, 52–69.
- Borkovec, T. D. and Castonguay, L. G.** (2006). What qualifies as research on which to judge effective practice? Effectiveness research. In J. C. Norcross, L. E. Beutler and R. F. Levant (Eds.), *Evidence-Based Practices in Mental Health: debate and dialogue on the fundamental questions*. Washington, DC: American Psychological Association.
- Brabban, A. and Turkington, D.** (2002). The search for meaning: detecting congruence between life events, underlying schema and psychotic symptoms. In A. P. Morrison (Ed.), *A Casebook of Cognitive Therapy for Psychosis*. London: Brunner-Routledge.
- Brooker, C. and Brabban, A.** (2004). *Measured Success: a scoping review of evaluated psychosocial interventions training for work with people with serious mental health problems*. Trent WDC: National Institute for Mental Health for England.
- Butler, G.** (1998). Clinical formulation. *Comprehensive Psychology*, 6, 1–23.
- Chadwick, P., Birchwood, M. and Trower, P.** (1996). *Cognitive Therapy for Delusions, Voices and Paranoia*. Chichester: Wiley and Sons.
- Chadwick, P., Williams, C. and Mackenzie, J.** (2003). Impact of case formulation in CBT for psychosis. *Behaviour Research and Therapy*, 40, 671–680.
- Cohen, J.** (1988). *Statistical Power Analysis for the Behavioural Sciences*. New Jersey: Lawrence Erlbaum Associates.
- Dudley, R. and Kuyken, W.** (2006). Formulation in cognitive therapy: a heuristic framework. In L. Johnstone and R. Dallos (Eds.), *Formulation in Practice*. East Sussex: Routledge.
- Dudley, R., Siitarinen, J., James, I. and Dodgson, G.** (2009). What do people with psychosis think caused their psychosis? A Q methodology study. *Behavioural and Cognitive Psychotherapy*, 37, 11–24.
- Eells, T. D., Lombart, K. G., Kendjelic, E. M., Turner, L. C. and Lucas, C. P.** (2005). The quality of psychotherapy case formulations: a comparison of expert, experienced, and novice cognitive–behavioral and psychodynamic therapists. *Journal of Consulting and Clinical Psychology*, 73, 579–589.
- Fowler, D., Garety, P. and Kuipers, E.** (1995). *Cognitive Behaviour Therapy for People with Psychosis: a clinical handbook*. Chichester: Wiley and Sons.
- Freeman, D.** (2007). Suspicious minds: the psychology of persecutory delusions. *Clinical Psychology Review*, 27, 425–457.
- Freeman, D., Garety, P. A., Kuipers, E., Fowler, D. and Bebbington, P. E.** (2002). A cognitive model of persecutory delusions. *British Journal of Clinical Psychology*, 41, 331–347.
- Kahneman, D.** (2003). A perspective on judgement and choice – mapping bounded rationality. *American Psychologist*, 58, 173–180.
- Kingdon, D. and Turkington, D.** (1994). *Cognitive Behavioural Therapy of Schizophrenia*. Hillside: Lawrence and Erlbaum Associates.
- Kuyken, W.** (2006). Evidence-based case formulation: is the emperor clothed? In N. Tarrow (Ed.), *Case Formulation in Cognitive Behaviour Therapy: the treatment of challenging and complex cases* (pp.12–35). East Sussex: Routledge.
- Kuyken, W., Fothergill, C. D., Musa, M. and Chadwick, P.** (2005). The reliability and quality of cognitive case formulation. *Behaviour Research and Therapy*, 43, 1187–1201.
- Kuyken, W., Padesky, C. and Dudley, R.** (2008). The science and practice of Case Conceptualization. *Behavioral and Cognitive Psychotherapy*, 36, Special Issue, 757–768.
- Kuyken, W., Padesky, C. and Dudley, R.** (2009). *Collaborative Case Conceptualization: working effectively with clients in cognitive behavioural therapy*. New York: Guilford Press.

- Luborsky, L. and Diguier, L.** (1998). The reliability of the core conflictual relationship theme method measure: results from eight samples. In L. Luborsky and P. Crits-Christoph (Eds.), *Understanding Transference: the core conflictual relationship theme method* (pp. 97–108). New York: Basic Books.
- Morrison, A. P.** (1998). A cognitive analysis of the maintenance of auditory hallucinations: are voices to schizophrenia what bodily sensations are to panic? *Behavioural and Cognitive Psychotherapy*, 26, 289–302.
- Morrison, A. P., Renton, J. C., Dunn, H., Williams, S. and Bentall, R. P.** (2004). *Cognitive Therapy for Psychosis: a formulation based approach*. New York: Brunner-Routledge.
- Mumma, G. H. and Smith, J. L.** (2001). Cognitive behavioural interpersonal scenarios: interformulator reliability and convergent validity. *Journal of Psychopathology and Behavioural Assessment*, 23, 203–221.
- National Institute for Clinical Excellence (NICE)** (2002). *Schizophrenia: core interventions in the treatment and management of schizophrenia in primary and secondary care*. London: Author.
- Persons, J. B. and Bertagnolli, A.** (1999). Interrater reliability of cognitive-behavioural case formulations of depression: a replication. *Cognitive Therapy and Research*, 23, 271–283.
- Persons, J. B., Mooney, K. A. and Padesky, C. A.** (1995). Interrater reliability of cognitive-behavioural case formulations. *Cognitive Therapy and Research*, 19, 21–34.
- Salkovskis, P. M.** (1996). The cognitive approach to anxiety: threat beliefs, safety-seeking behaviour, and the special case of health anxiety and obsessions. In P. M. Salkovskis (Ed.), *Frontiers of Cognitive Therapy*. New York: The Guilford Press.
- SPSS** (2007). *SPSS for Windows. Release 15.0*. Chicago, Illinois: SPSS.
- Tabachnick, B. G. and Fidell, L. S.** (1996). *Using Multivariate Statistics*. New York: Harper Collins.
- Tarrier, N. and Calam, R.** (2002). New developments in cognitive behavioural case formulation: epidemiological, systemic and social context: an integrated approach. *Behavioural and Cognitive Psychotherapy*, 30, 311–328.
- Trower, P., Birchwood, M. and Meada, A.** (2004). Cognitive therapy for command hallucinations: randomized controlled trial. *British Journal of Psychiatry*, 184, 312–320.
- Turkington, D., Dudley, R., Warman, D. M. and Beck, A. T.** (2004). Cognitive-behavioural therapy for schizophrenia: a review. *Journal of Psychiatric Practice*, 10, 5–16.
- Turkington, D., Kingdon, D., Turner, T. and the Insight into Schizophrenia Research Group** (2002). Effectiveness of a brief cognitive-behavioural therapy intervention in the treatment of schizophrenia. *British Journal of Psychiatry*, 180, 523–527.
- Wykes, T., Steel, C., Everitt, B. and Tarrier, N.** (2008). Cognitive behavior therapy for schizophrenia: effect sizes, clinical models, and methodological rigor. *Schizophrenia Bulletin*, 34, 523–537.