A repertory grid study of CAT group formulation in a forensic setting

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Abstract:
The study sought to examine the effect of Cognitive Analytic Therapy (CAT) group reformulation sessions on staff perceptions of a patient in a forensic mental health setting. The study evaluated ongoing practice of team based formulation using a pre-post design, with analysis through a range of repertory grid assessment techniques. The study used both individual and group level analysis of repertory grid data. There was no control sample. A repertory grid with common elements and constructs was developed through discussion with trained CAT therapists. This grid was completed by staff members, in a medium secure inpatient unit, before and after a CAT reformulation session. The outcomes were analysed using IDIOGRID. Individual level outcomes were validated through discussion between researcher and participants.

Seven staff members took part in the study. The results are interpreted as demonstrating some shift in constructs associated with the subject of the CAT sessions. The outcomes also indicated increased cohesion between staff members following the CAT session as evidenced by reduced differences between grids. Individual grids were analysed to explore the shifts seen in the group level analysis.

Repertory grid methods can provide meaningful individual and group level analysis to explore the effect of CAT formulation sessions. CAT reformulation sessions appeared to demonstrate positive effects, though the study's methodological weaknesses make it difficult to draw firm conclusions.

Keywords: consultation, team reformulation, forensic, repertory grid, cognitive analytic therapy

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Introduction

Forensic Settings and Relational Problems

Forensic mental health settings have high levels of violence and interpersonal threat (Papadopoulos et al., 2012). Patients in forensic settings can present with complex needs, particularly relational difficulties (Moore, 2012; Royal College of Psychiatrists, 2012). Psychological formulation may be a useful approach to providing a means to understanding patient needs and presentation in forensic settings, though there is currently limited evidence of efficacy (Davies, Black, Bentley, & Nagi, 2013; Moore & Drennan, 2013). Formulations developed within Cognitive Analytic Therapy (CAT; Ryle, 1991; Ryle, Poynton, & Brockman, 1990), an integrative from of psychotherapy, have been identified as a potentially useful approach for teams working with complex patients (Caruso et al., 2013; Davies et al., 2013). Team formulations may provide a means to targeting intervention, maintaining focus on treatment goals and reduce reactive responses to crises that may be successful in the short term, but inhibitory towards integrated treatment in the longer run (Moore & Drennan, 2013)

Cognitive Analytic Therapy

CAT is a psychotherapeutic approach, with a primary focus on relational difficulties (Ryle et al., 1990). An integrative therapy (Leiman, 1994; Roth & Fonagy, 2006), CAT draws on several theoretical models including Personal Construct Psychology (PCP; Kelly, 1955), object relations theory (Ryle, 1985), cognitive psychology and developmental psychology (Ryle & Kerr, 2002). CAT takes as its basis, that individuals develop internalised representations of the self and others termed 'reciprocal roles', which influence how we engage with the world (Ryle & Kerr, 2002). Based on these representations people engage in patterns of interpersonal interaction that can become problematic or inflexible (Calvert & Kellett, 2014). These problematic patterns, or target problem procedures, are described as 'snags, traps and dilemmas' in CAT (Ryle & Kerr, 2002). A shared understanding of reciprocal roles and the problematic patterns is developed through the process of reformulation; in individual therapy through a letter from the therapist to the patient and through a diagrammatic representation of the patterns, known as a sequential diagrammatic reformulation (SDR) (Ryle et al., 1990).

Though designed as an individual psychotherapy, CAT has also been used at a contextual level with teams. A CAT informed approach in teams can provide a shared language and be the basis for consistent approach

between therapist and patient (Kirkland & Baron, 2015). Training in CAT has been shown to increase team cohesion and clinical confidence among staff working with difficult patients (Caruso et al., 2013; Thompson et al., 2008). Team training in CAT has been suggested as a means to provide a 'common language' for staff teams, as well as providing a relational focus which may be effective in working with patients who present with interpersonal difficulties (Kerr, Dent-Brown, & Parry, 2007). In common with many studies of interventions with teams (Buljac-Samardzic, Dekker-van Doorn, van Wijngaarden, & van Wijk, 2010), the quantitative research evidence for CAT staff training reports positive outcomes. Thompson et al. (2008), in a qualitative study evaluating the impact of CAT training, found that staff reported increased confidence in their therapeutic skills and a perception that the training fostered team cohesion. Caruso et al. (2013) found changes at one month, post a CAT training intervention, though found no immediate difference following the intervention. As they did not have a control group it is difficult to attribute changes seen at one month post intervention to the CAT training.

A CAT consultation approach has also been suggested as a means to develop a shared relational understanding of the interaction between staff teams and patients and provide a psychological perspective on patient management (Carradice, 2013; Kellett, Wilbram, Davis, & Hardy, 2014; Kirkland & Baron, 2015). However, to date, there is limited evidence of the efficacy of this approach.

Carradice (2013) describes a CAT consultancy approach for work with people with a personality disorder diagnosis who may not be suitable for individual therapy. The model involves working with the patient and a staff member for five sessions with the aim of developing a shared SDR (map) between the patient, staff member and consultant. An unpublished case study based on this approach described this approach as acceptable and valued by the patient and care coordinator (Styring, in Carradice, 2013).

Kellett et al. (2014) completed a small, randomized, control trial to evaluate CAT consultancy in an assertive outreach team, using the consultancy model described by Carradice (2013). The intervention, cognitive analytic consultancy (CAC), involved team training, case consultation and CAT based team supervision (Kellett et al., 2014). The training focused on development of the SDR, while the consultation involved development of an SDR with the care coordinator and support workers that mapped the key reciprocal roles of staff and the patient. In

contrast to Carradice (2013), the model described did not involve joint sessions with the patient and care coordinator. The authors found no differences between CAC and treatment as usual on patient outcomes. However, the introduction of CAC had a significant effect on staff outcomes, as measured by team climate. In particular there was an increase in feelings of psychological safety and support, support for innovation and task orientation within the overall assertive outreach team (Kellett et al., 2014). A positive staff impact of consultation is consistent with qualitative research indicating that staff value psychological consultation (Murphy, Osborne, & Smith, 2013).

CAT training, consultation and supervision has been practised in the Orchard Clinic, a medium secure forensic mental health facility for several years. The consultancy and supervision components are provided through CAT reformulation sessions which seek to develop a relational understanding of the dynamics of staff interaction with patients. Kirkland and Baron (2015) presented a case report demonstrating the use of CAT to share a complex formulation across multiple agencies. The sessions are valued by staff but their efficacy is difficult to test. It might be hypothesized that CAT formulation promotes a 'shared language' across teams which leads to a more consistent treatment approach and protects against 'splitting and fragmentation' (Mitzman, 2010). In contrast to the approach adopted by Kellett et al. (2014), the current study seeks to explore how efficacy of CAT formulation based interventions can be measured by developing an understanding of the process through which the consultancy sessions influence team members' understanding of patients.

Repertory grids and attitudes

There is no clearly established method for examining the efficacy of formulation-based interventions (Davies et al., 2013). This is a difficult area to assess as individual understanding of a group formulation is an internal phenomenon. Repertory grid methods may provide a useful approach as they can provide a measure of the extent to which a formulation is 'shared' amongst participants. Sharing of psychological formulations in staff teams may reduce blaming and increase optimism about treatment (Berry, Barrowclough & Wearden, 2009). Repertory grids were developed from a PCP framework (Kelly, 1955). PCP suggests that each individual builds a representation of the world based on dichotomous constructs. The repertory grid has been widely used in

psychology research to measure attitudes and relationships (e.g. Fransella, Bell, & Bannister, 2004; Saúl et al., 2012), though often it has been used without reference to PCP (Bell, 2009). The repertory grid can be seen as an exploratory technique, drawing out a person's understanding of the world (Bell, 2009).

Repertory grids have historically been used in individual CAT psychotherapy. The similarity between reciprocal roles and the dichotomous constructs of the repertory grid, suggest that the repertory grid can be usefully applied in CAT. Ryle developed a relationships grid to examine interpersonal relationship dyads in CAT (Ryle & Lunghi, 1970). A repertory grid methodology has also been used to examine relationships between self-states in CAT (Golynkina & Ryle, 1999; Ryle & Marlowe, 1995). In forensic settings, repertory grids have been used to develop understanding of construal (internal representations) of offenders and examine the utility of CAT (Pollock, 1996; Pollock & Kear-Colwell, 1994). The repertory grid has also been used in a pre-post design to evaluate the efficacy of psychological therapy (Winter, 2003).

Repertory grids have been used within mental health research to explore patients' perception of the world or themselves (e.g. Castiglioni, Faccio, Veronese, & Bell, 2012; Castiglioni, Veronese, Pepe, & Villegas, 2014; Paget & Ellett, 2014; Randal, Bucci, Morera, Barrett, & Pratt, 2016). In recent years the repertory grid methodology has been used to examine staff perceptions of patient groups (Blundell, Wittkowski, Wieck, & Hare, 2012; Hare, Durand, Hendy, & Wittkowski, 2012; Ralley, Allott, Hare, & Wittkowski, 2009; Woodrow, Fox, & Hare, 2012). These staff based studies have employed a common methodology described by Ralley et al. (2009). This involves supplying a list of role titles relevant to the patient group of interest, termed elements, for example *ideal client*. Using the 'triadic opposite' method (Caputi & Reddy, 1999), the elements are used to elicit bipolar constructs from each individual participant (Fransella et al., 2004). Each element is then rated on each construct to provide the repertory gird.

One of the advantages of a repertory grid methodology is that it provides a rich range of potential summary indices (Caputi, Bell, & Hennessy, 2011). Relevant measures when assessing staff members' construal of patients include complexity (Bell, 2004) and identifying the constructs that each staff member associates with patients. The analysis of meaning requires some interpretation and can be understood as a qualitative approach.

A consistent finding across studies is that lower levels of cognitive complexity is associated with greater differentiation between staff and patient roles (Blundell et al., 2012; Hare et al., 2012). Cognitive complexity refers to the flexibility of an individual's construal, the ability to hold multiple perspectives (Caputi et al., 2011) and make fine distinctions between different elements (Hare et al., 2012). An increase in this cognitive flexibility, may be seen as an important outcome of CAT based reformulation with staff members as it would provide a basis for developing more nuanced perspectives of the patient.

Aims
The study aims to examine at the impact of Cognitive Analytic Therapy (CAT) reformulation sessions held for groups of staff in a medium secure forensic mental health setting. These sessions, informally termed 'CAT chats', are routinely provided at the clinic at the request of staff members. The study aims to measure if a CAT reformulation session leads to the participants (staff members) viewing the patient in a more consistent way.

Method
The study was an evaluation of current practice and the patient that was the subject of the CAT chat was typical of the patient group in the unit. To maintain confidentiality and anonymity no identifying details about the patient are presented in this report. The patient had a history of offending behaviour, a diagnosis of schizophrenia and was detained under the Mental Health (Care & Treatment) Scotland Act 2003. Permission was sought and granted from the patient's Responsible Medical Officer. The study received ethical approval from the School of Health in Social Science of the University of Edinburgh.

The study used a pre post design. The study used both individual and group level analysis of repertory grid data. There was no control sample. Prior to the CAT reformulation session those who consented to participate in the study completed the repertory grid. All pre-session grids were completed on the day of the reformulation session. Participants also completed a brief sheet rating their experience of CAT and the amount of contact they have with the patient being reviewed. Immediately following the CAT reformulation session, participants again completed the repertory grid.

Description of CAT reformulation session
CAT reformulation sessions last one hour and focus on developing a CAT based reformulation of the relationship between the patient and the staff team. The sessions are not limited to any one professional staff

group and any person working with the patient may attend. Two group reformulation sessions were held to increase the number of study participants, one preceding a Care Programme Approach (CPA) meeting and one during nursing staff handover. Both CAT sessions were facilitated by an accredited CAT therapist (JK), who had limited knowledge of the patient and had not previously been involved with the patient in a clinical role.

The CAT reformulation sessions were developed in line with the writings of Potter (2010). He describes how his approach to 'mapping' can teach all the staff of a team a 'relationally enhanced' approach to care and treatment. Essentially he describes three approaches to the mapping process, each more complex. Briefly these are 'sketches', 'life-maps' and 'therapy maps'. The most complex, a therapy map, is more akin to the traditional SDR used in CAT therapy. Of less complexity, he describes life-maps as trying to capture the 'bigger picture and key positions of someone's life experience as a whole'. These are built upon from a series of 'sketches'. 'Sketches' are described as early and impromptu sketches of patterns of interaction that can be drawn from the patient's initial accounts of interacting with the self, the others and the world.

One approach utilising these ideas for terms in forensic settings has been written about by Kemp, Bickerdike & Bingham (2017). They describe using a specific 'map and talk template' comprising a 'striving or battling place' a 'stuck' place, a 'hiding' place, a 'hoped for' place and a 'feared' place. Each position contains a reciprocal role or set of roles that are enacted.

The research described here took a slightly different approach, as described in Kirkland & Baron (2015) and similar to Potter's (2010) description of 'sketches'. Briefly, the team was asked to suggest words, descriptions, emotions and thoughts that came to mind in relation to the patient discussed. The approach sought to describe a reciprocal role or roles of the team in relation to the patient. It also sought to consider any procedures (traps, dilemmas and snags). The result was a diagram describing a simple procedural sequence.

Participants
Participants were Health or Social Work staff based in a medium secure unit. They were drawn from both the patients' treating clinical team and ward based staff. All participants had experience of working with the patient that was the subject of the CAT chat.

Eleven staff members took part in the two CAT chats about the same patient. The first chat, held prior to a CPA meeting had eight participants. The second CAT chat was ward based and had three participants. In all eight participants consented to take part in the study, with seven completing both pre and post study measures. The seven study participants included 4 Nurses, 1 Clinical Psychologist, 1 Social Worker, and 1 Forensic Psychiatrist.

Design of the Repertory Grid

There are two key differences in the methodology employed in the current study compared to the approached described by Ralley et al. (2009). Firstly, the current study used a standard grid rather than having participants elicit constructs. Using a standard grid allows for all participants to be compared to each other, and for changes to be measured before and after the reformulation session (Paget & Ellett, 2014). Supplying constructs assumes a commonality of understanding across participants and also assumes that the selected dimensions are the most relevant for the individual. The use of supplied constructs is not typical in repertory grid research though can be valid if the constructs are meaningful and similar to those that may have been produced spontaneously (Easterby-Smith, 1980; Fransella et al., 2004). Secondly, the current study adopts a pre-post design, with the grid being completed prior to and following the CAT session (Randal et al., 2016). This allowed for exploration of any individual or group level shifts following engaging in the contextual reformulation session.

As the focus of the grid was on measuring changes in staff perceptions of one patient, the selected constructs were based on discussion with the patient's individual therapist. The grid was also developed through consultation with CAT therapists to ensure that the constructs selected were meaningful and consistent with CAT. The grid was designed to access staff perceptions of patient roles, staff roles and self-roles. The measure was piloted on staff to test for acceptability and usability. Initial iterations of the grid used standard reciprocal role formats such as 'controlling – controlled' and 'rejecting – rejected'. On piloting, the 'ideal' elements were rated at a middle point on these constructs. This is consistent with the CAT model, which seeks to find the middle ground, however it represents difficulties for repertory grid methods, which suggest that there is a preferred pole in line with Kelly's personal construct theory (Fransella et al., 2004). For this reason, the constructs were reviewed to develop a more clearly 'preferred – not preferred' format (e.g. heard – ignored). The final grid developed contained ten elements and fifteen

bipolar constructs (Table 1). Elements were in the form of role titles, and included self-roles (*ideal self*), patient roles (*A typical restricted patient*), and colleague roles (*An admired colleague*). The role titles included both positive and negative roles. The roles were rated across 15 constructs on a 7 point Likert Scale.

Elements	Constructs		
Myself at work	Empathic	-	Cold
An admired colleague	Engaged	-	Dismissing
A colleague you dislike	Ignored	-	Heard
Myself outside of work	Moving Forward	-	Stuck
Patient X	Powerful	-	Powerless
Myself when working with	Competent	-	Incompetent
Patient X	Calm	-	Frazzled
A really difficult patient to work with	Respectful of Others	-	Disrespectful of Others
A typical Life sentence prisoner	Understood	-	A mystery
A patient you worked well with	Sticks to their guns	-	Easily influenced
A typical restricted patient	Pleases Others	-	Prioritises own needs
	Needs Reassurance	-	Self-confident
	Draws out parental feelings	-	Seems self-sufficient
	Caring	-	Cared for
	Containing of others	-	Not containing of others

Table 1: List of Elements and Bipolar Constructs

Analysis

To examine similarities of participants, Procrustes statistics were calculated and these values were used to compute a Principal Components Analysis Biplot for both pre and post treatment grids. This graphs all of the participants in a single space, demonstrating relative similarity to each other (Grice & Assad, 2009).

Group level analysis were conducted on pre and post grids using Generalized Proscrustes Analysis (GPA; Gower, 1975). This analysis was completed in IDIOGRID (Grice, 2006) using the methods described by Grice (Grice, 2007; Grice & Assad, 2009). A consensus grid combining all the grids at each timepoint was first created and then used to compute a principal components analysis. A further Multiple Groups Component Analysis, a form of extension analysis (Grice, 2007), was computed to demonstrate the relationship between elements and constructs for the

pre-intervention and post intervention grids. This plot would allow for interrogation of any relationships between elements' groupings, in particular to identify if there was differentiation of patient and non-patient roles.

To test for cognitive complexity the principal components were extracted for each participant's pre and post grids. The number of factors that accounted for 80% of variance was extracted from these results and analysed using Bell's (2004) descriptions of no principal components as fragmented, one principal component as monolithic and two or more as complex. To test relationships between pre and post grids for each participant the correlation between grids was calculated using Slater's analysis through IDIOGRID.

Results

Similarity among participants

Seven participants completed all the study measures. Six participants had prior experience of CAT, including attending a 5-day CAT skills training course. Similarity among participants is analysed using the Procrustes statistic where higher values indicate that grids are dissimilar to each other. Using these values, Principal Components Analysis (PCA) was completed to examine similarity between participants. At pre-treatment a two dimensional bi-plot (Figure 1) explained 74.34% of variance. The bi-plot demonstrates some similarities between participants. The raw Procrustes statistics range from 0.41 to 1.21 (Table 2) and as demonstrated in the graph, both P4 and P8 held significantly different views to the other participants. The remainder of the participants differed from each other in a relatively narrow range (0.41 to 0.72).

	P1	P2	P3	P4	P6	P7	P8
P1	0.00						
P2	0.54	0.00					
P3	0.51	0.72	0.00				
P4	0.99	1.12	0.92	0.00			
P6	0.41	0.71	0.63	0.93	0.00		
P7	0.53	0.68	0.71	0.92	0.47	0.00	
P8	0.93	0.82	1.11	1.21	1.06	1.06	0.00

Table 2: Procrustes statistics for pre intervention participants

	P1	P2	P3	P4	P6	P7	P8
P1	0.00						
P2	0.82	0.00					
P3	0.55	0.61	0.00				
P4	1.23	1.22	0.98	0.00			
P6	0.89	0.62	0.69	1.08	0.00		
P7	0.86	0.93	0.53	0.75	0.56	0.00	
P8	0.73	0.69	0.75	1.67	0.73	1.01	0.00

Table 3: Procrustes statistics for post intervention participants
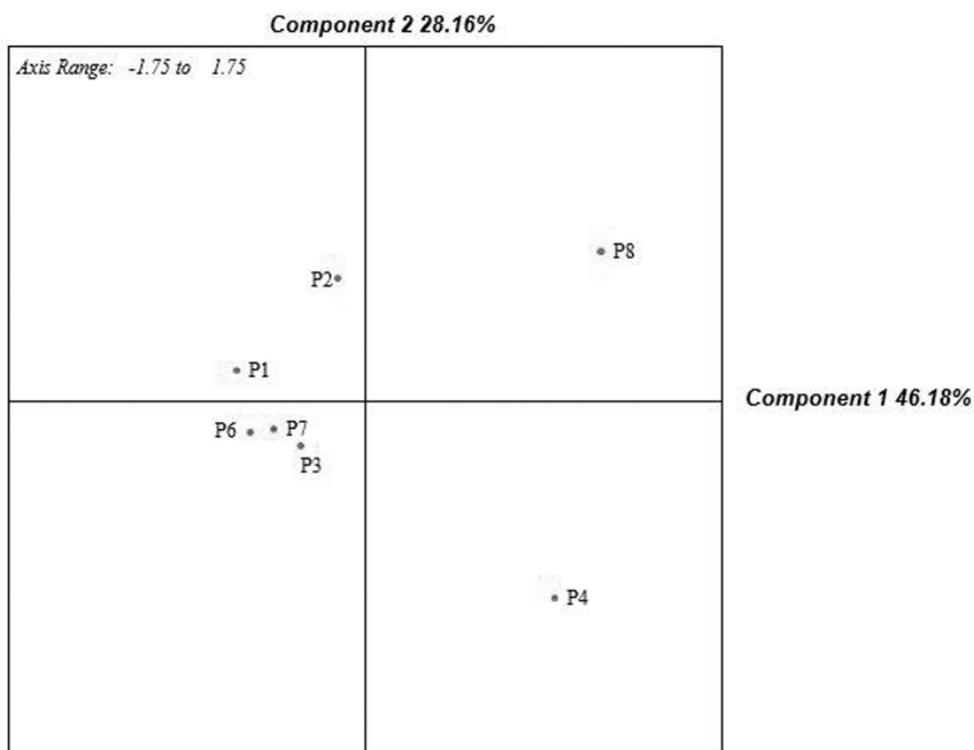
Figure 1: Biplot of Procrustes Statistics – pre intervention
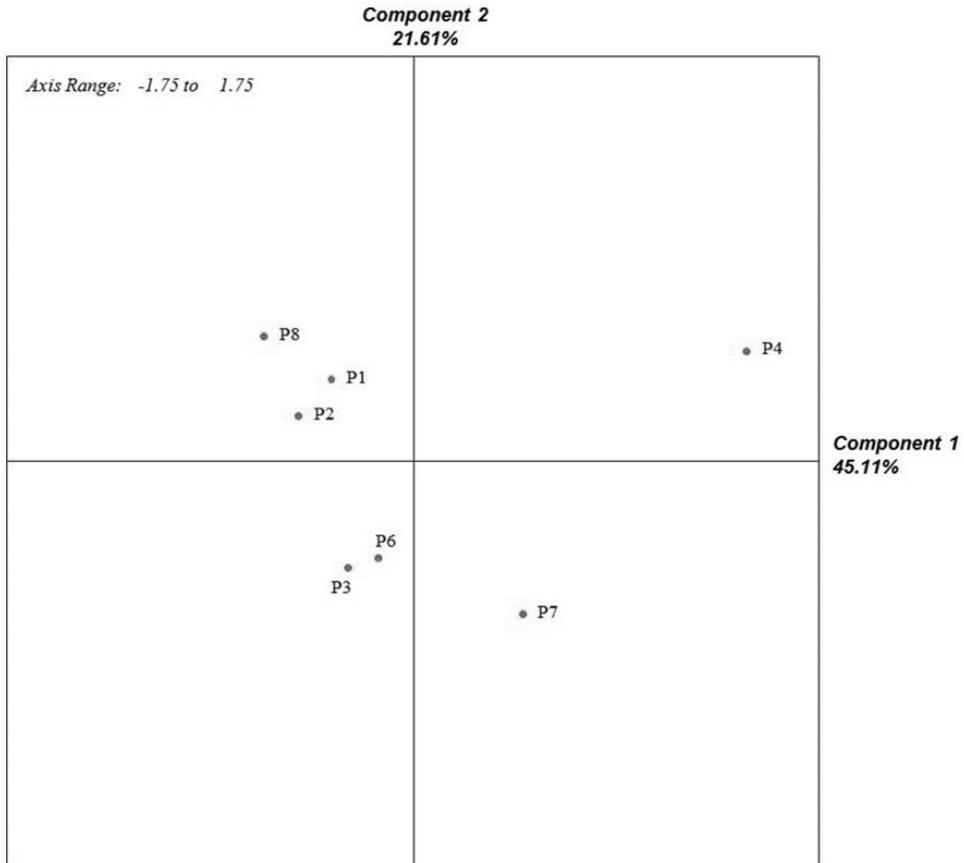
Figure 2: Biplot of Procrustes Statistics – post intervention

Following the intervention a two dimensional bi-plot (Figure 2) explained 66.72% of variance. The raw Procrustes statistics range from 0.53 to 1.67 (Table 3). The majority of participants appear to form two clusters (P1, P2, P8 and P3, P6, P7), with only P4 maintaining a markedly different perspective (Figure 2). However, within the 6 'grouped' particip-ants only P7 and P8 have a Procrustes statistic greater than 1 (1.01). The relative placements of the participants in space may be due to this difference (e.g. though they appear to have different relationships P3 is as similar to P1 (0.55) as P7 (0.53)). Compared to the pre-intervention grids, P8 has demonstrated the most shift, moving from a relative outlier to being similar to other grids.

Combined perspective on constructs and elements
The level of consensus was statistically significant for both pre and post treatment grids (Consensus pre = 0.83, p <0.01; Consensus post = 0.82; p <0.01). This is further evidence that the participants had a relatively similar construal system. The relatively higher residuals for P4

and P8 at pre intervention and P4 at post intervention is consistent with the findings of the Procrustes statistic (Table 4). The elements: *An admired colleague, A colleague you dislike* and *A really difficult patient to work with* demonstrated the greatest variance across participants at both pre and post intervention (Table 5). This is likely due to these elements being specific to each individual participant, for example, each participant would likely choose a different disliked colleague and attribute particular qualities to them.

Participant	Pre Intervention		Post Intervention	
	Residual	Total	Residual	Total
P1	1.48	15.40	2.52	14.05
P2	2.16	14.56	2.34	14.56
P3	2.17	14.71	1.55	15.88
P4	3.66	12.38	4.37	11.41
P6	1.78	15.35	2.01	15.21
P7	1.94	15.22	2.08	15.12
P8	3.76	12.39	3.02	13.77
Total	16.95	100.00	17.89	100.00
Consensus		0.83		0.82

Table 4: Residuals for Pre and Post treatment grids

Table 5: ANOVA Residuals for rated elements

Element	Pre Intervention		Post Intervention	
	Residual	Total	Residual	Total
Myself at work	1.12	7.04	1.36	7.70
An admired colleague	1.25	12.28	1.03	11.32
A colleague you dislike	1.96	23.07	3.65	21.51
Myself outside of work	1.91	7.76	1.50	7.00
Patient X	1.82	8.82	2.02	8.43
Myself when working with Patient X	1.42	4.87	1.19	4.90
A really difficult patient to work with	2.51	19.90	2.30	24.05
A typical Life sentence prisoner	2.09	6.66	1.85	6.16
A patient you worked well with	1.72	5.64	1.68	5.07
A typical restricted patient	1.15	3.67	1.31	3.86
Total	16.95	100.00	17.89	100.00

A consensus grid was calculated through GPA at each time-point and from this an extension analysis was used to generate a PCA (Figure 3, 4) (Grice & Assad, 2009). Constructs associated with each dimension (those with higher than 0.70 factor ladings) and the number of times they appeared are reported in the figures (Grice, 2007). The PCA of pre-intervention grids (Figure 3) explained 60.09% of the variance. The first component accounted for 45.35% of variance and highlights a dimension of negatively attributed construct poles (dismissing, cold, stuck, disrespectful of others) being associated with negative elements (A colleague you dislike, A really difficult patient to work with). Self and admired elements were more closely associated with positive poles of the constructs whilst patient roles were more closely associated with negative poles. This dimension appeared to differentiate patient and non-patient roles. Component two, which was associated with 14.74% of variance related to items around self-sufficiency and self-confidence. This dimension also differentiated patient and non-patient elements, though there was no differentiation between patient elements on this dimension. The construct poles, *needs reassurance, draws out parental feelings* and *easily influenced* were those identified as relevant for Patient X during the development of the repertory grid.

loadings???

Figure 3: Biplot of Consensus Matrix for Pre Intervention Grids
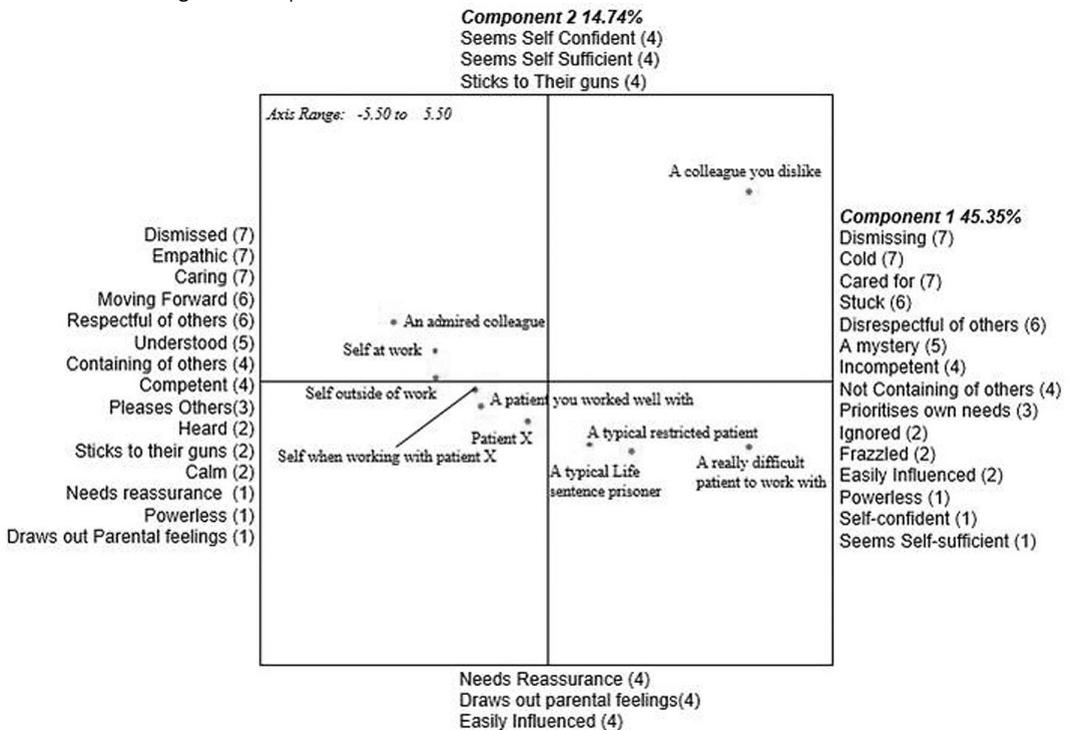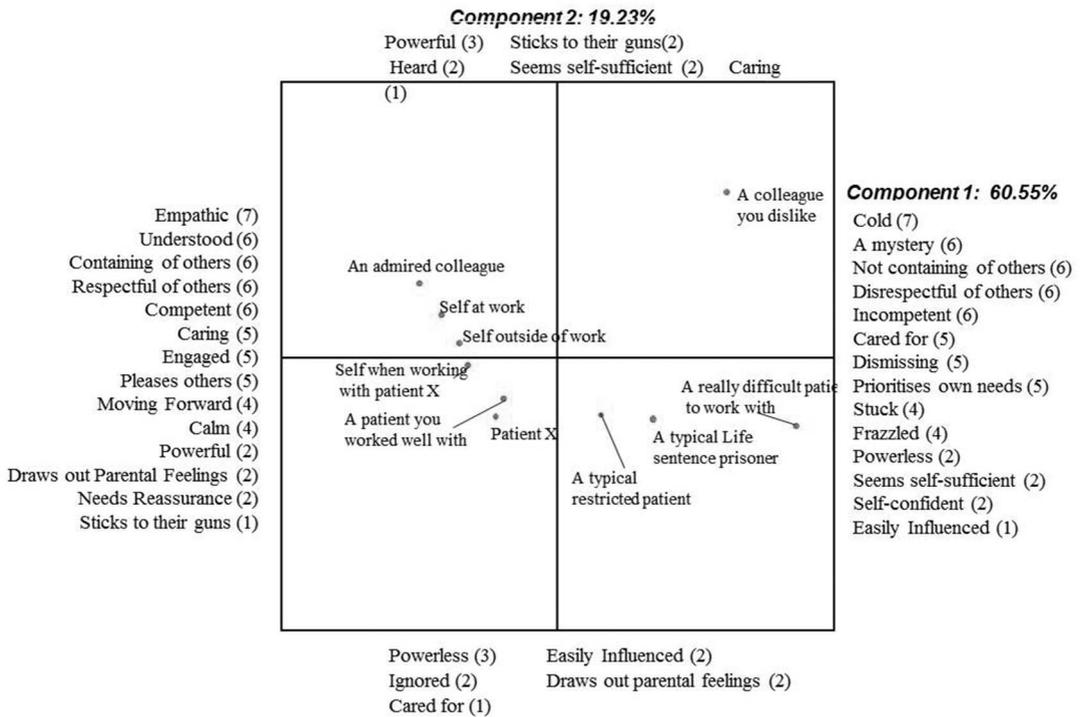
Figure 4: Biplot of Consensus Matrix for Post Intervention Grids

The two components extracted in the PCA for the post intervention grids (figure 4) accounted for 79.78% of variance. The first component accounted for 60.55% of variance and was broadly consistent with the primary dimension extracted in the pre-intervention analysis and differentiated patient and non-patient roles. The relative position of the elements was broadly consistent, with patient and non-patient roles being separated, though there is some shift in *Patient X* towards the other elements identified towards the positive pole. The second component (19.23%) was broadly consistent with the pre-intervention PCA, being formed from constructs related to competence. *Patient X* has moved to be more strongly associated with the constructs *easily influenced, draws out parental feelings* and *needs reassurance*. This is consistent with the content of the CAT chats. *Patient X* was most closely associated with *A patient you worked well with* perhaps indicating that staff felt that they could have a positive working relationship with the patient.

Individual outcomes
The correlation between pre and post grids was computed for all seven participants. This demonstrated correlations in the range of 0.56 to 0.79. Consistent with the Procrustes analysis P8 demonstrated the lowest

correlation between pre and post intervention grids, indicating a greater level of shift than evident in the other participants. Interestingly, the element *Self when working with patient X* showed a low pre-post correlation (< 0.5) for six of seven participants. To examine changes in complexity the measure of Percentage Variance Accounted for by First Factor (PVAFF) and number of components accounting for 80% of variance was calculated (Bell, 2004; Caputi et al., 2011; Hare et al., 2012). A lower PVAFF value indicates greater cognitive complexity. A higher number of factors indicates greater complexity (Bell, 2004). No clear pattern emerged in the data. Two participants demonstrated increased complexity, whilst five demonstrated decreased complexity or no change.

	Pre-Post Correlation	Pre Intervention		Post Intervention	
		PVAFF* Pre Intervention	Number of Components to > 80% variance explained	PVAFF Post Intervention	Number of Components to > 80% variance explained
P1	0.64	55.18	3	40.31	4
P2	0.60	54.88	3	67.39	2
P3	0.64	39.10	4	55.69	3
P4	0.76	52.01	3	63.76	3
P6	0.75	61.13	3	73.29	2
P7	0.79	65.85	2	58.00	3
P8	0.56	64.97	2	74.07	2

*Percentage Variance Accounted for by First Factor

Table 6: Measures of Cognitive Complexity

To validate the findings of the group level analysis, the individual PCAs for each grid were examined (Ralley et al., 2009). The differentiation between staff and patient roles was present in all pre intervention grids except for P4. However, *Patient X* was more closely associated with self-elements than with other patient elements in the post intervention grids for five participants (P1, P2, P3, P7 and P8), consistent with the overall post intervention grid (Figure 4). At post intervention, four participants (P1, P2, P5, P7) aligned *Patient X* with a component containing themes relevant to the CAT reformulation discussion such as *needs reassurance,* twice??? *draws out parental feelings* and *draws out parental feelings*. This shift may indicate a positive effect of the CAT reformulation session in generating useful shifts in how participants saw *Patient X*. Post session validation was completed with four participants, where the main patterns present in the PCA of their grids were discussed and agreed.

Discussion

The study, using a novel methodology, aimed to examine the impact of a CAT reformulation session on the extent to which a common understanding of a patient was shared across a staff team. The repertory grid measure was acceptable to staff as a means to test changes as a result of the intervention. The grid developed led to a meaningful pattern of representation, both in the group outcomes presented and in individual outcomes. The attribution of observed changes to CAT specific components is tentative given the lack of a control group.

Previous research looking at repertory grids with staff teams had sample sizes of 10-14 staff members (Ellis, 1999; Hare et al., 2012; Ralley et al., 2009; Woodrow et al., 2012), compared to the eight participants of the current study. Though repertory grid method provides rich data, it relies on a range of further measures or analysis for interpretation. In particular, multiple grid analysis relies on assumptions of similar approaches among participants of rating and understanding items (Ralley et al., 2009; Woodrow et al., 2012). The number of constructs used (15) was higher than in several studies and may have been a factor in leading to more principal components in the participants' grids (Caputi et al., 2011). The two dimensional graphs used in the analysis may obscure some differentiation between elements as further factors are not represented. A further difficulty encountered was that the participants overall had extensive CAT knowledge. This may have contributed to the low level of correlation for the *Self when working with patient X item* from pre intervention to post intervention, indicating a willingness to shift positions. This is consistent with CAT, which emphasises that our relational positions shift according to context. The potential of contextual reformulation to leave staff members feeling exposed (Davies et al., 2013) may have been more readily acceptable to this group due to their pre-existing knowledge of this approach. During piloting, participants anecdotally suggested the task was interesting and thought provoking, demonstrating the utility of the repertory grid as a tool, but unfortunately leading to difficulties in tapping underlying systems of construal. The shift to using constructs less aligned to typical CAT reciprocal roles overcame this difficulty.

Consistent with previous research on staff attitudes (e.g. Ralley et al., 2009) participants separated patient and non-patient roles at pre-intervention. Patient elements were more closely associated with negative construct poles as compared to non-patient elements. However, some patient roles, including *Patient X,* were identified as more similar to the

non-patient elements than to other patient elements. The *Patient I worked well with* element was generally placed close to the self-elements indicating that it may have been construed as an *ideal client* role commonly used in personal construct research on attitudes (Ralley et al., 2009). The *Self when working with Patient X* element was the most closely related of the self-elements to *Patient X*. In considering the therapeutic relationship, this can be seen as positive, as the staff member shifts their position to be more attuned to *Patient X*. Consistent with CAT, this closeness may also represent staff members being influenced by the reciprocal roles of *Patient X* (Ryle & Kerr, 2002).

Following the CAT chat, there was some indication that participants clustered together more closely in terms of their construal of *Patient X*, with six of seven participants having relatively low levels of difference (Table 3, Figure 2). This may indicate a more consistent conceptualisation of *Patient X* following the CAT reformulation session, and may indicate a benefit of this approach in reducing 'splitting' in teams (Summers, 2006). Case formulation without direct involvement of the patient risks ascribing difficulties to internal deficits (Moore & Drennan, 2013). CAT based reformulation due to its relational focus, may overcome this difficulty.

An unexpected finding was no increase in cognitive complexity found following the CAT reformulation session. The results indicated no clear pattern, though a tightening of construal was noted for several participants. Looking at the individual PCA graphs, it appears that for several participants the intervention was associated with the development of a second component relevant to the content of the CAT reformulation session. This process may explain the reduced complexity, due to the CAT session focusing in on key reciprocal roles relevant to *Patient X*. This finding highlights the specific nature of the CAT chat as an intervention, it is focused on work between a team and an individual patient as compared to approaches focused on developing skill in formulation in general, which may increase flexibility of understanding.

Conclusion

The current study provides some preliminary evidence that CAT based formulation sessions can increase consistency amongst staff members' in their individual construal of a patient. It also demonstrates use of repertory grid data in CAT and the rich suite of grid analysis techniques which can be useful for both research and clinical practice.

The study found some increase in the similarity of participant grids following completion of the CAT chat. A combined principal components analysis of all participants' grids demonstrated a shift in how the subject of the CAT chat was seen following the session. The shift was consistent with the map developed in the CAT chat sessions. The paper also demonstrated measures of cognitive complexity as well as individual level analysis of repertory grid data. The overall shift in terms of how *Patient X* was construed as a result of the CAT chat was positive, if limited. The scope for participants to demonstrate change was limited as the solution derived at pre-intervention showed that staff generally saw *Patient X* in a positive light. A longer term follow-up may demonstrate further changes as the staff use the reformulation developed to work with *Patient X.*

The implementation of CAT reformulation sessions for staff teams is supplemented by staff training. Six of the participants in the current study had attended previous CAT training. This prior exposure to CAT informed practice may have influenced the generally positive perception of *Patient X* prior to the intervention. Further research with staff members with limited CAT exposure may be useful in demonstrating the extent of shift in perspective achievable through this approach.

The model used in the current study does not involve the patient directly, and rather focuses on the staff team's perspective of working with the patient. This approach may have the added benefits of giving staff space to think creatively and express concerns (Summers, 2006). CAT informed reformulation contrasts with training in developing formulations (Minoudis et al., 2013), instead of using a skilled facilitator to draw together the perspectives of the participants in the reformulation sessions. The British Psychological Society (BPS, 2007) highlights the role of formulation in teams as a means to influence a culture towards psychological understandings. CAT informed reformulation sessions, with their explicit relational focus, may be particularly helpful in developing a shared language amongst staff teams and increase psychological understanding of the patient. □

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